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CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Dear Deployment Committee Members,

We look forward to our meeting on May 2nd at 1pm at CEFIA in Rocky Hill. We have a full agenda which includes:

- **Review of Onsite Distributed Generation (OSDG) RFP proposals**
  The OSDG program is a major program that CEFIA is phasing out as the ZREC and LREC programs move into the commercial market. This is the first of two groups of proposals under the final OSDG program RFP.

- **Review of two financing programs, Campus Efficiency Now and an Open Market ESCO for Multi-Unit Housing**
  We're excited to discuss and receive feedback on our first two financing programs. We believe both have great potential in their respective markets.

- **Review of the Residential Solar PV Investment Program**

Materials for the meeting can be found at the link below. There is a memo on each that summarizes the program. We have included numerous background documents for further information. Please let us know if you have any questions or concerns.
We'll see you on Wednesday.

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

AGENDA

Deployment Committee of the
Clean Energy Finance and Investment Authority
865 Brook Street, Rocky Hill, CT 06067

Wednesday, May 2, 2012 – Special Meeting
1:00-3:00 p.m.

Staff Invited: Jessica Bailey, Christin Cifaldi, Mackey Dykes, Brian Farnen, Bryan Garcia, Dale Hedman, David Ljungquist, and Rick Ross

1. Call to order

2. Public Comments – 5 minutes

3. Approval of meeting minutes for February 9, 2012* – 5 minutes

4. Review and approval of Onsite Distributed Generation RFP proposals* – 30 minutes

   a. Solar PV projects 100 kW to 250 kW – 15 minutes
   b. Fuel cell projects – 15 minutes

5. Update on the ARRA-SEP grant repurposing and discussion of residential clean energy financing programs in development – 60 minutes

6. Update, review and recommend approval of modifications to the Residential Solar Investment program* – 30 minutes

7. Adjourn

*Denotes item requiring Committee action
** Denotes item requiring Committee action and recommendation to the Board for approval

Call-in information: 1-877-885-3221 Access code: 8446562

Next Meeting: Friday, August 17, 2012
Clean Energy Finance and Investment Authority, 865 Brook Street, Rocky Hill, CT

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

RESOLUTIONS

Deployment Committee of the
Clean Energy Finance and Investment Authority
865 Brook Street, Rocky Hill, CT 06067

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   a. Solar PV projects 100 kW to 250 kW – 15 minutes

   RESOLUTION

   b. Fuel cell projects – 15 minutes

   RESOLUTION

5. Update on the ARRA-SEP grant repurposing and discussion of residential clean energy financing programs in development – 60 minutes

6. Update, review and recommend approval of modifications to the Residential Solar Investment program* – 30 minutes

   RESOLUTION

   WHEREAS, Section 106 of Public Act 11-80 “An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut’s Energy Future” (the Act) requires CEFIA to design and implement a Residential Solar Photovoltaic Investment Program (Program Plan) that results in a minimum of thirty (30) megawatts of new residential PV installation in Connecticut before December 31, 2022.

   WHEREAS, pursuant to Section 106 of the Act, CEFIA has prepared a Program Plan to

offer direct financial incentives, in the form of performance-based incentives or expected performance-based buydowns, for the purchase or lease of qualifying residential solar photovoltaic systems.

WHEREAS, CEFIA has prepared a declining incentive block schedule ("Schedule") that: (1) provides for a series of solar capacity blocks the combined total of which shall be a minimum of thirty megawatts and projected incentive levels for each such block, (2) provides incentives that are sufficient to meet reasonable payback expectations of the residential consumer, (3) provides incentives that decline over time and will foster the sustained, orderly development of a state-based solar industry, (4) automatically adjusts to the next block, and (5) provides comparable economic incentives for the purchase or lease of qualifying residential solar photovoltaic systems.

WHEREAS, the Deployment Committee seeks to revise the Schedule to (1) address the findings from the program data obtained since approval of the original incentive schedule,(2) address changes in the solar market ascertained since approval of the original incentive schedule which would affect the expected return on investment for a typical residential solar photovoltaic system under the performance based incentive model by twenty percent or more, and (3) ensure that third party financing companies enter the market to help serve the low and middle income markets.

NOW, therefore be it:

RESOLVED, that the Deployment Committee hereby recommends to the Board of Directors for approval the revised Schedule of Incentives.

RESOLVED, that the Deployment Committee hereby recommends to the Board of Directors a Step 2 budget increase of six million dollars to a total of $11 million dollars.

RESOLVED, that this Board action is consistent with Section 106 of the Act.

7. Adjourn

*Denotes item requiring Committee action
** Denotes item requiring Committee action and recommendation to the Board for approval

Call-in information: 1-877-885-3221 Access code: 8446562

Next Meeting: Friday, August 17, 2012
Clean Energy Finance and Investment Authority, 865 Brook Street, Rocky Hill, CT

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #1

Call to Order

May 2, 2012

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Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #2

Public Comments

May 2, 2012

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #3

Approval of Meeting Minutes of February 9, 2012

May 2, 2012

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Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #4

Review and Approval of OSDG RFP Proposals

May 2, 2012

Comprehensive Plan

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- **Programs in Transition**

- **On Site Distributed Generation "Best of Class" Programs** – final round of incentives as we transition to the ZREC-LREC program

- **RFP Issue Date: September 12, 2011**

  - $4.5 million to support ZREC (Solar PV)
    - Less than or equal to 100kWac - $1.5 million
    - Greater than 100kWac to 250kWac - $3.0 million

  - $3.5 million to support LREC (Fuel Cell and other low emissions technologies)

Project Recommendation Summary

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Solar PV Projects Scored (>100kWac to 250kWac) – 9

Recommended Solar PV Projects (>100kWac to 250kWac) – 7

Total Project kW – 1,658.7

Total Project Incentive Recommendation - $2,954,194

Recommended Fuel Cell Projects – 2

Total Project kW – 1,000.0

Total Project Incentive Recommendation – $1,506,645

OSDG PV Evaluation Criteria

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PV Project Economics	40%
Deployment of the Technology	20%
Probability of Completion and Feasibility	20%
Public and Unique Ratepayer Benefits	20%

OSDG PV Evaluation Summary

Projects Greater than 100 kW up to 250 kW (Competitive RFP)

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Ranking By Score	Project Name	Type of System Owner	kWptc	Evaluation Score Total Points	Total Cost	Total Cost per kWptc	Grant Recommendation	Cum. Grant Recommendation	Grant % of Total Cost	Grant per kWptc
1	Goodwives Shopping Center Stop & Shop	Outright Purchase	213.0	67.5	$887,915	$4,169	$406,155	$406,155	45.7%	$1,907
2	John C. Mead School	PPA	226.3	64.0	$1,029,600	$4,550	$338,908	$745,063	32.9%	$1,498
3	The Eagle Leasing Company	Outright Purchase	135.5	63.0	$542,864	$4,006	$221,166	$966,229	40.7%	$1,632
4	Stone Resources, LLC / Galleria Design Center	Outright Purchase	216.5	58.0	$1,055,602	$4,875	$585,495	$1,551,724	55.5%	$2,704
5	Lake Gaillard Treatment Plant	PPA	273.5	54.5	$1,248,687	$4,566	$681,906	$2,233,630	54.6%	$2,493
6	Firestone Building Products	Outright Purchase	108.0	52.5	$528,622	$4,894	$313,200	$2,546,830	59.2%	$2,899
7	RHAM High School	PPA	154.3	51.5	$788,600	$5,111	$407,364	$2,954,194	51.7%	$2,640
8	Valley Regional High School	Outright Purchase	197.8	51.0	$1,000,328	$5,057	$586,640	$3,540,834	58.6%	$2,966
9	DC Bloomfield Cinemas LLC	PPA	133.7	46.0	$668,250	$4,996	$327,970	$3,868,804	49.1%	$2,452
Totals					$7,750,468		$3,868,804			

Projects Recommended – Green
Projects Not Recommended - Orange

OSDG Fuel Cell Evaluation Summary
(Rolling Applications)

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Projects	Project Name	Type of System Owner	kW	Total Cost	Total Cost per kW	Grant Recommendation	Cum. Grant Recommendation	Grant % of Total Cost	Grant per kW
1	Macy's Distribution Warehouse	Outright Purchase	600.0	$4,133,044	$6,888	**$913,121**	**$913,121**	**22.1%**	$1,522
2	Western CT State University	PPA	400.0	$2,805,389	$7,013	**$593,524**	**$1,506,645**	**21.2%**	$1,484
Totals				**$6,938,433**		**$1,506,645**			

Projects Recommended – Green
Projects Not Recommended - Orange

Goodwives Shopping Center:
Stop & Shop Supermarket

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Host:	Stop & Shop Supermarket Company, LLC - Urstadt Biddle Properties Inc.
Business	Supermarket
Third Party Owner:	n/a
City/Town of Host:	Darien
Installer:	Martifer Solar USA
Ranking and Score:	1 - 67.5
System Size /kWptc:	213.0
Design Factor:	91.0%
Estimated 1st Year Generation (kWhs):	246,451
Generation as a % of Usage (Annual):	11.3%
System Cost:	$887,915
System Cost /kWptc:	$4,188
Grant Recommendation:	$406,155
Grant Recommendation as a % of Total Cost:	45.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.236
Requested Grant ZREC Equivalent /kWh:	$0.236

John C. Mead School

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Host:	John C. Mead School
Business	Public School
Third Party Owner:	SunLight General Capital, LLC
City/Town of Host:	Ansonia
Installer:	Martifer Solar USA
Ranking and Score:	2 - 64.0
System Size /kWptc:	226.3
Design Factor:	91.7%
Estimated 1st Year Generation (kWhs):	267,351
Generation as a % of Usage (Annual):	40.1%
System Cost:	$1,029,600
System Cost /kWptc:	$4,549.71
Grant Recommendation:	$338,908
Grant Recommendation as a % of Total Cost:	32.9%
Grant Recommendation ZREC Equivalent /kWh:	$0.165
Requested Grant ZREC Equivalent /kWh:	$0.224

The Eagle Leasing Company

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Host:	The Eagle Leasing Company
Business	Leasing Company
Third Party Owner:	n/a
City/Town of Host:	Orange
Installer:	Dynamic Solar, LLC
Ranking and Score:	3 - 63.0
System Size /kWptc:	135.5
Design Factor:	89.3%
Estimated 1st Year Generation (kWhs):	149,513
Generation as a % of Usage (Annual):	48.3%
System Cost:	$542,864
System Cost /kWptc:	$4,006
Grant Recommendation:	$221,166
Grant Recommendation as a % of Total Cost:	40.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.192
Requested Grant ZREC Equivalent /kWh:	$0.271

Galleria Design Center

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Host:	Stone Resources,LLC / Galleria Design Center
Business	Private Company
Third Party Owner:	n/a
City/Town of Host:	Middletown
Installer:	Alteris Renewables
Ranking and Score:	4 - 58.0
System Size /kWptc:	216.5
Design Factor:	91.9%
Estimated 1st Year Generation (kWhs):	242,006
Generation as a % of Usage (Annual):	23.2%
System Cost:	$1,055,602
System Cost /kWptc:	$4,876
Grant Recommendation:	$585,495
Grant Recommendation as a % of Total Cost:	55.5%
Grant Recommendation ZREC Equivalent /kWh:	$0.314
Requested Grant ZREC Equivalent /kWh:	$0.352

Lake Gaillard Water Treatment Plant

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Host:	Lake Gaillard Treatment Plant
Business	Public Water Polution Control Facility
Third Party Owner:	Smart Energy Capital, LLC
City/Town of Host:	North Branford
Installer:	RGS Energy
Ranking and Score:	5 - 54.5
System Size /kWptc:	273.5
Design Factor:	83.6%
Estimated 1st Year Generation (kWhs):	297,572
Generation as a % of Usage (Annual):	13.0%
System Cost:	$1,248,687
System Cost /kWptc:	$4,566
Grant Recommendation:	$681,906
Grant Recommendation as a % of Total Cost:	54.6%
Grant Recommendation ZREC Equivalent /kWh:	$0.298
Requested Grant ZREC Equivalent /kWh:	$0.310

Firestone Building Products

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Host:	Firestone Building Products
Business	Private Company
Third Party Owner:	n/a
City/Town of Host:	Bristol
Installer:	DC Power Systems
Ranking and Score:	6 - 52.5
System Size /kWptc:	108
Design Factor:	92.8%
Estimated 1st Year Generation (kWhs):	125,332
Generation as a % of Usage (Annual):	5.7%
System Cost:	$528,622
System Cost /kWptc:	$4,895
Grant Recommendation:	$313,200
Grant Recommendation as a % of Total Cost:	59.2%
Grant Recommendation ZREC Equivalent /kWh:	$0.324
Requested Grant ZREC Equivalent /kWh:	$0.383

RHAM Regional High School

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Host:	RHAM High School
Business	Public School
Third Party Owner:	DBS Energy Inc
City/Town of Host:	Hebron
Installer:	DBS Energy Inc
Ranking and Score:	7 - 51.5
System Size /kWptc:	154.3
Design Factor:	93.0%
Estimated 1st Year Generation (kWhs):	179,749
Generation as a % of Usage (Annual):	7.2%
System Cost:	$788,600
System Cost /kWptc:	$5,111
Grant Recommendation:	$250,300
Grant Recommendation as a % of Total Cost:	31.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.294
Requested Grant ZREC Equivalent /kWh:	$0.181

Valley Regional High School

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Host:	Valley Regional High School
Business	Public School
Third Party Owner:	n/a
City/Town of Host:	Deep River
Installer:	American Solar & Alternative Power
Ranking and Score:	8 - 51.0
System Size /kWptc:	197.8
Design Factor:	88.5%
Estimated 1st Year Generation (kWhs):	224,020
Generation as a % of Usage (Annual):	21.4%
System Cost:	$1,000,328
System Cost /kWptc:	$5,057
Proposed Grant:	$586,640
Proposed Grant as a % of Total Cost:	58.6%
Proposed Grant ZREC Equivalent /kWh:	$0.256
Requested Grant ZREC Equivalent /kWh:	$0.256

DC Bloomfield Cinemas

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Host:	DC Bloomfield Cinemas LLC
Business	Private Company
Third Party Owner:	Verde Electric Corporation
City/Town of Host:	Bloomfield
Installer:	Green Hybrid Energy Solutions Inc
Ranking and Score:	9 - 46.0
System Size /kWptc:	133.7
Design Factor:	94.4%
Estimated 1st Year Generation (kWhs):	156,469
Generation as a % of Usage (Annual):	59.3%
System Cost:	$688,250
System Cost /kWptc:	$5,148
Proposed Grant:	$327,970
Proposed Grant as a % of Total Cost:	47.7%
Proposed Grant ZREC Equivalent /kWh:	$0.272
Request Grant ZREC Equivalent /kWh:	$0.308

Macy's Distribution Warehouse

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Host:	Macy's Inc.
Business	Distribution Warehouse
Third Party Owner:	n/a
City/Town of Host:	Cheshire
Installer:	Bloom Energy
System Size	600 kW
Avalability	95.00%
Estimated Annual Generation (kWhs)	4,588,488
Generation as a % of Usage (Annual)	90.0%
System Cost:	$4,133,044
System Cost /kW	$6,888
Grant Recommendation	$913,121
Grant Recommendation as a % of Total Project Cost	22.1%
Grant Recommendation LREC Equivalent /kWh	$0.060

Western CT State University

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Host:	Western CT State University
Business	University
Third Party Owner:	UTC Power
City/Town of Host:	Danbury
Installer:	UTC Power
System Size	400 kW
Availability	95.00%
Estimated Annual Generation (kWhs)	3,328,800
Generation as a % of Usage (Annual)	100.0%
System Cost:	$2,805,389
System Cost /kW	$7,013
Grant Recommendation	$593,524
Grant Recommendation as a % of Total Project Cost	21.2%
Grant Recommendation LREC Equivalent /kWh	$0.056

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Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #5

Update on ARRA-SEP Grant Repurposing and Discussion of Residential Clean Energy Financing Program

May 2, 2012

ARRA-SEP Program

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- **Connecticut Grant – provided $38.50 million by DOE**
  - to support renewable energy, energy efficiency, alternative fuel vehicles and infrastructure and building code and operator training
  - Managed by OPM initially, and now is overseen by DEEP
- **Clean Energy Fund – provided $20.00 million by OPM**
  - New programs – solar thermal and geothermal
  - Existing programs – fuel cells and solar PV
- **Clean Energy Finance and Investment Authority – repurposed with DEEP $8.25 million**
  - BOD requested that all funds be expended and gave authority to President to find a solution
  - Worked with DEEP and DOE to create $8.25 million financing program for the residential sector
    - $1.25 million Clean Energy Financial Innovation RFP – DEEP just added an additional $110K
    - $7.00 million Residential Clean Energy Financing Program – CEFIA working on now

Goals

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Attract and deploy capital to finance the clean energy goals for Connecticut

Develop and implement strategies that bring down the cost of clean energy in order to make it more accessible and affordable to consumers

Reduce reliance on grants, rebates and other subsidies and move towards innovative low-cost financing of clean energy deployment

HARCOURT BROWN AND CAREY: MICHIGAN SAVES PROGRAM

- Unsecured loan
- Min of 680 for most loans/640 for some
- 50% Debt to Income
- Centralized intake and approval
- Close completed by credit unions
- Servicing done by credit unions
- Credit unions hold paper through life of loan
- Almost no marketing budget (all done through contractors) yet still a strong uptake
- **Credit enhancement: 5% of loan portfolio. $3,000,000 = $60,000,000 loan program.**

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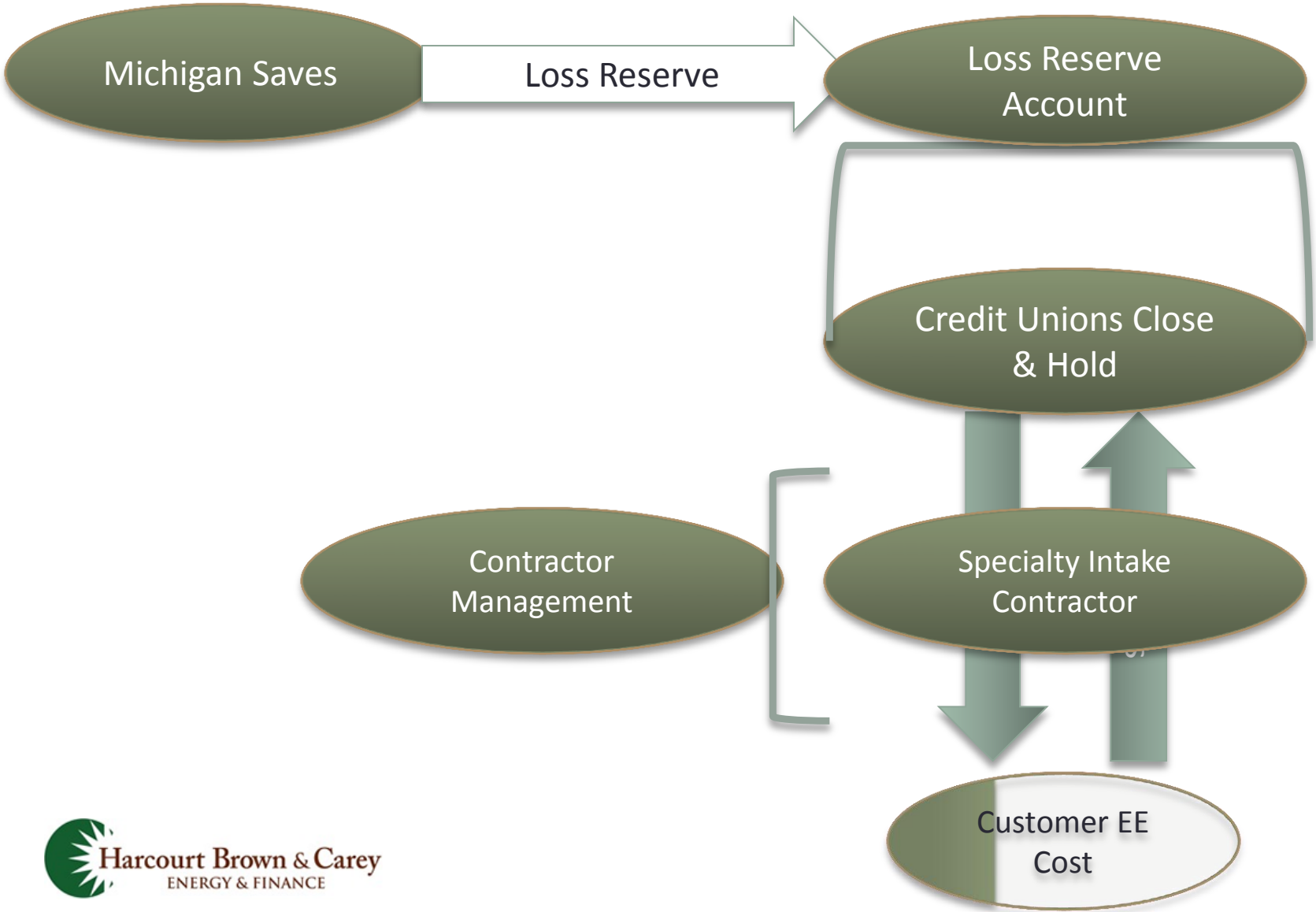
Michigan Saves (Consumer Lending, Credit Union Capital)



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DEFINITIONS

- **Credit Enhancement** – anything that improves the chances that financing will be repaid. Comes in one of several forms:

  - **Loan Loss Reserve** – sets aside (reserves) cash to cover potential losses (in case of default) cash in the reserve fund earns zero to minimal return. For instance, a 5% loan loss reserve on a $60 million loan portfolio would cover up to $3 million of a capital provider's losses on that loan portfolio.

  - **Loan Guarantee** – covers the entire amount of a capital provider's losses on a portfolio of loans. A guarantee differs from a loss reserve because it is not capped at the amount of money set aside in the reserve.

  - **Senior/Subordinate Capital Structure** – consists of subordinated capital this is invested in a portfolio of loans or a loan for which CEFIA will earn a return. However in case of a default, the subordinated capital absorbs all losses. Senior capital does not absorb any losses until the subordinated capital is exhausted. This structure acts attracts senior capital because the subordinated capital takes on the majority of the risk -- but gives CEFIA a return on its subordinated investment.

  - **Third Party Insurance** – insurance that covers a portion of total defaults, up to a capped amount. Instead of setting funds aside in a reserve account to cover losses (as in a loss reserve), the CEFIA would pay an insurance premium to a private insurer. Loan loss insurance is not easy to secure at the moment.

REFERENCES
http://www4.eere.energy.gov/wip/solutioncenter/finance_guide/content/credit_enhancements

CEFIA'S RESIDENTIAL PROGRAM OBJECTIVE:

- Develop a Residential Financing Program to promote and fund:
  - Energy efficiency improvements and solar thermal installations
  - Renewable energy projects such as solar photovoltaic (PV)

- The Program will include:
  - Contractor management
  - Origination and servicing
  - Investors
  - Financial incentives/credit enhancements

- CEFIA will accomplish these goals by partnering with industry and financial institutions. Financial institution partnerships likely in the form of:
  - Credit enhancements (loss reserves and/or subordinated debt)
  - Marketing partnerships.
  - Structures to ensure quality control and contractor management.

Typical Projects: Energy Efficiency

Measure	Cost	Annual Savings	Monthly Savings
Wall Insulation	$1,388	$1,089	$90.75
Air Sealing	$1,197	$588	$49.00
Insulation	$1,270	$618	$51.50
Duct Sealing	$732	$132	$11.00
Ceiling Insulation	$2,719	$344	$28.67
New Air Conditioning	$5,211	$48	$4.00
Total		$2,819	$235

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REFERENCES

Based on CEFIA ARRA-funded CT Energy Savings for pilot program in CT. Note that this reference project may be larger than many actually installed in homes.

Typical Projects Solar Hot Water

Scope: Solar Hot Water System

Installation cost, $11,527

Rebate, $3,019, Federal ITC, $2,552

Net Cost (out-of-pocket), $5,956

Savings Compared to:	% of CT Households*	Assumed Fuel Price	Annual Savings	Monthly Savings
Electric	15%	$0.184/kWh	$663	$55.25
Oil	52%	$3.50/gallon	$564	$47
Natural Gas	29%	$1.50/therm	$284	$24

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REFERENCES

Based on CEFIA ARRA-funded CT SHW Program Results

* http://www.eia.gov/state/state-energy-profiles-data.cfm?sid=CT#Consumption

Product Types: For Discussion

The CEFIA goal is to partner with financial institutions to offer up to 3 financial products

Unsecured home improvement loan

- Quick approval
- A rate that:
  - Is attractive to borrowers.
  - Reflects CEFIA willingness to bear some credit risk
  - Reflects unsecured position and risk profile
- Loan amounts up to $15k-$20k
- Term:
  - Attractive to borrowers and helps to sell the product
  - Aligned with rate and risk profile

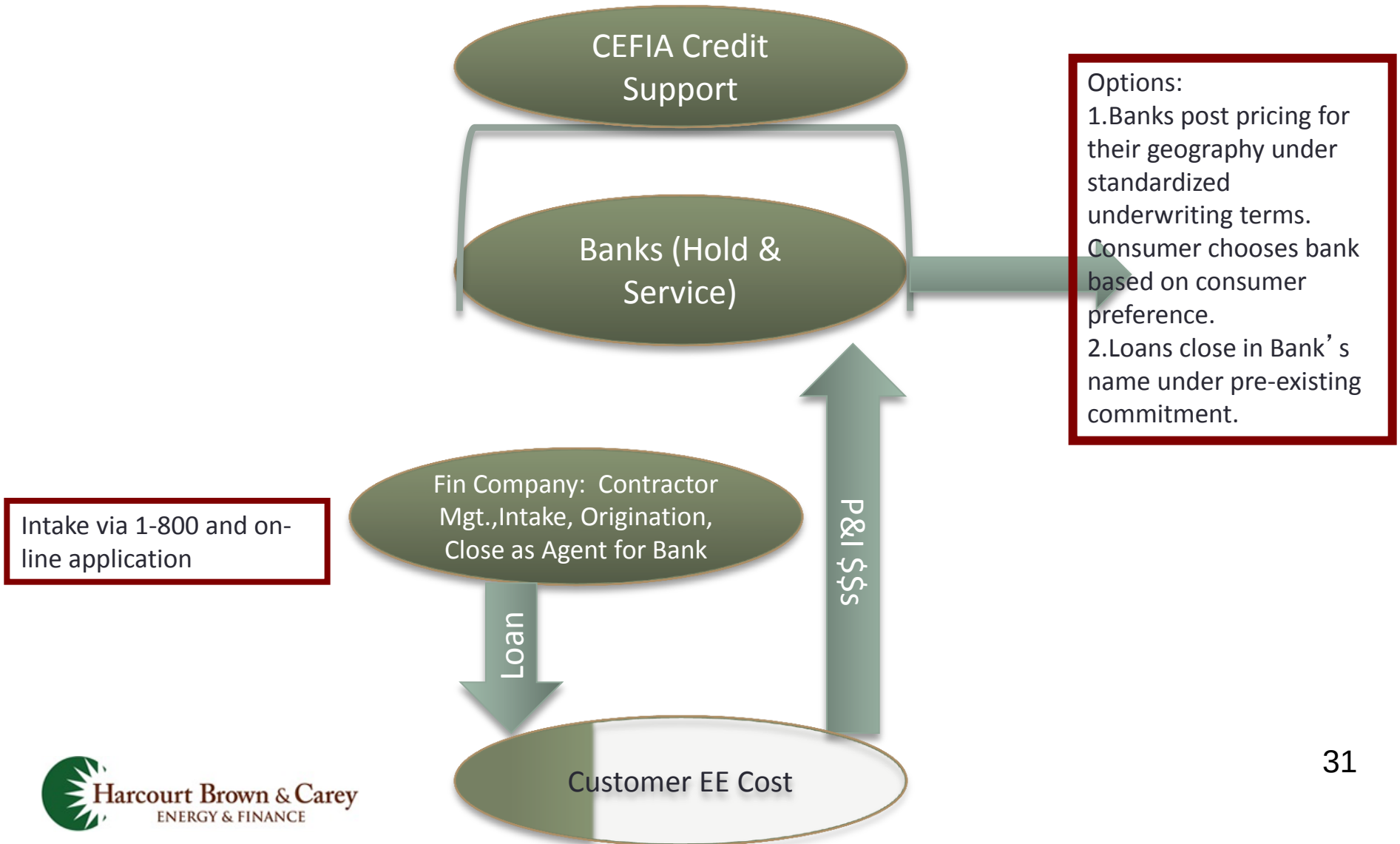
Secured home improvement loan (second lien)

- Uses Title 1 HUD PowerSaver federal insurance
- 2- 4 week approval
- Rate to reflect risk and need to attract market.
- $25k loan amounts, up to 20 year terms

Solar Lease

- CEFIA takes subordinated position in a fund.
- Structure based on combination of subordinated debt/senior capital and tax equity.

Option 1a: Delegated Underwriting and Servicing/Centralized Assignment of Loans



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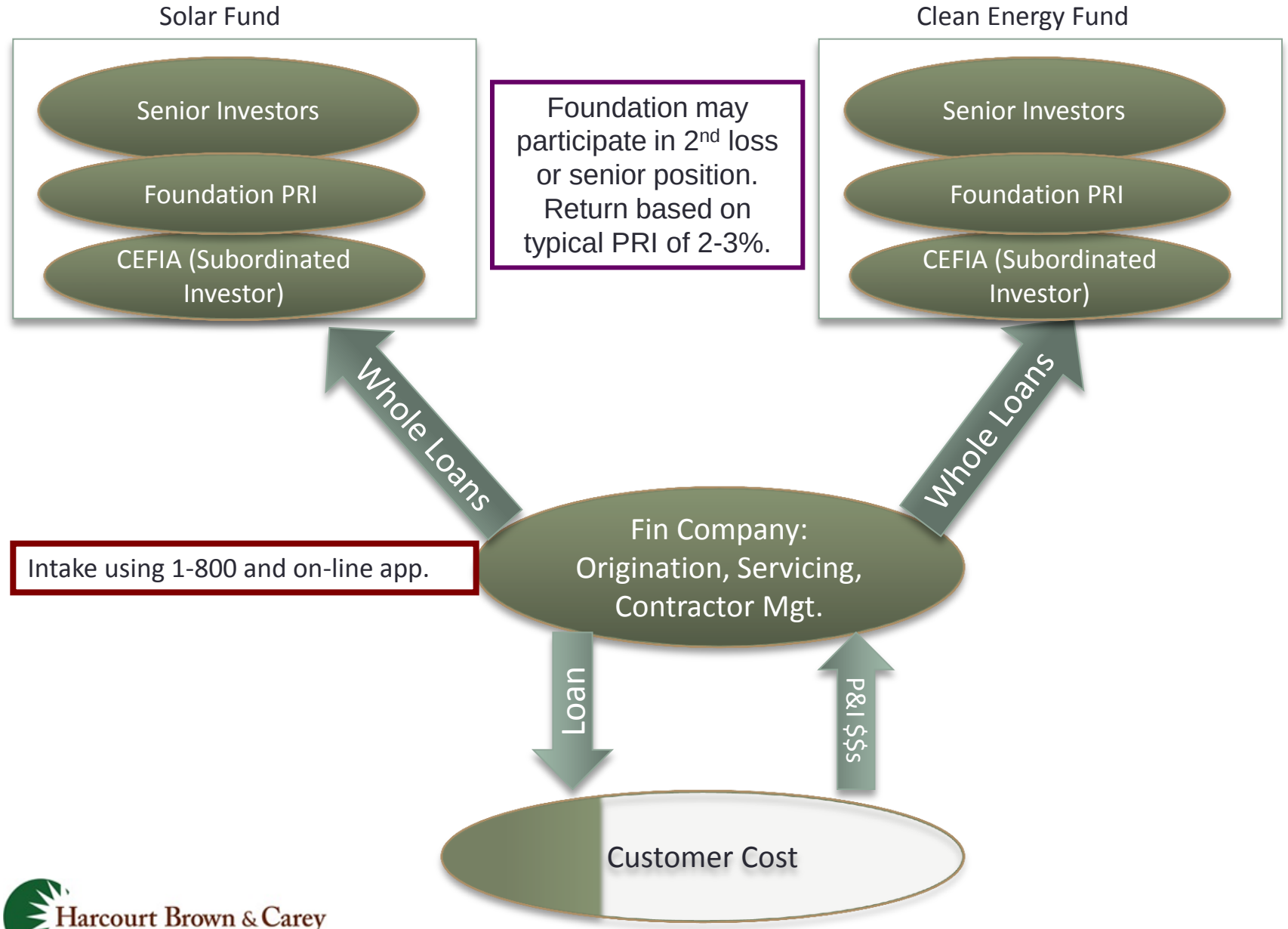
Option 2: Fund Option with Foundation Participation



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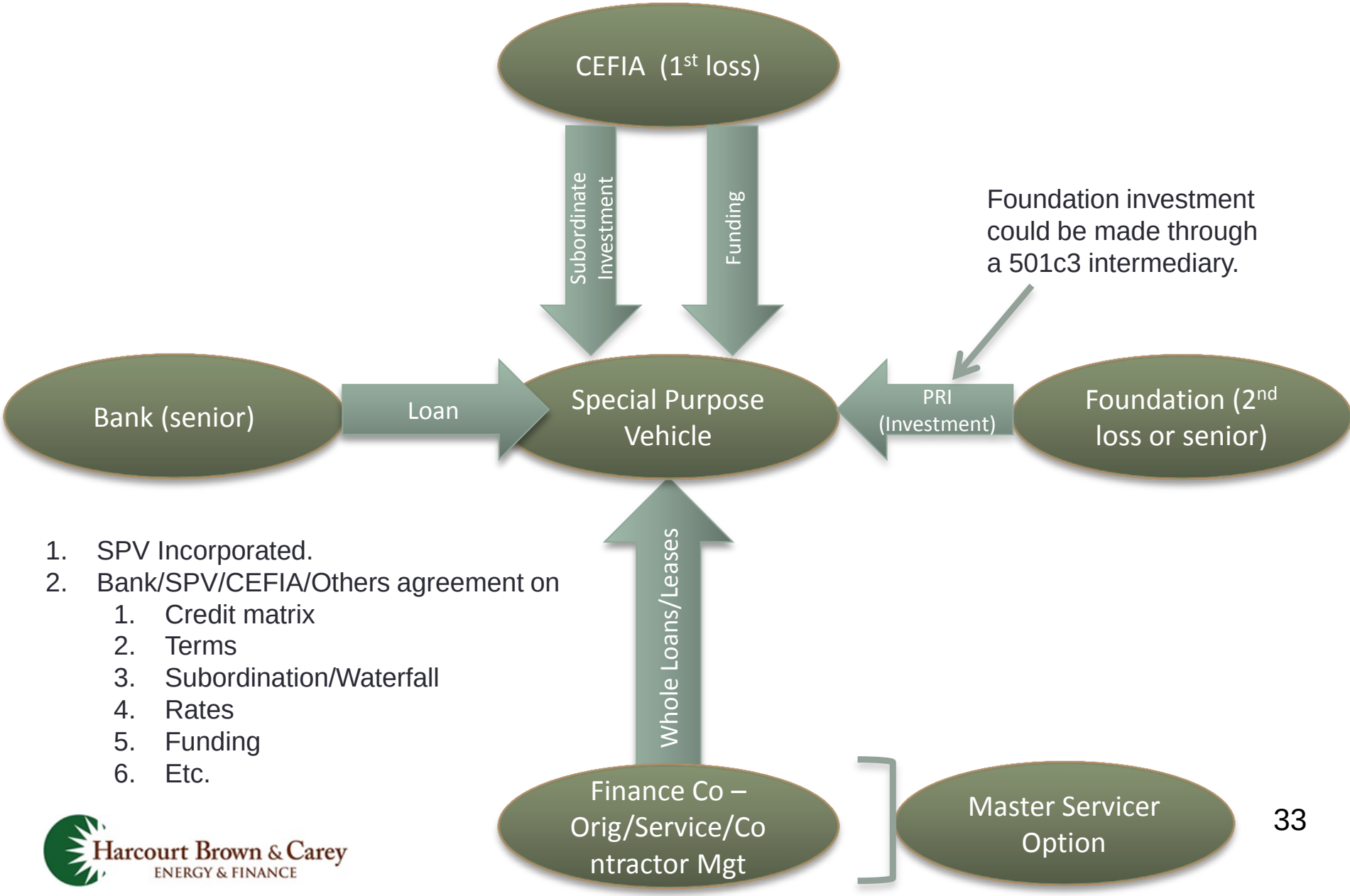
Option 2: Fund Option Structure Details



1. SPV Incorporated.
2. Bank/SPV/CEFIA/Others agreement on
    1. Credit matrix
    2. Terms
    3. Subordination/Waterfall
    4. Rates
    5. Funding
    6. Etc.

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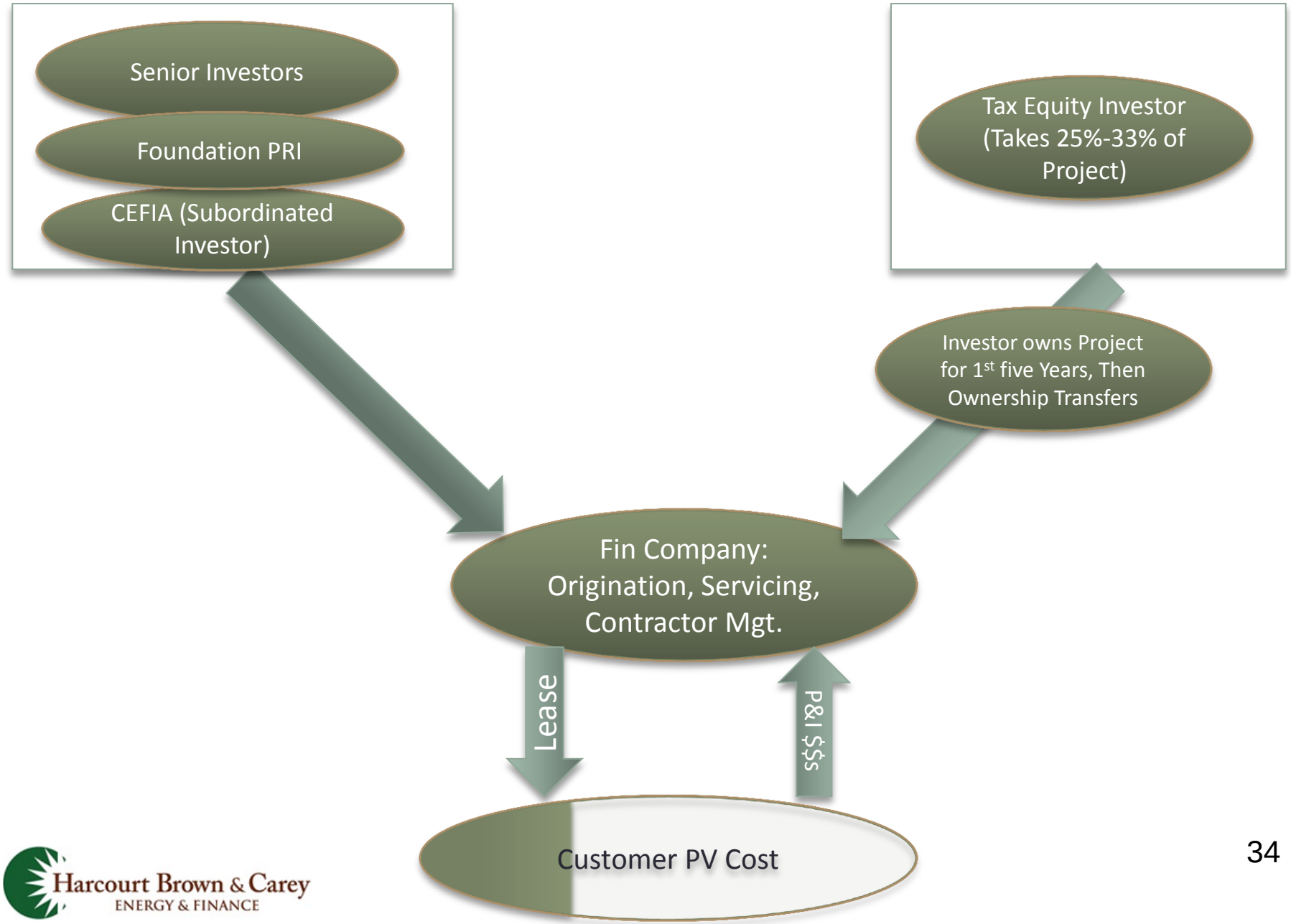
Option 2a: Solar Fund Only Option with Foundation Participation



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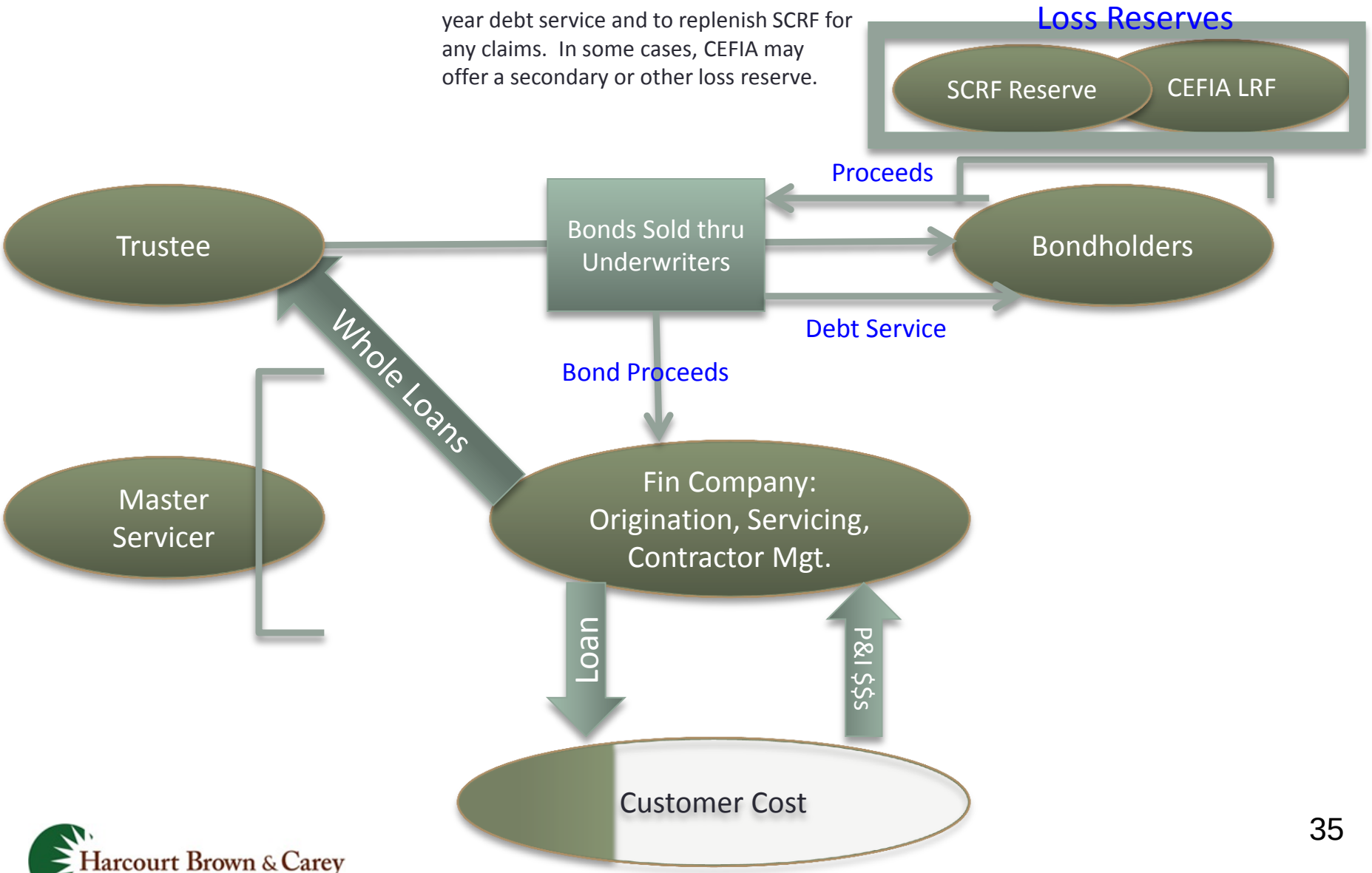
Option 3: Capital Markets Finance Option

Note: CEFIA sets aside funds based on 1 year debt service and to replenish SCRF for any claims. In some cases, CEFIA may offer a secondary or other loss reserve.



Harcourt Brown & Carey ENERGY & FINANCE

LESSONS LEARNED

- Financial institutions (FIs) are initially apprehensive about another public-backed financial institution competing in the market. However, CEFIA has made it clear that it is not intending to compete, but instead to enable FIs to deploy capital in ways they wouldn't otherwise be able to.
- FIs are comfortable with CEFIA absorbing first loss – through cash loss reserves or subordinated investments.
- FIs do not want to take on administrative work of originating very small loans and do not want to take on role of contractor management. FIs react positively to CEFIA taking on this role.
- FIs are interested in Community Reinvestment Act (CRA) credit if they can access it.
- CEFIA's role will consist of:
  - Set up infrastructure to originate loans, manage contractor network, address quality control, marketing.
  - Take on some, limited credit risk.
  - Recruit FIs to provide capital.

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #6

Residential Solar Investment Program Update and Proposed Modifications

May 2, 2012

Update

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- **Customer Acquisition** – strong demand from households at nearly 25 households per week or 5 per business day
- **Lower Average Incentive Level** – the average incentive level per kW installed is about $1,750 (as opposed to $2,450) – nearly 30% less.
- **Limited PBI Participation** – very few third party financing applications received

Goals

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **Bang for the Buck** – maximize the installation of systems and generation of clean energy per dollar of ratepayer incentive
- **Local Industry** – Support local installers in building a business and becoming more competitive in the market
- **Affordability** – build a base of third-party financing companies to help serve the low and middle income markets, which lease products do
- **Loans** – transition the market over time to a financing model instead of a subsidy-driven model

Proposed Modifications

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	Rebate		PBI
	≤5 kW	10 kW ≥ x x > 5 kW	10 kW ≥ x
Current Step 1	$2.450/W	$1.250/W	$0.300/kWh
Current Step 2	$2.100/W	$0.900/W	$0.243/kWh
Proposed Step 2	$2.275/W	$1.075/W	$0.300/kWh

- **Rebate Incentive** – a rebate will be provided in the amount of $2.275/W for systems up to 5 kW and $1.075/W for systems 5-10 kW until collectively installed 2.8 MW or by April 1, 2013, whichever comes first.
- **Performance Based Incentive** – a performance based incentive in the amount of $0.300/kWh for systems up to 10 kW until collectively installed 2.8 MW or by April 1, 2013, whichever comes first.

CLEAN ENERGY
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Deployment Committee of the Clean Energy Finance and Investment Authority

Agenda Item #7

Adjourn

May 2, 2012

Subject to changes and deletions

DEPLOYMENT COMMITTEE OF THE
CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY
Draft Minutes – Special Meeting
Thursday, February 9, 2012

A special meeting of the Deployment Committee of the Board of Directors of the **Clean Energy Finance and Investment Authority ("CEFIA")** was held on February 9, 2012, at the office of CEFIA, 865 Brook Street, Rocky Hill, CT.

1. Call to Order: Reed Hundt, Chairperson of the Deployment Committee, called the meeting to order at 8:35 a.m. Deployment Committee members participating: Mark Cirilli; Reed Hundt; Donald Kirshbaum representing Denise Nappier, State Treasurer; Matthew Ranelli; and Patricia Wrice.

Other Board members attending: Daniel Esty, Vice Chair of CEFIA and Commissioner of the Department of Energy and Environmental Protection.

Staff Attending: Jocelyn Anastasiou, Christin Cifaldi, Mackey Dykes, Brian Farnen, Bryan Garcia, David Goldberg, Dale Hedman, , Bob Wall and Shelly Mondo.

Others Attending: Dot Kelly, Darien; and Jonathan Schrag, Department of Energy and Environmental Protection.

2. Introductions:

Mr. Hundt spoke about his background working with green banks and the Federal Green Bank Act of 2009. Although the bill was not enacted, Mr. Hundt stated that some of the ideas of lending were embedded in the American Recovery and Reinvestment Act of 2009. He talked about the importance of CEFIA and noted that other states are trying to emulate what Connecticut has done with the creation of CEFIA. Mr. Hundt mentioned that he, Governor Malloy and Commissioner Esty will be talking about Connecticut's green bank initiative at the National Governors' Association conference.

3. Public Comments:

Dot Kelly stated that she is hoping that one of CEFIA's advisory committees would support having a member of the Connecticut Resource Recovery Authority ("CRRA") as an ex-officio member. She stated that the CRRA is putting solar on the Hartford land fill. Ms. Kelly noted the opportunities with green banks and the importance of getting the word out. She encouraged CEFIA to do things "right" and make Connecticut a "smart" place.

4. Discussions of Goals and Objectives:

Mr. Garcia discussed the composition of the Deployment Committee. In accordance with CEFIA's Bylaws, the Deployment Committee shall consist of no more than six members, of which no less than three are directors of the Board. Mr. Garcia stated that currently, five directors from the Board have been appointed to the Deployment Committee. Additionally, the Chairperson of the Board can appoint advisory non-directors to the Deployment Committee. Mr. Garcia explained that the director members can vote on proposals. Non-director members of the Deployment Committee provide advice and guidance but are not authorized to vote on proposals. The State Treasurer or his/her designee is a voting ex-officio member of the committee. If there is not a sufficient number of voting members to constitute a quorum, Mr. Garcia explained that the Chairperson or the Vice Chairperson of the Board can participate and vote.

Mr. Garcia explained the principal functions and responsibilities of the Deployment Committee as identified in Section 5.3.3. of CEFIA's Bylaws. He mentioned that the Deployment Committee is authorized to act on behalf of the Board and consider and approve transactions between $300,000 and $2,500,000. The Deployment Committee would make a recommendation to the Board about transactions greater than $2,500,000. Mr. Garcia stated that there is approximately $13,000,000 of outstanding notes under the Solar Lease Program that the Deployment Committee may be asked to consider and make a recommendation to the Board on whether to continue to hold them or sell them.

In response to a request, Mr. Garcia provided an update on the hiring of a financial advisor. He stated that Lamont Financial Services was hired to act as financial advisor and is in the process of putting together a low cost financing structure for CEFIA. Mr. Garcia briefly spoke about the public finance experience of Lamont Financial Services. He noted that additionally, another consultant who has experience working with states across the country on leveraging state and federal funding, has also been hired and is working with Lamont.

5. Financing Standards:

Mr. Hundt discussed some of the assumptions made over the last 3.5 years about energy. He explained how those energy assumptions have changed dramatically over that time, particularly relating to natural gas costs. Mr. Hundt talked about exporting liquid natural gas and breaking down the dependency of the United States on oil from the Middle East. He noted the need to consider the changing predictions with respect to natural gas while framing energy costs. Mr. Hundt also noted the questions that have arisen about using taxpayer funds on anything other than developing natural gas. He noted the need for government funding for the necessary upfront incentives to allow solar in Connecticut to go forward and the need to implement some mechanisms in the future to pay that funding back.

Mr. Hundt spoke about some of the lessons learned from Solyndra, which include: 1) not starting off too fast or taking too many high risks; 2) constantly monitoring and learning as you go; and 3) being really transparent.

In light of changes to natural gas costs, changes in costs in the solar industry, and unanticipated changes, the Deployment Committee members discussed the need to regularly review the program structure to make adjustments if necessary

There was a general discussion about innovation and financing and whether CEFIA should be involved in both. A suggestion was made to work with CI when possible so that CEFIA's funding can be leveraged and its risks can be shared or reduced.

A discussion ensued on the solar industry and the market dislocation. Staff was asked to opine on whether to proceed with a solar residential program at this time or wait. There was consensus among staff that it is important to provide feedback to the stakeholders and provide clarity and some predictability about the program. Staff indicated that if CEFIA waits a year to approve a program, the residential solar market in Connecticut will disappear, Solar City and other companies may not come to Connecticut and Connecticut will lose momentum. It was noted that the solar installers have pipelines of customers waiting for subsidies to proceed. There was general consensus to move forward as soon as possible with a residential solar program and not to slow down the progress of the solar industry in Connecticut.

With respect to contractors, it was noted that contractors can be from other states but must be licensed in the State of Connecticut. Staff was asked to be cognizant and consider the out of state contractors when reporting job creation results.

There was consensus that public funding is necessary at this time to make a difference in the solar industry. Some concern was expressed that 30 megawatts, as required by the legislature, is too small to make a real difference. However, there is a desire to get people in the market. There was general consensus that CEFIA should try to lead by example, not spend a lot up front, evaluate its programs based on early results and to be transparent.

The Deployment Committee members discussed the proposed Residential Solar Photovoltaic Investment Program. The declining subsidy structure was reviewed. The legislation specifically requires the structure of the subsidy program to be declining in an effort to eventually create a self-sustaining industry. It was noted that incentives entice various people to do various things, including attracting solar installers to come to Connecticut to do business. The Deployment Committee members noted the importance of having strong incentives to drive costs down while also recognizing the need to protect ratepayers/taxpayers from overpaying. There was some discussion about the ratepayers/taxpayers and to whom the CEFIA subsidy would be paid. There was concurrence that the Deployment Committee should have a discussion in the future about the differences between the ratepayers and taxpayers.

Mr. Garcia noted that revisions were made to the proposed Residential Solar PV Investment Program based on feedback received from the Deployment Committee members and the Board. He indicated that staff will continue to develop an innovative financing concept for ratepayer payback. A suggestion was made to have the financing program totally independent and separate from the investment program.

Considering both the requirements of the statute and desire to provide some consistency for the stakeholders, the Deployment Committee discussed various options for determining an appropriate time frame to reassess the process and progress. There was general consensus to start off fairly slow and learn from lessons.

The Deployment Committee reviewed the proposed resolution regarding the Residential Solar Photovoltaic Investment Program and suggested several changes: 1) to delete Section 2.3.2. "Financing" in the program plan, 2) approval of a total allocation of $7,500,000 (inclusive and not in addition to any previous funding authorized) for projects, 3) when $5,000,000 has been committed, the Deployment Committee will decide whether and how to modify the program Plan after steps one and two.

There was consensus to have staff amend the proposed resolution accordingly and to reconvene at 12:30 p.m. to consider the amended resolution.

6. Financial Assistance Agreement Extensions for Smith Elementary School, West Hartford and Whole Foods, Cheshire:

Ms. Cifaldi mentioned that in February 2010 and June 2010, the Connecticut Clean Energy Fund Projects Committee approved grants in the amount of $299,900 and $344,970, respectively, for SunEdison projects to be installed on the Smith Elementary School, West Harford, and Whole Foods Distribution Center, Cheshire. She indicated that SunEdison has experienced delays and the dates for completion of the projects have expired. SunEdison has requested an extension to April 30, 2012 to complete the projects.

Upon a motion made by Mr. Cirilli, seconded by Mr. Esty, the Deployment Committee members voted unanimously in favor of adopting the following resolutions regarding the extension of the completion of commercial solar PV projects for 1) Smith Elementary School, West Hartford, and 2) Whole Foods Distribution Center, Cheshire:

RESOLUTION EXTENDING COMMISSIONING DATE FOR SMITH ELEMENTARY SCHOOL, WEST HARTFORD

WHEREAS, a Standard Grant Agreement ("Agreement") was executed between CEFIA and SunEdison Origination3, LLC ("SunEdison") on August 16, 2010, ("Effective

Date"), for a solar photovoltaic ("PV") system to be located at the Smith Elementary School, 64 Saint James Street, West Hartford, Connecticut;

WHEREAS, the PV system was to be installed, tested and accepted by SunEdison within one year from the Effective Date of the Agreement ("Commissioning Date"); and

WHEREAS, SunEdison has requested and CEFIA has agreed to an extension to April 30, 2012 for the Commissioning Date.

NOW, THREFORE, BE IT:

RESOLVED, that the Commissioning Date for the Agreement between CEFIA and SunEdison is revised from August 16, 2011 to April 30, 2012; and

RESOLVED, that the proper CEFIA officers are authorized and empowered to do all other acts and execute and deliver all other documents as they shall deem necessary and desirable to effect the above-referenced legal instrument.

RESOLUTION EXTENDING COMMISSIONING DATE FOR
WHOLE FOODS DISTRIBUTION WAREHOUSE, CHESHIRE

WHEREAS, a Standard Grant Agreement ("Agreement") was executed between CEFIA and SunEdison Origination1, LLC ("SunEdison") on August 16, 2010, ("Effective Date"), for a solar photovoltaic ("PV") system to be located at the Whole Foods Distribution Warehouse, 400 East Johnson Avenue, Cheshire, Connecticut;

WHEREAS, the PV system was to be installed, tested and accepted by SunEdison within one year from the Effective Date of the Agreement ("Commissioning Date"); and

WHEREAS, SunEdison has requested and CEFIA has agreed to an extension to April 30, 2012 for the Commissioning Date.

NOW, THREFORE, BE IT:

RESOLVED, that the Commissioning Date for the Agreement between CEFIA and SunEdison is revised from August 16, 2011 to April 30, 2012; and

RESOLVED, that the proper CEFIA officers are authorized and empowered to do all other acts and execute and deliver all other documents as they shall deem necessary and desirable to effect the above-referenced legal instrument.

7. Financing Standards:

Attorney Farnen mentioned that there are certain protocols and processes that have to be in place before any funds can flow through CEFIA. Staff will look through the resolutions and documents previously adopted by the CEFIA Board to determine whether additional documentation is necessary.

The meeting was recessed at 11:00 a.m., and reconvened at 12:45 p.m.

Attorney Farnen described the changes made to the draft resolution based on the feedback from Deployment Board members for the Deployment Committee's recommendation for approval of the Residential Solar Photovoltaic Investment Program. He explained that the Deployment Committee members indicated the desire to authorize funding of $7,500,000 for the financial incentives steps.. Attorney Farnen noted that the $7,500,000 does not include operating expenses for items such as legal fees, marketing, workforce development efforts, monitoring and evaluating, quality assurance measures, inspections, etc. over the next two years. He explained that the revised amount in the resolution of $9,750,000, includes operating expenses. Some concern was expressed that the operating budget is too high and noted the need to be cautious with ratepayer funds. Staff indicated that the operating budget of $2,250,000 is the maximum amount that will be spent, and efforts will be made to minimize costs as much as possible. Mr. Hundt reiterated that $7,500,000 is intended to provide funding for individual projects, and $2,250,000 is to fund operating costs for the program.

Upon a motion made by Mr. Ranelli, seconded by Mr. Esty, the Deployment Committee members voted unanimously in favor of adopting the following resolution recommending approval by the CEFIA Board of the Residential Solar Photovoltaic Investment Program:

WHEREAS, Section 106 of Public Act 11-80 "An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future" (the "Act") requires the Clean Energy Finance and Investment Authority ("CEFIA") to design and implement a Residential Solar Photovoltaic Investment Program ("Program Plan") that results in a minimum of thirty (30) megawatts of new residential photovoltaic installation in Connecticut before December 31, 2022.

WHEREAS, pursuant to Section 106 of the Act, CEFIA has prepared this Program Plan to identify barriers to the development of a permanent Connecticut-based solar workforce and support comprehensive training and accreditation and certification programs.

WHEREAS, pursuant to Section 106 of the Act, CEFIA has prepared this Program Plan to offer direct financial incentives, in the form of performance-based

incentives or expected performance-based buydowns, for the purchase or lease of qualifying residential solar photovoltaic systems.

WHEREAS, CEFIA has prepared a declining incentive block schedule ("Schedule") that: (1) provides for a series of solar capacity blocks, the combined total of which shall be a minimum of thirty (30) megawatts and projected incentive levels for each such block; (2) provides incentives that are sufficient to meet reasonable payback expectations of the residential consumer; (3) provides incentives that decline over time and will foster the sustained, orderly development of a state-based solar industry; (4) automatically adjusts to the next block; and (5) provides comparable economic incentives for the purchase or lease of qualifying residential solar photovoltaic systems.

NOW, THEREFORE, BE IT:

RESOLVED, that the Deployment Committee of CEFIA hereby recommends approval of the Program Plan and Schedule as presented by the CEFIA staff and as subsequently modified by the Deployment Committee.

RESOLVED, that Section 2.3.2—Financing of the Program Plan is hereby deleted and will be reviewed by the Deployment Committee at a later date for approval.

RESOLVED, that the Deployment Committee recommends approval of a total allocation of $9,750,000 (inclusive and not in addition to any previous funding) to be used for (1) incentives supporting steps one and two of the Program Plan and (2) program operations.

RESOLVED, the CEFIA staff will (1) continuously monitor activities pursuant to the Program Plan and (2) provide quarterly updates to the Deployment Committee.

RESOLVED, at the point that $5,000,000 has been committed to projects under the Program, the Deployment Committee will decide whether and how to modify the Program Plan after steps one and two to ensure the sustained and orderly deployment of the residential solar market in Connecticut.

RESOLVED, that this Board action is consistent with Section 106 of the Act.

RESOLVED, that the proper CEFIA officers are authorized and empowered to do all other acts and execute and deliver all other documents as they shall deem necessary and desirable to effect this Resolution.

The Deployment Committee will meet quarterly, and any requests for an emergency special meeting should be directed to Mr. Hundt.

8. **Adjournment**: Upon a motion made by Mr. Cirilli, seconded by Mr. Ranelli, the Deployment Committee members voted unanimously in favor of adjourning the February 9, 2012 meeting at 1:16 p.m.

Respectfully submitted,

Reed Hundt, Chairperson of the
Deployment Committee

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CLEAN ENERGY
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Memo

To: **Deployment Committee**

From: **Dale Hedman**

dale.hedman@ctcleanenergy.com

CC: **Bryan Garcia, Christin Cifaldi and Rick Ross**

Date: **April 26, 2012**

Re: **OSDG RPF Solar PV and Fuel Cell Project Grant Recommendations**

The staff's project recommendations for the final round of the OSDG Solar PV Best of Class, Public Buildings, and Affordable Housing (greater than 100 kW to 250 kW) and Fuel Cell and Other Non-Solar PV Technologies RFP's will be presented at the May 2, 2012 Deployment Committee meeting. Below is a list of documents being provided to the committee containing staff's project recommendations and other information regarding the two solicitations to be discussed at the meeting.

- OSDG Round 2 Project Summary
- Solar PV RFP (V1 OSDG PV RFP)
- Fuel Cell RFP (V1 OSDG FC OT RFP)
- Round 2 Project Evaluation Form (Round 2 Eval Sheet)
- Master Financial Assistance Agreemen1 (Solar PV)
- Master Financial Assistance Agreement (Fuel Cell)

If you have any questions regarding the documents listed above prior to the meeting, please contact me at your convenience.

CLEAN ENERGY
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On-site Renewable Distributed Generation Program

Round 2 Project Recommendations

PV Best of Class, Public Buildings and Affordable Housing Competitive RFP

Fuel Cell and Other Approved Non-Solar PV Class 1 Renewable Technologies

Name: Dale Hedman, Christin Cifaldi and Rick Ross

Date: May 2, 2012

Project Recommendation Summary

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Recommended Solar PV Projects – 7

Total Project kW – 1,658.7

Total Project Incentive Recommendation - $2,954,194

Recommended Fuel Cell Projects – 2

Total Project kW – 1,000.0

Total Project Incentive Recommendation – $1,506,645

OSDG PV Evaluation Summary

Projects Greater than 100 kW up to 250 kW (Competitive RFP)

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Ranking By Score	Project Name	Type of System Owner	kWptc	Evaluation Score Total Points	Total Cost	Total Cost per kWptc	Grant Recommendation	Cum. Grant Recommendation	Grant % of Total Cost	Grant per kWptc
1	Goodwives Shopping Center Stop & Shop	Outright Purchase	213.0	67.5	$887,915	$4,169	$406,155	$406,155	45.7%	$1,907
2	John C. Mead School	PPA	226.3	64.0	$1,029,600	$4,550	$338,908	$745,063	32.9%	$1,498
3	The Eagle Leasing Company	Outright Purchase	135.5	63.0	$542,864	$4,006	$221,166	$966,229	40.7%	$1,632
4	Stone Resources, LLC / Galleria Design Center	Outright Purchase	216.5	58.0	$1,055,602	$4,875	$585,495	$1,551,724	55.5%	$2,704
5	Lake Gaillard Treatment Plant	PPA	273.5	54.5	$1,248,687	$4,566	$681,906	$2,233,630	54.6%	$2,493
6	Firestone Building Products	Outright Purchase	108.0	52.5	$528,622	$4,894	$313,200	$2,546,830	59.2%	$2,899
7	RHAM High School	PPA	154.3	51.5	$788,600	$5,111	$407,364	$2,954,194	51.7%	$2,640
8	Valley Regional High School	Outright Purchase	197.8	51.0	$1,000,328	$5,057	$586,640	$3,540,834	58.6%	$2,966
9	DC Bloomfield Cinemas LLC	PPA	133.7	46.0	$668,250	$4,996	$327,970	$3,868,804	49.1%	$2,452
Totals					$7,750,468		$3,868,804			

Projects Recommended – Green
Projects Not Recommended - Orange

Goodwives Shopping Center:
Stop & Shop Supermarket

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Host:	Stop & Shop Supermarket Company, LLC - Urstadt Biddle Properties Inc.
Business	Supermarket
Third Party Owner:	n/a
City/Town of Host:	Darien
Installer:	Martifer Solar USA
Ranking and Score:	1 - 67.5
System Size /kWptc:	213.0
Design Factor:	91.0%
Estimated 1st Year Generation (kWhs):	246,451
Generation as a % of Usage (Annual):	11.3%
System Cost:	$887,915
System Cost /kWptc:	$4,188
Grant Recommendation:	$406,155
Grant Recommendation as a % of Total Cost:	45.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.236
Requested Grant ZREC Equivalent /kWh:	$0.236

John C. Mead School

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	John C. Mead School
Business	Public School
Third Party Owner:	SunLight General Capital, LLC
City/Town of Host:	Ansonia
Installer:	Martifer Solar USA
Ranking and Score:	2 - 64.0
System Size /kWptc:	226.3
Design Factor:	91.7%
Estimated 1st Year Generation (kWhs):	267,351
Generation as a % of Usage (Annual):	40.1%
System Cost:	$1,029,600
System Cost /kWptc:	$4,549.71
Grant Recommendation:	$338,908
Grant Recommendation as a % of Total Cost:	32.9%
Grant Recommendation ZREC Equivalent /kWh:	$0.165
Requested Grant ZREC Equivalent /kWh:	$0.224

The Eagle Leasing Company

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	The Eagle Leasing Company
Business	Leasing Company
Third Party Owner:	n/a
City/Town of Host:	Orange
Installer:	Dynamic Solar, LLC
Ranking and Score:	3 - 63.0
System Size /kWptc:	135.5
Design Factor:	89.3%
Estimated 1st Year Generation (kWhs):	149,513
Generation as a % of Usage (Annual):	48.3%
System Cost:	$542,864
System Cost /kWptc:	$4,006
Grant Recommendation:	$221,166
Grant Recommendation as a % of Total Cost:	40.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.192
Requested Grant ZREC Equivalent /kWh:	$0.271

Galleria Design Center

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FINANCE AND INVESTMENT AUTHORITY

Host:	Stone Resources,LLC / Galleria Design Center
Business	Private Company
Third Party Owner:	n/a
City/Town of Host:	Middletown
Installer:	Alteris Renewables
Ranking and Score:	4 - 58.0
System Size /kWptc:	216.5
Design Factor:	91.9%
Estimated 1st Year Generation (kWhs):	242,006
Generation as a % of Usage (Annual):	23.2%
System Cost:	$1,055,602
System Cost /kWptc:	$4,876
Grant Recommendation:	$585,495
Grant Recommendation as a % of Total Cost:	55.5%
Grant Recommendation ZREC Equivalent /kWh:	$0.314
Requested Grant ZREC Equivalent /kWh:	$0.352

Lake Gaillard Water Treatment Plant

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	Lake Gaillard Treatment Plant
Business	Public Water Polution Control Facility
Third Party Owner:	Smart Energy Capital, LLC
City/Town of Host:	North Branford
Installer:	RGS Energy
Ranking and Score:	5 - 54.5
System Size /kWptc:	273.5
Design Factor:	83.6%
Estimated 1st Year Generation (kWhs):	297,572
Generation as a % of Usage (Annual):	13.0%
System Cost:	$1,248,687
System Cost /kWptc:	$4,566
Grant Recommendation:	$681,906
Grant Recommendation as a % of Total Cost:	54.6%
Grant Recommendation ZREC Equivalent /kWh:	$0.298
Requested Grant ZREC Equivalent /kWh:	$0.310

Firestone Building Products

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FINANCE AND INVESTMENT AUTHORITY

Host:	Firestone Building Products
Business	Private Company
Third Party Owner:	n/a
City/Town of Host:	Bristol
Installer:	DC Power Systems
Ranking and Score:	6 - 52.5
System Size /kWptc:	108
Design Factor:	92.8%
Estimated 1st Year Generation (kWhs):	125,332
Generation as a % of Usage (Annual):	5.7%
System Cost:	$528,622
System Cost /kWptc:	$4,895
Grant Recommendation:	$313,200
Grant Recommendation as a % of Total Cost:	59.2%
Grant Recommendation ZREC Equivalent /kWh:	$0.324
Requested Grant ZREC Equivalent /kWh:	$0.383

RHAM Regional High School

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	RHAM High School
Business	Public School
Third Party Owner:	DBS Energy Inc
City/Town of Host:	Hebron
Installer:	DBS Energy Inc
Ranking and Score:	7 - 51.5
System Size /kWptc:	154.3
Design Factor:	93.0%
Estimated 1st Year Generation (kWhs):	179,749
Generation as a % of Usage (Annual):	7.2%
System Cost:	$788,600
System Cost /kWptc:	$5,111
Grant Recommendation:	$250,300
Grant Recommendation as a % of Total Cost:	31.7%
Grant Recommendation ZREC Equivalent /kWh:	$0.294
Requested Grant ZREC Equivalent /kWh:	$0.181

Valley Regional High School

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	Valley Regional High School
Business	Public School
Third Party Owner:	n/a
City/Town of Host:	Deep River
Installer:	American Solar & Alternative Power
Ranking and Score:	8 - 51.0
System Size /kWptc:	197.8
Design Factor:	88.5%
Estimated 1st Year Generation (kWhs):	224,020
Generation as a % of Usage (Annual):	21.4%
System Cost:	$1,000,328
System Cost /kWptc:	$5,057
Proposed Grant:	$586,640
Proposed Grant as a % of Total Cost:	58.6%
Proposed Grant ZREC Equivalent /kWh:	$0.256
Requested Grant ZREC Equivalent /kWh:	$0.256

DC Bloomfield Cinemas

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Host:	DC Bloomfield Cinemas LLC
Business	Private Company
Third Party Owner:	Verde Electric Corporation
City/Town of Host:	Bloomfield
Installer:	Green Hybrid Energy Solutions Inc
Ranking and Score:	9 - 46.0
System Size /kWptc:	133.7
Design Factor:	94.4%
Estimated 1st Year Generation (kWhs):	156,469
Generation as a % of Usage (Annual):	59.3%
System Cost:	$688,250
System Cost /kWptc:	$5,148
Proposed Grant:	$327,970
Proposed Grant as a % of Total Cost:	47.7%
Proposed Grant ZREC Equivalent /kWh:	$0.272
Request Grant ZREC Equivalent /kWh:	$0.308

OSDG Fuel Cell Evaluation Summary
(Rolling Applications)

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Projects	Project Name	Type of System Owner	kW	Total Cost	Total Cost per kW	Grant Recommendation	Cum. Grant Recommendation	Grant % of Total Cost	Grant per kW
1	Macy's Distribution Warehouse	Outright Purchase	600.0	$4,133,044	$6,888	**$913,121**	**$913,121**	**22.1%**	$1,522
2	Western CT State University	PPA	400.0	$2,805,389	$7,013	**$593,524**	**$1,506,645**	**21.2%**	$1,484
Totals				**$6,938,433**		**$1,506,645**			

Projects Recommended – Green
Projects Not Recommended - Orange

Macy's Distribution Warehouse

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Host:	Macy's Inc.
Business	Distribution Warehouse
Third Party Owner:	n/a
City/Town of Host:	Cheshire
Installer:	Bloom Energy
System Size	600 kW
Avalability	95.00%
Estimated Annual Generation (kWhs)	4,588,488
Generation as a % of Usage (Annual)	90.0%
System Cost:	$4,133,044
System Cost /kW	$6,888
Grant Recommendation	$913,121
Grant Recommendation as a % of Total Project Cost	22.1%
Grant Recommendation LREC Equivalent /kWh	$0.060

Western CT State University

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Host:	Western CT State University
Business	University
Third Party Owner:	UTC Power
City/Town of Host:	Danbury
Installer:	UTC Power
System Size	400 kW
Availability	95.00%
Estimated Annual Generation (kWhs)	3,328,800
Generation as a % of Usage (Annual)	100.0%
System Cost:	$2,805,389
System Cost /kW	$7,013
Grant Recommendation	$593,524
Grant Recommendation as a % of Total Project Cost	21.2%
Grant Recommendation LREC Equivalent /kWh	$0.056

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865 Brook Street
Rocky Hill, CT (860) 563-0015

2011-2012 Competitive PV RFP Calculation Worksheet

Reviewer Name:
PV Project Name:
Applicant Name:
PV Project Code:
Type of Customer Site:
Type of System Owner:
Grant Request:

SCORE: #DIV/0!

Category			Explanation of Points Calculation and Required Documentation	Actual Points	Possible Points
PV Project Economics - Requested Grant			**The PV Project Economics review will include an assessment of the PV Project's Pro Forma and the commitment of non-CEFIA financing sources. All calculations are made taking the requested grant award into account.**	**#DIV/0!**	**40.0**
Are the costs of the equipment and installation reasonable? (Using the average per watt cost for RFP responses of like technologies)			**Point Range 0-14** Projects will be ranked by cost/kWPTC in order from lowest to highest, with the lowest receiving a full 14 points and the highest receiving 0 points.		14.0
Grant Request	Grant Request	$ -	If the ratio of requested grant to total PV Project cost is less than 40% a full 8 points will be awarded (< 40%)		
	Total PV Project Cost	$ -	If the ratio of requested grant to total PV Project cost is between 40% and 65%, 4 points will be awarded (≥ 40% and ≤ 65%)		
	Ratio	#DIV/0!	If the ratio of requested grant to total PV Project cost is greater than 65%, no points will be awarded (> 65%)	#DIV/0!	8.0
Cash Flow Net Present Value (NPV)			If the NPV is greater than or equal to 0, a full 4 points will be awarded (≥ 0)	4.0	
Internal Rate of Return (IRR)			For-Profit: If the IRR is greater than or equal to 9.32%, a full 4 points will be awarded Non-Profit: If the IRR is greater than or equal to 4.5%, a full 4 points will be awarded	0.0	8.0
Is Cash Flow consistent? (Yes/No)			If the cash flow is consistent and trends towards positive cash flow, a full 2 points will be awarded	0.0	2.0
Simple Payback			If the simple payback is 10 years or less, a full 3 points will be awarded If the simple payback is between 10 and 20 years, 1.5 points will be awarded If the simple payback is greater than 20 years, no points will be awarded	3.0	3.0
CEFIA Grant Calculation	CEFIA Grant		If grant request is less than CEFIA Staff Grant Calculation 5 points will be awarded.		
	Total PV Project Cost				
	Ratio	#DIV/0!		0.0	5.0

Cash Flow Net Present Value (NPV) - CEFIA Grant Calculation	
Internal Rate of Return (IRR) - CEFIA Grant Calculation	
Simple Payback - CEFIA Grant Calculation	

2011-2012 Competitive PV RFP Calculation Worksheet				
Reviewer Name:				
PV Project Name:				
Applicant Name:				
PV Project Code:				
Type of Customer Site:				

SCORE: #DIV/0!

Deployment of the Technology	**Deployment of the Technology review will include an assessment of the entire PV Project Application.**	**0.0**	**20.0**
How well are the technology attributes matched with the Customer Site's energy needs and requirements?	**Point Range 0-8.** If the PV system production corresponds to peak usage patterns 8 points should be awarded. Insert Explanation		8.0
Has the equipment proposed been appropriately sized to the Customer Site's electrical loads?	**Point Range 0-8.** For example, if the PV system produces excess kWh no points should be awarded. Insert Explanation		8.0
Does the PV Project reflect a thorough understanding of the generating equipment's limitations and capabilities?	**Point Range 0-4.** No points should be awarded if excessive shading present, or, if the PV system being used to offset less than 1% of a building's usage. Insert Explanation		4.0

2011-2012 Competitive PV RFP Calculation Worksheet

Reviewer Name:
PV Project Name:
Applicant Name:
PV Project Code:
Type of Customer Site:

SCORE: #DIV/0!

Probability of PV Project Completion and PV Project Feasibility	The Probability of PV Project Completion and PV Project Feasibility review will include an assessment of the entire PV Project Application.	0.0	20.0
Does the Applicant exhibit financial strength, technical expertise and experience with similar Projects?	**Point Range 0-2** Insert Explanation		2.0
Does the Applicant demonstrate awareness and experience with community issues that could influence the PV Project's success and schedule?	**Point Range 0-2** Insert Explanation		2.0
Has the applicant made efforts to interface with community and special interest groups?	**Point Range 0-2** Insert Explanation		2.0
Is the Customer Site certified as one of the following: (1) EPA Energy Star compliant, (2) Two Green Globes or better, (3) compliant with Connecticut regulations regarding High Performance Building Standards, (4) LEED Silver or better, or, (5) energy efficient under an equivalent standard?	**Point Range 0-4** Insert Explanation		4.0
Has the Customer Site implemented a third party energy efficiency audit's recommendations during the 5-year period prior to submission of the OSDG application?	**Point Range 0-4** Insert Explanation		4.0
Is funding secured for the balance of the costs not funded by CEFIA? Is the Applicant committing equity to the Project?	**Point Range 0-6** Insert Explanation		6.0

2011-2012 Competitive PV RFP Calculation Worksheet

Reviewer Name:
PV Project Name:
Applicant Name:
PV Project Code:
Type of Customer Site:

SCORE: #DIV/0!

Public and Unique Ratepayer Benefits	All Applications will be evaluated on their ability to provide the state's ratepayers with a high level of benefits.	0.0	20.0
Will the PV Project rely on the purchase of major system components manufactured or assembled in Connecticut? Will the system components manufactured or assembled in Connecticut be manufactured or assembled in a distressed municipality?	**Point Range 0-4.** 4 points will be awarded for components assembled or manufactured in a distressed Connecticut municipality. 2 points will be awarded for components assembled or manufactured in a non-distressed Connecticut municipality. 1 point will be awarded for components assembled or manufactured in the USA. No points will be awarded for components assembled or manufactured overseas. Insert Explanation		4.0
Is the PV Project unique in terms of size, location or technology?	**Point Range 0-4** Insert Explanation		4.0
Are outreach efforts to promote the application of PV to non-residential entities and the general public planned?	**Point Range 0-2** Insert Explanation		2.0
Will the PV system be promoted in schools through curriculum, programs and events?	**Point Range 0-2** Insert Explanation		2.0
Is the PV Project part of a larger municipal or corporate sustainability plan?	**Point Range 0-2** Insert Explanation		2.0
Which entity will retain ownership of the RECs?	**Point Range 0-4.** 4 points will be awarded if the RECs are to be retired. 2 points will be awarded if the RECs will be sold to CEFIA. No points will be awarded if the Customer Site elects to retain ownership of the RECs. Insert Explanation		4.0
APPLICABLE ONLY TO MUNICIPAL AND SCHOOL PROJECTS: Is the PV Project located in a CEFIA Clean Energy Community?	**Point Range 0-2** Insert Explanation		2.0

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865 Brook Street
Rocky Hill, CT 06067-3444
Phone 860.563.0015
Fax 860.563.4877
info@ctcleanenergy.com
www.ctcleanenergy.com

Projects that have received or will receive a grant from CEFIA under this solicitation are not eligible to participate in any future ZREC or LREC programs.

Request for Proposals

On-Site Renewable Distributed Generation

Best of Class,
Public Buildings
and
Affordable Housing
for
Solar Photovoltaic Projects

Program Opportunity # CEFIA-RFP-002

Version 2
October 18, 2011

Important Dates:

Request for Proposals (RFP) Released	September 12, 2011
RFP Version 2 Released	October 18, 2011
Application Deadline	December 30, 2011, 5:00 p.m. EST

Questions or clarifications about this RFP should be directed to:

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, CT 06067-3444
Telephone: 860.563.0015
FAX: 860.563.4877
Email: info@ctcleanenergy.com

This RFP is available on the following Web sites:

Clean Energy Finance and Investment Authority (CEFIA)

www.ctcleanenergy.com/bestofclass

Department of Energy and Environmental Protection (DEEP)

http://www.ct.gov/deep/site/default.asp

No other person employed by CEFIA other than its Director of Project Development is authorized to provide information with respect to the On-Site Renewable Distributed Generation (OSDG) Program Applications (Applications) submitted under this RFP. Contact with any other employee, officer or director of CEFIA, consultants to CEFIA, or members of the CEFIA Board of Directors (the Board) with respect to Applications or confidential information related to this RFP is prohibited. Violation of this provision may result in Application disqualification.

Questions will be accepted via email from the release date, September 12, 2011, through October 12, 2011. All relevant questions and answers will be posted on the CEFIA Web site at www.ctcleanenergy.com/bestofclass. The identities of those who submit questions will not be revealed.

At any time, CEFIA staff will be available to answer general questions regarding process or timetables.

Any oral communication concerning this RFP is not binding and shall in no way alter a specification, term or condition of this RFP or indicate any selection preference other than that identified herein.

Contents

Executive Summary

The purpose of the competitive OSDG Program Best of Class, Public Buildings and Affordable Housing RFP is to solicit Applications from eligible entities working with experienced renewable energy developers (Applicants). There will be a strong emphasis on evaluating the financial feasibility of each proposed OSDG solar photovoltaic installation (PV Project) as well as the Applicant's ability to complete construction of the PV Project in a timely manner. Applications for this RFP will only be accepted during the timeframe specified in this RFP, Section 2.

Important Dates

Request for Proposals (RFP) Released	September 12, 2011
RFP Version 2 Released	October 18, 2011
Application Deadline	December 30, 2011, 5:00 p.m. EST

Solar Photovoltaic (PV) is the only technology eligible for grants under this RFP.

This RFP is a financial support program for new renewable energy generating equipment at commercial, industrial and institutional facilities in Connecticut. Through this RFP, CEFIA will offer financial support to buy down the cost of renewable energy generating equipment for PV Projects in the development phase that have not yet commenced the construction phase. The level of support for individual awards is not a fixed amount based on size or cost; it will vary based on the specific PV technology, efficiency and economics of the installation. The intent of the funding is to enable owners of PV systems to "break even" over the life of the PV Project, with a fair and reasonable return on investment, compared with purchasing the equivalent amount of power from the utility.

This RFP is intended to provide PV Project funding during the transition from grant-based, CEFIA supported PV Project funding to the market-based, Public Utility Regulatory Authority (PURA) and electric distribution company (EDC) regulated Zero-emission Renewable Energy Certificate (ZREC) program. The ZREC program was created by Public Act 11-80, Sections 107 to 108 (PA 11-80) in July 2011. The ZREC program will be implemented by PURA, formerly the Connecticut Department of Public Utility Control (DPUC), and EDCs. Currently, the program has not yet been developed, but it is expected program information will be available in late 2011 with program implementation beginning in early 2012. PA 11-80 specifies the following about the ZREC program:

- ZRECs will have a $350/MWh price ceiling
- Contracts will be awarded in a competitive bidding environment with competitive bid RFPs issued by the following EDCs:
  - Connecticut Light & Power (CL&P)
  - United Illuminating Company (UI)
- ZRECs will be rate-payer funded
- Contracts will have a fifteen (15) year duration

CEFIA was created by the Connecticut General Assembly in 2011. It is the successor organization to the Connecticut Clean Energy Fund (CCEF). CEFIA's mission is to promote,

develop and invest in clean energy and energy efficiency projects in order to strengthen Connecticut's economy, protect community health, improve the environment, and promote a secure energy supply for the state. As the nation's first full-scale clean energy finance authority, CEFIA will leverage public and private funds to drive investment and scale-up clean energy deployment in Connecticut.

Section 1 - Introduction

1.1. Objectives of the Request for Proposals

CEFIA's competitive OSDG Program Best of Class, Public Buildings and Affordable Housing RFP is the only vehicle through which CEFIA will identify and qualify PV installations for RFP funding. CEFIA will competitively screen and evaluate all of the proposed PV Projects and recommend only the PV Projects best meeting this RFP's criteria. The results will be provided to the Board for final authorization of grant awards. Following a minimum review to determine Application eligibility, CEFIA intends to conduct reviews of the Applications concurrently.

Under this RFP, CEFIA intends to recommend only those PV Projects that (1) use commercially available PV technologies, (2) have already achieved substantial progress in permitting and site control, (3) require minimal investment from CEFIA, (4) are ready for deployment and (5) are installed at sites that have taken maximum advantage of available energy efficiency incentive programs. If an Application does not meet the minimum criteria or does not include all required documentation listed in Section 2 of this RFP, the Application will not be accepted for further review by CEFIA. The Applicant must reapply under a future funding opportunity. **No Applications will be held in a queue or pipeline, as in past CCEF commercial OSDG programs.**

The specific objectives of this RFP are to:

- Fund a geographically and size-diverse portfolio of PV Projects;
- Select PV Projects with a high probability of reaching successful installation and operation;
- Focus on PV Projects that fully utilize the characteristics of the technology and maximize benefits to a Connecticut property or facility (the Customer Site);
- Select PV Projects that include investments in energy efficiency with short (≤5-year) payback periods;
- Select PV Project Customer Sites that will disseminate lessons learned, barriers overcome and benefits of the installation to peers; and
- Assist the market in becoming more acquainted with a performance-based incentive program such as the ZREC program currently being developed in the State of Connecticut.

The total funding allocated for all selected PV Projects under this RFP is $4.5MM. This solicitation offers grant funding as shown below:

Section 1 Best of Class, Public Buildings and Affordable Housing

Best of Class, Public Buildings and Affordable Housing		
System Size Blocks	≤ 100kW$_{AC}$	>100 kW$_{AC}$ to 250kW$_{AC}$
Funding Allocation per System Size Block	**$1,500,000**	**$3,000,000**

Unused funds from this RFP will be added to future Best of Class, Public Buildings and Affordable Housing solicitations or will be reallocated at CEFIA's discretion.

The Application for this solicitation is posted on CEFIA's Web site at www.ctcleanenergy.com/bestofclass.

Applications must be in CEFIA's possession no later than 5:00 p.m. EST on Friday, December 30, 2011.

1.2. Eligible Technologies

To be eligible, an Applicant must propose to install commercially available PV generating equipment at the Customer Site.

1.3. Eligible Applicants

CEFIA will review Applications only from developers, Customer Sites or companies who are engaged in the development of a PV system. The Applicant must establish to CEFIA's satisfaction which entity will be primarily responsible for the overall managerial and financial control for the proposed PV Project. **Only one Application will be accepted per Customer Site per RFP round.** PV Projects must be located in either CL&P or UI territories.

The following commercial entities may apply under this RFP:

- For-profit companies
- Not-for-profit companies
- Religious organizations
- Condominium associations
- Municipalities
- State and federal agencies
- School districts
- Not-for-profit and for-profit affordable housing companies

1.4. Eligible PV Projects

Under this RFP, CEFIA will accept only PV Projects in the development phase. PV Projects that have begun construction prior to executing a Financial Assistance Agreement (FAA) with CEFIA will not be eligible for funding under this program.

An eligible PV Project under this RFP must also meet the following criteria:

- As required under Connecticut law, the PV Project must be located within the state of Connecticut.
- PV Projects must be located in either CL&P or UI territories.
- **Customer Sites must have a minimum peak demand of 10kW or greater. (Please refer to Section 4.1, PV Project kW Size Limit Calculation) Customer Sites with a minimum peak demand of less than 10kW will not be considered for funding under this RFP.**
- **PV Projects may be larger than 250 kW_{AC}, however, the grant calculation shall only be based on the first 250 kW_{AC}.**
- If the Application is structured as a Power Purchase Agreement (PPA) or a lease, the contract duration of the proposed PPA or lease must be between ten (10) and twenty (20) years.
- The PV Project must generate electricity for use on site.
- The Applicant must agree to accept the standard FAA "as is" except for technical revisions or PV Project-specific revisions required due to special features of a particular PV Project.

Applications not meeting all of the requirements outlined above will not be further evaluated by CEFIA under this RFP.

1.5. PV Project Cost

For economic evaluation purposes, Applications must include firm costs not subject to revision through the evaluation process and Board review proceedings. Applicants must also disclose all other sources of funding that will be applied to the PV Project. Final determination of whether a PV Project has quoted reasonable costs will be made by CEFIA at the time of Application review.

For-profit, tax-paying Applicants should include all applicable state and federal tax benefits in their financial analysis. Federal and investment tax credits are to be retained by the Applicant. **Not-for-profit Applicants are not eligible for state and federal tax benefits.**

1.6. Funding

CEFIA will award a grant to each PV Project selected under this RFP through the evaluation process and approved by the Board. Funding will be provided in the form of a monetary grant under standardized terms, and grant payment(s) will be contingent upon the following items:

- Execution of an FAA with CEFIA.
- Reaching the in-service date within nine (9) months of FAA execution.

CEFIA will provide a contingent funding offer letter to PV Projects approved by the Board. Execution of the FAA will occur within ninety (90) days of Board approval. **PV Projects failing to execute the FAA within ninety (90) days of Board approval will not be funded under this RFP.**

No one Customer Site may receive more than $4.0MM in CEFIA funding during any two (2)-year period for all types of renewable energy technologies under the OSDG Programs. The maximum aggregate incentive dollar amount any Customer Site will be awarded for multiple PV Projects will be limited to $1.0MM in any two (2)-year period.

CEFIA will give priority in the Application evaluation process to those Applications whose overall costs have the least impact on ratepayers. Final funding amounts offered by CEFIA to an Applicant will be at the sole discretion of CEFIA.

Section 2 - Application Process

2.1. RFP Schedule

As shown on the following schedule, the due date for this RFP is December 30, 2011, at 5:00 p.m. EST.

Other key milestones for this RFP are presented below. **Any modifications to this schedule or this RFP will be posted at www.ctcleanenergy.com/bestofclass. Applicants are strongly encouraged to check CEFIA's Web site for any modifications.**

Activity	Activity Date
Issue RFP document	September 12, 2011
Issue press release	September 12, 2011
Questions accepted in writing - E-mail only - info@ctcleanenergy.com	September 12, 2011 to October 12, 2011
Information session – Phoenix Room, Department of Energy and Environmental Protection, 79 Elm Street, Hartford	October 12, 2011 4:00 p.m. – 6:00 p.m.
Final question responses posted on CEFIA Website	October 31, 2011
Letter of intent to apply	December 2, 2011
Proposal due date	December 30, 2011 5:00 p.m. EST
Eligibility rejection/acceptance letters Issued	January 2012
CEFIA staff recommendations to the Board	February 2012
Funding authorization letters issued	**March 2012**

A letter of intent must be submitted by December 2, 2011. This letter should be on the Applicant's letterhead and signed by the following parties:

- Applicant
- Developer/Contractor
- Customer Site, if different from Applicant

An original, hardcopy of the letter of intent should be mailed to the following address:

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, CT 06067-3444
Attention: Christin A. Cifaldi, Project Manager

2.2. Minimum Criteria

All Applications must meet the minimum requirements outlined below to be considered for eligibility. **If an Application fails to meet the minimum requirements, the Application will not be accepted by CEFIA under this RFP.** The Applicant will receive a denial letter from CEFIA clarifying why the Application failed to meet the minimum criteria. **No Applications**

will be reviewed for minimum compliance until December 30, 2011. CEFIA recommends Applicants develop a response over the entire available RFP timeline to ensure submission of a complete and thorough Application.

Minimum eligibility requirements:

- Customer Sites must be commercial, industrial, or institutional facilities.
- Portable or mobile systems will not be considered under this RFP.
- Seasonal, temporary, or limited-use facilities will be closely scrutinized for high value and visibility, and may be excluded.
- PV Projects must use energy-generation devices that are commercially available and offer warrantees, spare parts, and service commensurate with their commercial status.
- Applicants must be the owner and operator of the Customer Site where the PV Project is to be located, or a PPA provider willing to own and operate the PV equipment for the contract term.
- PV Projects must be located in CL&P or UI service territories.
- The PV Project must intend to generate energy primarily for consumption at the Customer Site at the moment it is generated. Net metering may be used to accommodate occasional excess production, but if significant excess energy is anticipated, the incentive will be calculated on the proportion of the PV Project's capacity that does not result in excess production.
- A specific PV Project location must be identified at the Customer Site.

2.3. Minimum Documentation

All Applicants must submit the minimum documentation outlined below to be considered for eligibility. **If an Applicant fails to submit the minimum documentation in the proper format, the Application will not be reviewed by CEFIA under this RFP.** The Applicant will receive a denial letter from CEFIA outlining which minimum documentation the Applicant failed to submit. **No Applications will be reviewed for minimum documentation until December 30, 2011.**

All Applicants must provide the following minimum documentation to be considered for a CEFIA grant:

1. **Utility Bills** – This requirement is applicable only to existing buildings. If the Customer Site is using a separate generation provider, provide the following information for both the generation provider and the transmission and distribution information from the utility.
    - Copies of the most recent twelve (12) months of electricity bills.
    - Utility interval data upon request.
2. **Usage Information for New Construction** – This requirement is only applicable to buildings with less than six (6) months of utility history. If six (6) months of usage history or less is available, provide any available usage history as listed under the utility bills requirement. In addition to the utility bills requirement above, Customer Sites with less than six (6) months of usage history will provide the following information:

- Engineering calculations specifying anticipated monthly electrical consumption in kWh for the site.
- Engineering calculations specifying the anticipated monthly maximum peak demand in kW for the site.
- A letter from the engineer who performed the calculations explaining calculation methodology. The letter should be signed by the engineer and on the engineer's letterhead.

3. **Financial Information** – Provide verifiable evidence of financial capability to undertake this PV Project from the Applicant. This should include the following:
   - Proof of funding resources for the PV Project in the form of a bank letter of reference/credit. This letter should be addressed to CEFIA on the bank's letterhead, signed by the appropriate bank officer, reference the length of time the Applicant has been a customer of the bank and the minimum balance carried by the Applicant.
   - Recipients of a grant under this RFP must provide a detailed statement of all sources and uses of funds for their project before receiving the final grant payment. Such statement must be certified as correct by the chief financial or principal officer of the grant recipient.
4. **Site Plans** – Site plans cannot be hand-drawn. Site plans shall include:
   - Electrical one-line diagram – This diagram clearly shows all major system components, identifies the make and model number of all major system components, and identifies the interconnections among all major system components.
   - PV Project Site Plan – A detailed drawing of the proposed PV Project site and surrounding territory. The drawing must clearly identify the specific location of the equipment to be installed and the expected point of electric interconnection.
5. **Site Energy Efficiency Measures for Existing Buildings** – Documentation must be submitted indicating the Customer Site has participated in one or more of the local utility's conservation programs funded by the Connecticut Energy Efficiency Fund (CEEF) or has had an energy audit performed by a qualified third-party energy services company. The Applicant must submit evidence that an energy efficiency audit has been performed at the Customer Site during the sixty (60) months **prior** to the submission of its Application. **Audits conducted by Customer Site personnel or the PV Project developer/contractor will not be accepted. If an energy efficiency audit has not been performed at the Customer Site within this timeframe, the Application will not be reviewed under this RFP.**

   CEFIA prefers applicants work with CEEF to perform an energy audit. However, if this is not possible, a full-building system audit may be performed by a qualified third party energy services company, including Professional Engineers (PEs) or Certified Energy Managers (CEMs). An energy audit includes a review of the entire building system – the envelope and all mechanical systems. The entity performing the energy audit

cannot be related to the Customer Site, installation contractor, PPA provider or any other entity directly involved with the renewable energy project.

The Applicant will submit the following documentation to evidence participation in a CEEF program:

- A copy of the completed energy efficiency audit, including the report's findings and payback periods for any recommended energy efficiency measures.
- Notarized affidavit signed by the Customer Site stating all recommendations in the energy efficiency audit with a payback of five (5) years or less will be implemented **prior** to the installation of the PV equipment.
- If available, a copy of the financial agreement with CL&P or UI executed by the following parties:
    - Customer Site
    - Energy efficiency contractor
    - Local utility

The Applicant will submit the following documentation to evidence completion of an energy efficiency audit conducted at the Customer Site by a qualified third-party energy services company:

- A copy of the completed energy efficiency audit, including the report's findings and payback periods for any recommended energy efficiency measures.
- Notarized affidavit signed by the Customer Site stating all recommendations in the energy efficiency audit with a payback of five (5) years or less will be implemented **prior** to the installation of the PV equipment.
- If available, invoices marked paid for all measures with a payback of five (5) years or less recommended in the energy efficiency audit.

No payments will be made by CEFIA until all energy efficiency recommendations in the energy efficiency audit with a payback of five (5) years or less have been implemented and proof, in the form of invoices marked paid or a signed financial agreement with CL&P or UI, has been provided to CEFIA's satisfaction. **CEFIA reserves the right to request more information regarding energy efficiency audits prior to making a grant payment.**

6. **Site Energy Efficiency Measures for New Construction or Gut Rehabilitations** – If a Customer Site has been constructed or gut-rehabilitated within the sixty (60) months **prior** to the submission of the Application, the Applicant **does not** have to evidence the Customer Site's participation in a CEEF program. CEFIA will require a letter from the general contractor or architect – on the general contractor or architect's letterhead – stating the date of construction or gut rehabilitation completion and listing all the energy efficiency measures included in the construction or gut rehabilitation. The letter must also state the site has been brought up to all current Connecticut electrical codes, building codes and regulations. The general contractor or architect and the Customer Site must both sign and date this letter.

7. **PV Project Agreements** – All PV Project agreements must be in place at the time of Application. Agreements must be signed by both the Applicant/Customer Site and the PV Project developer/contractor. Agreements should be made contingent upon receipt of a CEFIA grant award. Submit an executed copy of all PV Project agreements that demonstrate the ability of the Applicant to successfully develop and operate the proposed PV Project. Copies of the following contracts must be submitted, as applicable:
    - For third-party ownership PV Projects, where the Applicant plans to sell the PV Project's energy to the Customer Site, a copy of the PPA or lease between the Applicant and the Customer Site.
    - Letters of intent to negotiate any necessary easements.
    - Contracts to acquire, install, operate and maintain all major pieces of equipment.
    - Contracts or letters of commitment from financing firms or guarantors.
8. **Shading Analysis** – Provide a shading analysis using the solar pathfinder angle estimator diagram (www.solarpathfinder.com/DIA-Angle.html) at the planned installation location at the Customer Site. Google Earth or other aerial photos taken off the Internet are not valid shading analysis tools. Please provide any shading report(s) generated for the location as well as a digital photo of the pathfinder.
9. **Roof Information, applicable to roof-mounted projects only:**
    - Provide a notarized statement from Customer Site giving the estimated remaining useful life of the roof, years left on roofing warranty and assurance that the installation of solar PV modules will not void the existing warranty.
    - Provide a letter stamped by a PE or an Architect certifying a PE or an Architect has reviewed the Customer Site, and the roof is able to support the additional load PV modules will add. This letter will be on the PE's or Architect's letterhead and will be signed by both the PE or Architect and the Customer Site.
    - Provide a PE-stamped layout of the PV modules on the roof to certify the layout has been reviewed and is suitable for the specific Customer Site.
10. **Ground Mount Information, applicable to ground-mounted projects only:**
    - If applicable, provide a notarized statement from the Customer Site committing to clearing all trees/brush from the future site of the ground-mounted PV Project.
    - Provide a PE-stamped layout of the ground-mounted PV modules to certify the layout has been reviewed and is suitable for the specific Customer Site.
11. **Not-for-profit Documentation** – This requirement is applicable only to not-for-profit Applicants. Provide a copy of a 501(c)3 letter from the Internal Revenue Service (IRS) indicating the Customer Site is a not-for-profit enterprise.
12. **Affordable Housing Documentation** – This requirement is applicable only to not-for-profit affordable housing Applicants.

- Submit a copy of the page in the not-for-profit's by-laws which indicates the primary mission of the Customer Site is to develop, manage, promote and/or construct affordable housing.
- Submit a letter from a Federal, State or local government agency listing the PV Project's address and certifying the site is part of a Federal, State or locally recognized affordable housing development.

Applications not meeting all requirements outlined above will not be further evaluated under this program.

2.4. Evaluation Process

Applications submitted under this RFP will be assessed through three evaluation steps. CEFIA may use department staff, staff of other agencies, private consultants, industry experts or other designated representatives to evaluate the Applications throughout the evaluation process. The RFP evaluation process steps are as follows:

- Minimum RFP Requirements – The information provided in each response will be evaluated first for completeness and consistency with the minimum RFP requirements and documentation requirements outlined above. These are the minimum requirements all responses must meet to be eligible for further evaluation. All Applications with deficiencies will be denied.

- PV Project Analysis and Evaluation – After the evaluation of the complete Application, including receipt of responses to any follow-up questions, Applications will be evaluated by CEFIA staff based on the following criteria:

    - PV Project Economics
    - Deployment of the Technology
    - Probability of PV Project Completion and PV Project Feasibility
    - Public and Unique Ratepayer Benefits

    Based on this evaluation, CEFIA staff will rank all eligible PV Projects and develop a recommendation of PV Projects for funding to the Board.

- Selection of PV Projects for Funding – At a regularly scheduled Board meeting, CEFIA staff will present recommendations to the Board for review and funding authorization. All PV Projects approved by the Board will receive a conditional funding offer from CEFIA.

Applications can be rejected at any point in the evaluation process at the sole discretion of CEFIA. Where appropriate, PV Projects not awarded a grant will be encouraged to resubmit a revised Application in response to a later solicitation.

2.5. Evaluation Criteria

Those Applications meeting the minimum requirements will be evaluated by CEFIA for funding based on the following evaluation criteria:

- PV Project Economics 40%
- Deployment of the Technology 20%
- Probability of PV Project Completion and PV Project Feasibility 20%
- Public and Unique Ratepayer Benefits 20%

2.5.1. PV Project Economics

This review will include an assessment of the PV Project's pro forma and the commitment of non-CEFIA financing sources to determine if the costs of the equipment and installation are reasonable.

Key PV Project economic values to be evaluated are:

- Ratio of grant request to total PV Project cost
- Staff grant calculation
- Cash flow net present value (NPV) and Internal rate of return (IRR)
- Cash flow consistency
- Simple payback

2.5.2. Deployment of the Technology

Key issues to be addressed in the Deployment of the Technology evaluation:

- How well are the technology's attributes matched with the Customer Site's energy needs and requirements?
- Has the proposed equipment been appropriately sized to the Customer Site's electrical loads?
- Does the PV Project reflect a thorough understanding of the generating equipment's limitations and capabilities?

2.5.3. Probability of PV Project Completion and PV Project Feasibility

Key issues to be addressed in the Probability of PV Project Completion and PV Project Feasibility evaluation:

- Does the Applicant exhibit financial strength, technical expertise and experience with similar PV Projects?
- Does the Applicant demonstrate awareness and experience with community issues that could influence the PV Project's success and schedule?
- Has the Applicant made efforts to interface with community and special interest groups?
- For buildings complying with the most current Connecticut State Building Code or ASHRE standard 90.1-2004, whichever is more stringent, and demonstrating 10.5% or better minimum energy performance, is the Customer Site certified as:
    - EPA Energy Star compliant
    - Green Globes rating system - Two (2) Globes or better

  - Compliant with the Connecticut regulations regarding High Performance Building Standards
  - LEED Silver or better
    Or
  - Energy efficient under an equivalent standard
- Does the Applicant exhibit a strong understanding of the PV Project's expected production of renewable energy?
- Is the Application economically sound?
- Is funding secured for the balance of the costs not funded by CEFIA?
- What is the level of financial commitment from the Customer Site?
- What is the likelihood the PV Project will meet its proposed operational date?

2.5.4. Public and Unique Ratepayer Benefits

Important in CEFIA's evaluation is the degree to which the proposed PV Project relates to the broader interests of Connecticut ratepayers. All Applications will be evaluated on their ability to provide the state's ratepayers with a high level of benefits.

Key elements of the Public and Unique Ratepayer Benefits evaluation will include:

- In-state job creation, including purchases of major system components manufactured or assembled in Connecticut.
- Additional consideration for manufacturing or assembling major system components in a distressed municipality in Connecticut.
- Generation output and reliability at time of system peaks.
- PV Project diversity in terms of technology, location and size.
- Outreach efforts to promote the application of PV to non-residential entities and the general public.
- Efforts to promote PV in schools through curriculum, programs and events.
- Unique PV Project attributes (e.g., part of larger municipal or corporate sustainability plan, etc.)
- Has the Customer Site implemented the recommendations from a third-party energy efficiency audit?
- Applicable to municipal and school projects only – Is the project located in a CEFIA Clean Energy Community?

Section 3 - Application Submission Requirements

This section outlines the content and format requirements for all Applications submitted in response to this RFP. Applications that do not include the information requested in this section will be ineligible for further evaluation. CEFIA is permitted, but not obligated, to contact the Applicant to clarify or obtain any information inadvertently omitted from an Application.

All Applications must address the requirements outlined in the following sections of this RFP document.

3.1. Application Delivery

Applicant must submit a sealed package that includes:

- Original application (labeled "ORIGINAL") with confidential material separated and placed in a sealed envelope clearly marked "CONFIDENTIAL" in accordance with Section 6 of this RFP
- One (1) electronic copy on compact disc or thumb drive

Sealed Application packages must be received at CEFIA's offices no later than 5:00 p.m., December 30, 2011. E-mail and facsimile (fax) transmissions are not acceptable under any circumstances. Applications must be submitted as complete packages, not piecemeal. The Application package will be date-stamped by CEFIA upon receipt, and this time and date shall determine when the package was received.

3.2. Application Format

All Applications must conform to the following format guidelines:

- 12-point font, 1.5-line spacing, standard 8.5 X 11" paper.
- Double-sided printing where possible.
- Bound using binder clip or other soft method. No three-ring binders.
- No handwritten applications.

3.3. Application Content Requirements

An Application will include a complete set of Application forms and all additional documentation as required.

3.4. Application Instructions

All Applications must include a complete set of forms for each PV Project. Using the forms will ensure consistency in PV Project submission, interpretation and evaluation. Information requested on each of the forms must be completed in detail and cannot refer to other sections of the response, even if the information is redundant.

Each Customer Site is allowed to submit one Application under this RFP. Each Application must be submitted by the Customer Site/Applicant. If an Applicant is a PPA provider submitting more than one Application for separate Customer Sites, a separate set of forms

must be submitted for each PV Project. **Additionally, for PPA providers, the Customer Site must sign Form A – Application Certification along with the PPA provider's representative.**

The Application and all required forms are posted on CEFIA's Web site at www.ctcleanenergy.com/bestofclass.

Brief descriptions for each section of the Application are provided below.

3.4.1. Form A – Application Certification

This section requests general information about the Applicant, Customer Site and proposed PV Project, including contact information, PV Project description, funding sources, REC ownership and grant request.

A duly authorized officer of the Applicant must complete and sign the Application Certification. This will certify the information in the Application is accurate, the pricing includes all costs for the proposed term of service, and the Applicant agrees to be bound by the terms and conditions contained in this RFP. At least one (1) original signature must be provided.

If the Applicant is a third-party PPA provider, the Customer Site, in addition to the duly authorized representative of the PPA provider, must sign Form A.

3.4.2. Form B – PV Project Summary

This section requests both general and specific information about the Applicant and the proposed PV Project including contact information, location and size.

3.4.3. Form C – Technology-Specific Data

This section requests information about the technology being utilized, the cost and the PV Project schedule and milestone dates for the proposed generating facility. Applicants should format the schedule using a number of months from a reference date.

3.4.4. Form D – Team Experience and Qualifications

This section requests information regarding the key team members responsible for the development, installation, coordination and/or maintenance of the proposed PV Project.

3.4.5. Form E – Estimated Job Creation Information

This section requests estimated information regarding the number of owner(s), fulltime and/or part-time employees working directly on installing the renewable energy system. The Applicant will be responsible for collecting all relevant data from the PV Project contractor(s) and/or any subcontractor(s) working on the PV Project. Required information includes:

- Name of company
- Location of company headquarters
- Location of any other company offices, if applicable
- Total number of people employed by company
- Total number of employees located in Connecticut, if applicable

- Total number of employees working directly on the Customer Site
- Number of new employees hired to complete the Customer Site, if applicable
- Hours worked per employee directly on Customer Site
- Hourly wages per employee working directly on Customer Site
- Employee job classifications for those working directly on the Customer Site, including but not limited to:
    - Master/Journeyman/Apprentice Tradesman
    - Roofer
    - Design Engineer
    - Installation Project Manager
    - Heavy Machinery Operator
    - Volunteer
    - Student
    - Owner

Section 4 - Incentive Limits and Calculation

4.1. PV Project kW Size Limit Calculation

PV Projects may be larger than 250 kW_{AC}, however, the grant calculation shall only be based on the first 250 kW_{AC}.

Where interval data are available, the maximum system size eligible for CEFIA's incentive will be limited to the difference between the most recent twelve (12) months' peak demand and the "base load." Base load is defined as the average of the account's non-zero monthly minimum demands over the most recent twelve (12) months.

In cases where interval data are not available, the greatest allowable system size will be no larger than the maximum of the previous twelve (12) months' peak demand on a kW_{AC} basis. **If the minimum of the previous twelve (12) months' peak demand is less than 10kW the site will not be eligible to apply under this RFP.** Sites with a peak demand greater than 250kW are eligible to apply.

4.2. Renewable Energy Certificates (RECs)

Applicants will have several options regarding the ownership of the Connecticut Class I RECs generated by the proposed PV system. Applicants may:

- Retain ownership of the RECs.
- Retire the RECs.
- Sell the RECs to CEFIA at a set price.

If an Applicant elects to retain ownership of the RECs, CEFIA will include the estimated, positive annual cash flow generated by these RECs in the grant calculation.

If an Applicant chooses to retire or sell the RECs to CEFIA, the value of the RECs will not be included in the grant calculation.

Applicants that sell the RECs to CEFIA will receive a larger grant than Applicants opting to retain or retire the RECs. For Applicants opting to sell their Connecticut Class I RECs to CEFIA, the purchase price will be estimated using a value of $10.00 per MWh ($.010 per kWh) for a fifteen (15) year period.

4.3. Funding and Disbursement

This RFP is intended to help transition commercial renewable energy projects located in Connecticut from a CEFIA-funded, grant-based incentive structure to a REC-based model. Grants will vary based on the economics of each PV Project and will be capped according to Table 1. The grant caps in Table 1 are based on the proposed ZREC program structure outlined in PA 11-80. For systems less than or equal to 100 kW_{AC}, the grant cap is $3.60 per Watt. For systems greater than 100 kW_{AC} up to 250 kW_{AC}, the grant cap is $3.30 per Watt.

The proposed ZREC program does not provide different incentives for systems based on commercial customer type (i.e. private, government, or non-profit); thus, no premium for customer type is built into the grant structure of this RFP. The grant caps presented in Table 1 have been calculated based on the present value of the cash flow generated by ZREC payments over an estimated fifteen (15) year time period. Although grants are offered through this RFP, CEFIA will provide the comparative ZREC incentive price for project based on CEFIA's financial model assumptions.

The assumptions used by CEFIA to determine the grant funding caps are presented in Table 2 below. The actual funding amount will be determined by an assessment of the difference between the Customer Site's cost of energy displaced by the proposed PV Project and the total cost and value of the energy generated by the PV Project.

Each Customer Site will be individually analyzed by CEFIA, and will be evaluated over the reasonable life cycle of the PV Project.

Table 1 – Funding Limits for PV Projects

	Maximum Incentive
Incentive Blocks	**All System Owners** ($/Watt$_{PTC}$)**
≤100kW$_{AC}$	$3.60/Watt$_{PTC}$
>100 kW$_{AC}$ to 250kW$_{AC}$	$3.30/Watt$_{PTC}$
Evaluation timeframe	20 years

Table 2 - Assumptions Used To Determine ZREC-Based Grant Incentive

	Private Owners**		Public, Non-Profit and Affordable Housing Owners	
Incentive Blocks	**≤ 100 kW_{AC}**	**>100 kW_{AC} ≤ 250 kW_{AC}**	**≤ 100 kW_{AC}**	**>100 kW_{AC} ≤ 250 kW_{AC}**
ZREC Rate Cap[1]	$.385/kWh	$.350/kWh	$.385/kWh	$.350/kWh
Internal Rate of Return	9.320%	9.320%	4.500%	4.500%
Debt Interest Rate	8.000%	8.000%	4.500%	4.500%
Initial Debt Term	15 Years	15 Years	15 Years	15 Years
Debt to Total Cost Ratio	70.0%	70.0%	100.0%	100.0%
Federal Investment Tax Credit	30.000%	30.000%		
Combined Federal and State Income Tax	39.445%	39.445%		
Avoided Utility Rate	$.1870/kWh	$.1870/kWh	$.1870/kWh	$.1870/kWh
Avoided Utility Cost Inflation Rate	2.000%	2.000%	2.000%	2.000%
General Inflation Rate	2.500%	2.500%	2.500%	2.500%
Depreciation	50% Bonus, 5-year MACRS	50% Bonus, 5-year MACRS		
Class 1 REC Price	$.01 per kWh	$.01 per kWh	$.01 per kWh	$.01 per kWh

****Includes PPAs with not-for-profit entities**

Awarded grants will be disbursed in installments to the owner of the PV equipment based on PV Project milestones according to the schedule in Table 2 below. **Payments may not be assigned to a third party for any reason.**

Table 3 - Disbursement Schedule – Basic Grant

Milestone	Payment
Delivery of generating equipment to site	50%
Startup, commissioning, and inspection	40%
After six (6) months of successful operation	10%

The final grant payment will be made only if the system has produced at least seventy percent (70%) of the FAA's projected AC energy production during the first six (6) months of operation, as verified by production reports generated by on-site metering and a data acquisition system such as Fat Spaniel or equivalent.

[1] The ZREC rate cap is higher for systems up to 100 kW per Section 108 (b) (3) of PA 11-80.

Additionally, the final grant payment will not be made until actual job creation information has been submitted. With the final payment request the Applicant must submit job information for all employees working directly on the installation of the renewable energy generating system. The Applicant will be responsible for collecting all relevant data to satisfy this requirement. Requisite information includes:

- New employees hired to complete the PV Project
- Employee job classifications, for example:
  - Electrician
  - Plumber
  - Design Engineer
- If applicable, employee license type, for example:
  - Journeyman Plumber (P-2)
  - Master Electrician (E-1)
  - Home Improvement Contractor (HIC)
- Hours worked per employee
- Hourly wages per employee

The actual job creation information will be compared to the estimated job creation information submitted in Form E of the Application. As a development agency for the State of Connecticut CEFIA will be collecting job creation information to gauge the effectiveness of development programs in Connecticut.

Section 5 - Change Orders

If an Applicant is selected by the Board for a grant award, no changes to the Application will be permitted, unless the change is required due to documented unavailability of key equipment (e.g., PV modules, inverters) and the change results in no significant change (<±5%) in the PV Project scope, cost or schedule.

No other circumstances may trigger a change order. If a change order is required, the Applicant must submit to CEFIA the following documentation:

- Updated Application Forms A, B and C
- Updated site plan
- Updated electrical one-line drawing
- Letter from Applicant, signed by both the Applicant and the PV Project developer/contractor, explaining the circumstances and nature of the change order.

Any changes to PV Project scope other than the above will require reapplication at a future date.

Section 6 - Terms and Conditions of CEFIA Financing

Applicants accepting a grant award must be willing to accept terms and conditions substantially similar to those found below. **An FAA detailing the terms and conditions of the award is expected to be negotiated and executed within ninety (90) days of award notification, after which time the financing offer from CEFIA may be retracted if an FAA has not been executed.** An outline of the basic terms and conditions of CEFIA financing is provided below.

No Commitment; Reserved Rights
This program is not an offer. Neither this program nor any subsequent discussion shall give rise to any commitment on the part of CEFIA or confer any rights on any Applicant unless and until a binding written FAA is executed by CEFIA and the Applicant. CEFIA reserves the right to reject any or all Applications; waive defects or irregularities in any Application; enter into discussions with selected Applicants; discontinue discussions with any Applicant at any time and for any reason; correct inaccurate awards; change the timing or sequence of activities related to this program; modify, suspend or cancel this program; and condition, modify or otherwise limit awards pursuant to this program.

Applicant's Costs
The Applicant shall bear all costs associated with the preparation of its Application, any related investigative or due diligence activities and any resulting discussions or negotiations.

Applicant Representations
By responding to this program, the Applicant shall be deemed to have represented and warranted: (1) that the Applicant's Application is not made in connection with any competing Applicant submitting a separate response to the program and is in all respects fair and without collusion or fraud; provided, that this requirement shall not be construed to prohibit any person or entity from being involved in more than one project or Application; (2) that the Applicant did not participate in the program development process; (3) that no Board member, consultant to CEFIA or employee of CEFIA participated directly or indirectly in the Applicant's response preparation; (4) that the Applicant has not been convicted of bribery or attempting to bribe a public official or employee of the state, has not been disqualified for contract awards by any agency of the state and is not in default under any contract with an agency of the state; (5) that the Applicant has not provided any gift or benefit to any state official or employee having direct influence over the evaluation of this proposal; (6) that the Applicant has disclosed all affiliates, partnerships and relationships; and (7) that the information contained in the Application is true, accurate and complete and includes all information necessary to ensure that the statements therein are not misleading.

Freedom of Information Act and Confidential Material
CEFIA is a "public agency" for purposes of the Connecticut Freedom of Information Act (FOIA). Accordingly, upon receipt at CEFIA's office, the Application, the request for financial assistance, and any files or documents associated with this Application, including e-mails or other electronic files, will be considered a public record and will be subject to disclosure under FOIA. Under C.G.S. §1-210(b), FOIA includes exemptions for, among other things, "trade secrets" and "commercial or financial information given in confidence, not required by statute." Only the particular information falling within a statutory exemption can be withheld by

CEFIA if CEFIA receives a FOIA request that encompasses a particular proposal or request for financial assistance.

All Applicants submitting responses to this program must specifically identify particular sentences, paragraphs, pages, sections or exhibits it claims are confidential and should be exempt, and provide these confidential materials in a separate sealed envelope clearly marked "Confidential." All Application materials not placed in a separate, sealed envelope clearly marked as confidential will not be treated as confidential and will be made available for public view upon an FOIA request. Applicants may not submit the entire program response marked as confidential.

The Applicant must also provide a statement of the basis for each claim of exemption. It will not be sufficient to state generally that the proposal is proprietary or confidential in nature and not, therefore, subject to release to third parties. A convincing explanation and rationale sufficient to justify each exemption consistent with C.G.S. § 1-210(b) must be provided.

Further, Applicants should be aware:

(i) CEFIA has no obligation to notify any Applicant of any FOIA request received by CEFIA, although it may make an effort to do so;

(ii) CEFIA may disclose materials claimed to be exempt if in its judgment such materials do not appear to fall within a statutory exemption;

(iii) CEFIA may in its discretion notify Applicants of FOIA requests and/or of complaints made to the Freedom of Information Commission concerning items for which an exemption has been claimed, but CEFIA has no obligation to initiate, prosecute or defend any legal proceeding or to seek to secure any protective order or other relief to prevent disclosure of any information pursuant to an FOIA request;

(iv) the Applicant will have the burden of establishing the availability of any FOIA exemption in any such legal proceeding; and

(v) in no event shall CEFIA or any of its officers, directors or employees have any liability for the disclosure of documents or information in CEFIA's possession where CEFIA, or such officer, director or employee in good faith believes the disclosure to be required under FOIA or other law.

In the event of a public records request for an Application, CEFIA may request from the Applicant a version of such Application from which all information for which an FOIA exemption has been claimed has been redacted. By submitting such an Application, the Applicant agrees to provide such a redacted version upon request by CEFIA.

Use of Information and Ownership of Work Product

Except for information falling within a statutory FOIA exemption as described in the section above dealing with the FOIA, CEFIA is not restricted in its right to use or disclose any or all of the information contained in any Application and can do so without compensation to the

Applicant, notwithstanding any language in the Application to the contrary. Except as otherwise expressly provided in an agreement with CEFIA, all work products developed under a contract awarded as a result of this program shall be the sole property of CEFIA.

State Contracting Requirements
This program and any FAA awarded pursuant to this program shall be subject to and incorporate all applicable legal requirements arising under federal or state law, including applicable state statutes and Executive Orders relating to maintenance and examination of records, nondiscrimination, sexual discrimination, the Americans with Disabilities Act, violence in the workplace and whistleblower protection. A more complete description of such state contracting requirements is available on request directed to CEFIA in accordance with the communications protocol set forth above.

PV Project Operation
The Applicant is required to operate the PV Project for the "financeable life" of the equipment, which is assumed to be fifteen (15) years for solar PV. Language will be incorporated into the FAA allowing temporary cessation of operation if it can be documented that continued operation would cause significant economic hardship.

Term of FAA
The term of the FAA will be fifteen (15) years.

PV Project Characteristics
In addition to the funding terms discussed above, successful Applicants will be required to:

- Operate the equipment in Connecticut for the duration of the FAA.
- Make available, in real time, via a publicly accessible web link, downloadable operating and historical data from the PV Project, through an energy monitoring system for all installations.
- Provide CEFIA with reasonable access to the site.
- Show proof of contractor, subcontractor and Applicant/Customer Site's insurance policies evidencing a minimum of $1,000,000 liability insurance coverage.
- Insure the equipment and list CEFIA as an additional loss payee.
- Repay the total grant amount from the date of disbursement in the event of a default.
- Provide prominent and visible signage at the PV Project site and acknowledgment in any and all of the customer and owner's promotional materials recognizing CEFIA's contribution to the PV Project in a form acceptable to CEFIA.
- Meet certain standards that include documentation, operational, warranty and hardware requirements.

The details of these requirements can be found in the sample FAAs posted on the CEFIA Web site at www.ctcleanenergy.com/bestofclass.

STANDARD GRANT AGREEMENT

THIS STANDARD GRANT AGREEMENT ("Agreement") is made on INSERT DATE ("Effective Date"), by and THE CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY ("CEFIA"), a quasi-public agency of the State of Connecticut under Section 16-245n of the Connecticut General Statutes ("Conn. Gen. Stat."), acting as the successor agency to Connecticut Innovations, Incorporated for the purposes of administrating the Connecticut Clean Energy Fund ("CCEF") created under said Section 16-245n, having a place of business at 865 Brook Street, Rocky Hill, Connecticut 06067, and INSERT OWNER NAME ("Owner") a INSERT STATE corporation having a place of business at INSERT OWNER ADDRESS with each referred to as a "Party" and collectively as the "Parties" in this Agreement.

BACKGROUND

WHEREAS, in accordance with the CEFIA Comprehensive Plan to foster the growth, development and commercialization of renewable energy sources and related enterprises, and to stimulate demand for renewable energy and deployment of renewable energy sources that serve end use customers in the State of Connecticut, the Board of Directors of CEFIA ("CEFIA Board") has determined that it is in keeping with Conn. Gen. Stat. Section 16-245n for CEFIA to fund certain commercial activities that support projects involving the use of photovoltaic technology for distributed generation ("DG") power production;

WHEREAS, Owner submitted an application for financial assistance under CEFIA's On-Site Renewable Distributed Generation Program for the procurement and installation of photovoltaic power generating equipment ("Equipment" or "Project") to be installed at Owner's facility located at INSERT ADDRESS ("Project Site" or "Customer Site"); and

WHEREAS, after reviewing and careful consideration of Owner's proposal, the Board of Directors of CEFIA has determined that it is prudent for CEFIA to provide to Owner financial assistance, in the form of a monetary grant under CEFIA's On-Site Renewable DG Program, for the procurement and installation of the Equipment.

NOW, THEREFORE, in consideration of the mutual promises herein contained, the Parties hereby agree as follows:

1. FUNDING AND DELIVERABLES.

1.1. Grant. CEFIA shall provide financial assistance to Owner in the aggregate amount not-to-exceed $INSERT AMOUNT ("Grant"). Payment of the Grant is subject to the terms and conditions of this Agreement.

1.1.1. Initial Grant Payment. CEFIA will pay Owner fifty percent (50%) of the Grant when:

1.1.1.1. All Equipment identified in Schedule A of this Agreement has been delivered to Owner at the Project Site;

1.1.1.2. Owner has provided proof to CEFIA of Owner's contractor's and subcontractor's insurance policies evidencing a minimum of $1,000,000.00 liability insurance coverage through the Commissioning Date;

1.1.1.3. Owner has provided to CEFIA proof of insurance coverage pursuant to Section 3.5 of this Agreement; and

1.1.1.4. CEFIA will make the payment to Owner within ten (10) business days of CEFIA's receipt of a letter substantially in the form of Appendix I (Equipment Delivery to Site) of this Agreement attesting to the delivery to Project Site of all Equipment, including appropriate documentation of delivery of said Equipment, and including proof of insurance.

1.1.2. Interim Grant Payment. CEFIA will pay Owner forty percent (40%) of the Grant when the Equipment has been installed, tested, and accepted by Owner ("Commissioning Date"), but only if all of the following requirements shall have been met:

1.1.2.1. The Equipment is operational and complies with all of the details and specifications set forth in this Agreement;

1.1.2.2. Owner has provided CEFIA with supporting documentation regarding the Equipment and its installation as reasonably requested by CEFIA, including but not limited to manufacturer's warranties and satisfactory inspection and test reports;

1.1.2.3. CEFIA has received an inspection report from an independent engineer selected by and paid for by CEFIA certifying that the Equipment: (1) has been installed at the Project Site in accordance with the manufacturer's instructions and all applicable code requirements, (2) has been tested, and (3) is operational and capable of power generation in substantially the amounts projected in Schedule A;

1.1.2.4. Owner has provided to CEFIA written proof of Owner's compliance with the energy monitoring requirements pursuant to Section 3.2.2 of this Agreement; and

1.1.2.5. CEFIA has received from Owner an executed letter substantially in the form of Appendix II (Equipment Acceptance) attached to this Agreement, certifying the completion of the system commissioning

and entry into operational service of the generating Equipment, and requesting the interim funding.

1.1.3. Final Grant Payment. Six (6) months after the Commissioning Date described in Section 1.2.1, CEFIA shall pay to Owner the remaining ten percent (10%) of the Grant, but only if:

1.1.3.1. Owner has demonstrated to CEFIA's reasonable satisfaction that the Equipment has produced during said six (6) months on an annualized basis at least seventy percent (70%) of the projected net kWh production; and

1.1.3.2. Owner has provided CEFIA with an executed funding request substantially in the form of Appendix III (Form of Funding Request) attached to this Agreement.

1.2. Other Deliverables. In addition to the terms and conditions in Section 1.1 above, Owner shall comply with the following to CEFIA's reasonable satisfaction unless waived by CEFIA:

1.2.1. Owner shall use reasonable commercial efforts to cause the Commissioning Date to occur on or before the date that is one (1) year from the Effective Date.

1.2.2. Within ten (10) business days of the interconnection date, Owner shall certify, in writing or via email, to CEFIA that interconnection is complete.

1.3. Waiver. CEFIA may waive satisfaction of any deliverable or condition for any Grant payment under this Agreement, but each waiver must be in writing and no such waiver shall extend to any subsequent Grant payment.

2. REPRESENTATIONS AND WARRANTIES

2.1. Of Owner. Owner represents and warrants to CEFIA, as of the Effective Date, as follows:

2.1.1. Owner represents and warrants that it is a corporation/limited liability company/other legal entity duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, with all requisite power and authority to (i) develop the Project, and install, own, and operate the Equipment; and (ii) enter into and perform this Agreement, and to incur the obligations herein provided. The execution, delivery, and performance by Owner of this Agreement have been or will be duly authorized and approved by all necessary governmental authorities or other third parties and do not and will not violate Owner's organizational documents or any applicable law

or any agreement or instrument to which Owner is a party or by which it is bound or by which any of its properties may be affected. This Agreement is the legal, valid, and binding obligation of Owner, enforceable against it in accordance with this Agreement's terms;

2.1.2. There are no actions, suits, or proceedings pending, or to Owner's knowledge, threatened against Owner before any court or other governmental authority or before any arbitrators that could reasonably be expected to affect the installation and operation of the Equipment;

2.1.3. Owner's proposal resulting in this Agreement accurately reflects all material costs and expenses reasonably expected to be incurred in connection with the installation and operation of the Equipment, and accurately reflects the anticipated time period for the implementation of each material part of the Project;

2.1.4. All required approvals and permits necessary for the installation and operation of the Equipment at the Project Site have been obtained or will be obtained prior to the installation of the Equipment;

2.1.5. Owner has selected the Equipment based on its own judgment and expressly disclaims reliance on any statements made by CEFIA or its agents relating thereto. Owner understands and acknowledges that CEFIA did not select, manufacture, or supply the Equipment. Owner will look solely to the manufacturer for delivery of the Equipment. Owner hereby waives any claim (including any claim based on strict or absolute liability in tort) it may have against CEFIA for any loss, damage (including incidental or consequential damage), or expense caused by the Project or the Equipment other than claims or liabilities resulting from the gross negligence or willful misconduct of CEFIA;

2.1.6. An energy efficiency audit was conducted at the Project Site by an independent third party or by the Connecticut Energy Efficiency Fund. All energy efficiency measures recommended in the energy efficiency audit, with a payback period of five (5) years or less, have been implemented at the Project Site. Alternatively, if the Project Site is a new construction or major renovation, Owner shall provide a written confirmation that the energy efficiency standards employed at the Project Site comply with the current Connecticut building code as of the Effective Date of this Agreement; and

2.1.7. State Code of Ethics:

2.1.7.1. Owner has not provided to any employee of CEFIA on or after July 1, 2005, any items of value for which full payment has not been made;

2.1.7.2. In connection with the application for, and solicitation and award of, the financial assistance provided pursuant to this Agreement, Owner has not committed any violation of the Connecticut Code of Ethics for Public Officials and Lobbyists, Conn. Gen. Stat. Chapter 10 ("Codes of Ethics"), or intentionally and knowingly violated any applicable requirement of the request for proposals or other applicable law; and

2.1.7.3. Owner has not been found to have violated the Codes of Ethics or Conn. Gen. Stat. § 4a-100, and has not been suspended or disqualified from bidding on contracts with the State of Connecticut or any department, agency, or quasi-public agency thereof.

2.2. Of CEFIA. CEFIA represents and warrants as follows:

2.2.1. CEFIA represents and warrants to Owner that CEFIA has all requisite power and authority to enter into and perform this Agreement and to incur the obligations herein provided. The execution, delivery, and performance by CEFIA of this Agreement have been or will be duly authorized by all necessary federal, state, and local agencies and boards and do not and will not violate any law (including without limitation Conn. Gen. Stat. § 16-245n) or any agreement, instrument, or evidence of indebtedness to which CEFIA is a party or by which it is bound or by which any of its properties may be affected. This Agreement is the legal, valid, and binding obligation of CEFIA, enforceable against it in accordance with this Agreement's terms; and

2.2.2. CEFIA neither makes nor shall be deemed to have made any warranty or representation, express or implied, concerning the Equipment, including, without limitation, any warranty or representation as to design, quality, capability, title, or condition or as to merchantability or fitness for any particular purpose.

3. COVENANTS

3.1. Location and Operation.

3.1.1. Status and Location. Owner, or its assignee(s) or transferee(s), shall maintain a legal existence in its jurisdiction of organization with authority to transact business in the State of Connecticut. Owner, or its assignee(s) or transferee(s), shall operate the Equipment in the State of Connecticut for the Term of Agreement;

3.1.2. Taxes. Owner understands and agrees that it, not CEFIA, is responsible for all applicable taxes associated with the Equipment;

3.1.3. Equipment. Owner shall install the Equipment, or cause the Equipment to be installed, in a manner consistent with any installation manual prepared by the manufacturer or supplier of the Equipment. Owner shall make commercially reasonable efforts, within a reasonable period of time, to notify CEFIA of the occurrence of any event or contemplated action (including the threat and/or commencement of any legal proceedings) which could have a material adverse effect on the Project (including a material deviation from the specifications set forth in Schedule A), together with a recommended course of action; and

3.1.4. Operation of the Project. Owner, or its assignee(s) or transferee(s), shall maintain the Equipment at the Project Site and shall use and operate the Equipment solely to meet Owner's energy needs. Owner shall (a) operate the Equipment in accordance with the supplier's or manufacturer's instructions, consistent with warranty and insurance requirements; and (b) maintain the Equipment in good repair, working order and condition and make all needed and proper repairs, renewals, replacements, additions, or improvements thereto and immediately notify CEFIA of any event causing loss or depreciation in the value of the Equipment other than ordinary wear and tear.

3.2. Access to and Public Notice of Information.

3.2.1. Subject to applicable law, including Connecticut's Freedom of Information Act, CEFIA shall have the right to collect, review, analyze, utilize, and disseminate to third parties and the public all information relating to the Project, including data directly related to the Project's economic, social, and operational benefits, as well as Equipment performance, installation costs, and operating costs. Without limiting the generality of the foregoing, CEFIA shall be entitled to reasonable access to, and the right to obtain and use copies of, all operation, maintenance, and similar data relating to the Project.

3.2.2. Owner shall describe the photovoltaic system and make all real-time and historical operating information with respect to the Project available to CEFIA, including operating hours, power output, and any other available operating data reasonably requested by CEFIA, through the installation and continued operation of an energy monitoring system such as Power One's Fat Spaniel or an equivalent system reasonably acceptable to CEFIA. If Owner chooses Fat Spaniel, then Owner shall subscribe to Fat Spaniel's "Five-Year Connecticut CEF Agency Report" feature. If Owner subscribes to Fat Spaniel's Solar Plant Vision, then Owner shall provide CEFIA with a unique user name and password for as long as Owner subscribes to Solar Plant Vision, but in no case for longer than the Term of this Agreement. Owner shall provide a live-information, publicly accessible hyperlink between its energy monitoring website, CEFIA's website, and any other websites as CEFIA may reasonably request.

3.2.3. On or before February 28th during each calendar year of the Term of this Agreement, Owner shall provide to CEFIA an Annual Production Report detailing, among other things, the Project's annual kilowatt hour production for the previous calendar year. Visit CEFIA's website at www.ctcleanenergy.com/osdgproduction for a template of the report.

3.3. Compliance with Laws. Owner shall comply with all applicable laws affecting or applicable to the Project. Without limiting the generality of the foregoing, Owner shall timely secure, preserve, renew, and maintain all governmental approvals and its material private rights and licenses relating to the Project.

3.4. Payment of Obligations. Owner shall pay and discharge all lawful claims and demands whatsoever, including trade obligations, arising in connection with, and/or relating to, the Project; provided, however, that the payment of any obligations may be postponed so long as they are being diligently contested in good faith. Owner shall defend the Equipment against all claims and demands of any party at any time claiming any interest therein.

3.5. Insurance. Owner shall maintain fire, extended coverage, and other hazard insurance policies with respect to the Equipment, in amounts not less than the replacement value of the Equipment and listing CEFIA as an additional loss payee; and shall maintain liability insurance in form and amount reasonably satisfactory to CEFIA. Each policy of insurance shall (a) include a clause that it cannot lapse or be canceled or modified except upon at least thirty (30) days' prior written notice to CEFIA; and (b) be issued by a company licensed to provide such insurance in the State of Connecticut and reasonably acceptable to CEFIA. Owner is under an ongoing obligation to provide CEFIA with current insurance certificates during the Term of this Agreement.

3.6. No Corrupt Practices. Owner shall not pay, offer or promise to pay, or give any money or anything of value, directly or indirectly, to any party involved with the Project, any officer or employee of a governmental authority, or to any political party or candidate for political office for the corrupt purpose of inducing any such party, official, political party or candidate to misuse its position or to influence any act or decision of a governmental authority in order to obtain, retain or direct business to or otherwise influence a decision in favor or for the direct or indirect benefit of Owner, in violation of any applicable law.

3.7. Financial Management Systems. Owner shall keep a full and complete account of all Project costs. Owner also shall maintain complete books, records, and financial management systems for the Project until three (3) years from the Commissioning Date. Such systems shall provide: (a) accurate, current, and complete disclosure of the financial activity relating to the Project, (b) separate accounting for Project funds from other activities and accounts of Owner, (c) effective control over and accountability for all Project funds, property, and other assets, (d) comparison of actual outlays for Project costs with budgeted amounts, and (e) accounting records

supported by source documentation. All of such systems shall be subject to audit by CEFIA, at the election of CEFIA and at its expense.

3.8. Access to the Project Site. Owner shall provide to CEFIA reasonable access to the Project Site during normal business hours for educational purposes, case study development, Project inspection, public relations, or other reasonable purposes. CEFIA shall contact Owner at least three (3) business days in advance to request access.

3.9. Renewable Energy Certificates. Owner shall be entitled to all Renewable Energy Certificates ("RECs") and any other tradable energy- or environmental-related commodity produced by or associated with the Project, including but not limited to greenhouse gas credits, emissions credits, tradable carbon credits, and all other types of tradable project-related commodities however named that are presently known or designated or created in the future.

3.10. Interconnection. Owner understands and agrees that it is responsible for ensuring the appropriate interconnection of the Equipment to any utility service providers responsible for the provision of electricity, gas, and telecommunications services to the Project.

3.11. Indemnification. Owner agrees to indemnify CEFIA, and its officers, directors, employees, agents, and affiliates against, and defend and hold each of them harmless, from any and all claims or liabilities related to or arising in any manner from this financing or the Project other than claims or liabilities resulting from the gross negligence or willful misconduct of CEFIA.

3.12. Education and Outreach.

3.12.1. Owner shall ensure that it makes reasonable efforts to cooperate with CEFIA's marketing and outreach activities.

3.12.2. Subject to approval as to form by CEFIA, Owner shall acknowledge the financial assistance of the CEFIA in Owner's promotional materials relating to the Project, signage at the Project Site, and on Owner's website to the effect of **"THIS CLEAN ENERGY PROJECT WAS MADE POSSIBLE BY A GRANT FROM THE CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY.**".

3.12.3. Owner agrees to acknowledge CEFIA's financial assistance during any media outreach relating to the Project, including but not limited to press releases, media interviews, and advertising as described in section 3.14.1 herein.

3.12.4. If CEFIA decides to seek its own media coverage of the Project, then Owner shall cooperate with CEFIA, including but not limited to providing CEFIA and the media with reasonable access to the Project Site.

3.12.5. If Owner hosts a "dedication" event, then: a) such event shall be coordinated with CEFIA; b) a CEFIA representative shall be given an opportunity to speak at the event; and c) Owner shall provide CEFIA and the media with reasonable access to the Project Site; and

3.12.6. CEFIA and Owner agree to make reasonable efforts to discuss collaboration, on a voluntary basis, on other projects or programs that may be reasonably suggested by either Party, and which are consistent with the objectives of both organizations, to jointly promote employee or community participation in other clean energy projects or outreach/educational programs. Examples of such projects or programs include:

3.12.6.1. Encouraging enrollment in the CTCleanEnergyOptions Program offered to all customers of CL&P and UI;

3.12.6.2. Publicizing practicable renewable energy and energy conservation technologies and encouraging employees and others in the local community to implement them;

3.12.6.3. Directly supporting renewable energy generation through the purchase of Renewable Energy Credits, thereby offsetting a percentage of electricity use; and

3.12.6.4. Publicizing "green" activities (including this Project) or programs that may be of interest to each other's constituencies on each other's websites, newsletters or other media, as appropriate. Owner shall make reasonable efforts to add information to the Owner's website regarding the economic savings and avoided pollutants resulting from this Project.

3.12.6.5. If the Project Site is a school, discussion with CEFIA of its Learning for Clean Energy Innovation ("LCEI") professional development program.

3.13. Advertising.

3.13.1. Neither Party nor its subcontractors or agents shall use in any advertising or sales promotion, any endorsements, direct or indirect quotes, or pictures that imply endorsement by the other Party or any of its employees without such Party's prior written approval.

3.13.2. Nothing in this Agreement shall grant, suggest, or imply any authority for one Party to use the name, trademarks, service marks, logos, or trade names of the other Party in any advertising, press releases, publicity matters, marketing and/or promotional materials or for any other commercial purpose without prior written approval from such other Party.

3.13.3. Owner agrees to submit to CEFIA, and CEFIA will submit to Owner, for review, prior to publication, all press releases relating to the Project that mention or display one another's name and/or marks or contain language from which a connection to said name and/or marks may be inferred or implied. Nothing herein, however, shall be construed as preventing either Party from publicly stating the fact that it has executed this Agreement with the other Party.

3.14. Information and Inspection. Owner shall allow CEFIA on at least one occasion in each fiscal year, and more frequently upon the occurrence of an Event of Default by Owner under this Agreement, upon reasonable notice, to inspect Owner's financial records, properties, and assets related solely to the Project under this Agreement.

4. DEFAULT AND REMEDIES

4.1. Default by Owner. The occurrence of any one or more of the following events shall constitute an event of default by Owner ("Event of Default"):

4.1.1. Owner significantly deviates from Schedule A of this Agreement without the prior written consent of CEFIA;

4.1.2. Any warranty or representation of Owner in this Agreement is incorrect in any material respect at the time it was made;

4.1.3. Owner is in material default of any of its covenants made under this Agreement;

4.1.4. Bankruptcy, reorganization, receivership, insolvency, or liquidation proceedings, or other proceedings under similar law for the relief of debtors are instituted by or against Owner; or

4.1.5. Owner fails to provide one or more of the deliverables under this Agreement.

4.2. Remedies upon Event of Default. Upon and during the continuation of an Event of Default, and if the default remains unremedied for a period of ninety (90) days after written notice from CEFIA ("Cure Period"), CEFIA may terminate any obligation on its part to make any further Grant payments to Owner under this Agreement and may seek repayment by Owner of the Grant payments received by Owner from CEFIA according to the following schedule: If the Event of Default occurs within the first five (5) years of the Term of Agreement, then the repayment shall be the full amount of the Grant amounts paid by CEFIA. If the Event of Default occurs after the 5^{th} year of the Term of Agreement, then the repayment shall be reduced at a rate of $1/10^{th}$ per year for the remaining ten (10) years under the Term of Agreement.

4.3. Security Interest.

4.3.1. To secure prompt and complete payment and performance of the Obligations (as defined below), Owner hereby pledges, assigns, transfers and grants to CEFIA a continuing security interest only to the extent of Owner's Obligations as set forth in this Section 4.3, which shall be subordinate to all existing debt as of the Effective Date, and any existing debt as of the Effective Date that is later refinanced, in all Collateral (as defined below). In connection therewith, Owner hereby agrees to take any and all actions that CEFIA may reasonably request from time to time by way of obtaining, executing, delivering and filing financing statements, assignments, landlord's or mortgage's waivers, and other notices and amendments and renewals thereof, and Owner will take any and all steps and observe such formalities as CEFIA may request in order to create and maintain a valid and enforceable lien upon, and security interest in, the Collateral. CEFIA is authorized to file financing statements without the signature of Owner and to execute and file such financing statements on behalf of Owner as specified by the Uniform Commercial Code of the State of Connecticut ("UCC") to perfect or maintain the security interest granted herein. So long as any Obligations remain outstanding, Owner shall (i) not permit to incur or suffer any loss, theft, substantial damage or destruction of any of the Collateral that Owner does not repair or replace within ninety (90) days, and (ii) provide written notice to CEFIA of any change of location of the Collateral or any change in the jurisdiction of organization/incorporation/formation of Owner within five (5) business days of the occurrence thereof.

4.3.2. As used in this Section 4.3, the following terms shall have the following definitions:

4.3.2.1. "**Collateral**" means all equipment purchased (at any time) by Owner with proceeds of the Grant, including without limitation the Equipment, and any and all accessions and additions thereto, and any and all replacements and proceeds thereof (including proceeds of insurance policies payable by reason of loss of the foregoing).

4.3.2.2. "**Obligations**" means the obligations of Owner (i) to pay to CEFIA any amounts due to CEFIA under this Agreement, including without limitation the repayment to CEFIA of a dollar amount up to the total amount of the Grant received by Owner plus interest upon and after the occurrence of an Event of Default as set forth in Section 4.2 above, and/or (ii) to reimburse CEFIA, on demand, for all of CEFIA's expenses and costs, including the reasonable fees and expenses of its legal counsel, in connection with any enforcement of this Agreement, including the security interest granted hereunder, and including, without limitation, any proceeding brought or threatened to enforce payment of any of the obligations referred to in the foregoing.

4.3.2.3. All undefined terms used in this Section 4.3 shall have the meanings for such terms set forth in the UCC, including without limitation the definitions of "proceeds" and "accessions".

4.3.3. Owner hereby irrevocably constitutes and appoints CEFIA as Owner's true and lawful attorney-in-fact with full irrevocable power and authority in the place and stead of Owner and in the name of Owner or in CEFIA's own name, from time to time in CEFIA's discretion, for the purpose of carrying out the terms of this Section 4.3, to take any and all appropriate action and to execute any and all documents and instruments which may be necessary or desirable to accomplish the purposes of this Section 4.3. Owner also authorizes CEFIA, at any time and from time to time, to execute, in connection with the sale provided for in Section 4.3.4 hereof, any endorsements, assignments or other instruments of conveyance or transfer with respect to the Collateral. The powers conferred on CEFIA hereunder are solely to protect CEFIA's interests in the Collateral and shall not impose any duty upon CEFIA to exercise any such powers. CEFIA shall be accountable only for amounts that it actually receives because of the exercise of such powers, and neither it nor any of its officers, directors, employees or agents shall be responsible to Owner for any act or failure to act hereunder, except for CEFIA's own gross negligence or willful misconduct.

4.3.4. If an Event of Default shall occur, CEFIA may exercise, in addition to all other rights and remedies granted to it in this Agreement and in any other instrument or agreement securing, evidencing or relating to the Obligations, all rights and remedies of a secured party under the UCC.

4.3.5. All authorizations and agencies herein contained with respect to the Collateral are irrevocable and powers coupled with an interest.

4.4. Force Majeure. It shall not be an Event of Default under this Agreement if the Equipment cannot operate as expected due to circumstances beyond Owner's reasonable control, and as long as Owner makes commercially reasonable efforts to repair or replace such Equipment, Owner shall be excused from performance as long as such circumstances remain in effect.

5. RELATIONSHIP OF PARTIES; LIMITATIONS

5.1. This Agreement does not create a partnership or joint venture between the Parties. Without limiting the generality of the foregoing, except for the funding contemplated in the Agreement, CEFIA shall not be liable under any circumstances for the obligations and liabilities of Owner and/or any other obligations and liabilities arising out of, or relating to, the activities of Owner, including without limitation, under the Project.

5.2. **Limitation of Damages**. Neither Party shall be liable to the other Party for any special, indirect, incidental, consequential, punitive, or exemplary damages of any kind whatsoever, whether based on contract, warranty, tort (including negligence or statutory liability), or otherwise, in connection with the performance of this Agreement.

5.3. **No Third-Party Beneficiaries**. Nothing in this Agreement, expressed or implied, is intended to confer any rights, remedies, obligations, or liabilities under or by reason of this Agreement on any other person or entity other than the Parties, their respective successors, or permitted assigns.

5.4. **Waiver of Sovereign Immunity**. Without limitation of any other provisions herein, CEFIA agrees that the execution, delivery, and performance of this Agreement is a commercial act, and should any action be brought against CEFIA in connection with this Agreement, CEFIA shall not claim immunity, and CEFIA hereby waives any rights to any claim of immunity from such proceedings in any jurisdiction or from any judgment rendered in such proceedings and the enforcement of such judgment.

6. ASSIGNMENT

6.1. Except as specified below, the rights and obligations herein of Owner may not be assigned by Owner, and such assignment shall be void, except upon the express written consent of CEFIA, which consent shall not unreasonably be withheld, conditioned, delayed, or denied; provided that Owner may elect to use subcontractors in meeting its obligations hereunder and such use of subcontractors shall not be considered an assignment hereunder. Any corporation/limited liability company/other legal entity to whom an assignment is made shall be required to demonstrate, to the reasonable satisfaction of CEFIA, that the assignee is: (1) duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, and (2) capable of fulfilling Owner's obligations hereunder.

6.2. Notwithstanding Section 6.1, Owner shall have the right to assign, without the consent of CEFIA, (i) this agreement to an affiliate of Owner, or (ii) Owner's rights to any payments received under this Agreement to any bank, insurance company or similar financial institution providing financing to Owner, provided that no such assignment under this subsection shall relieve Owner of responsibility or liability for the due performance of this Agreement by its assignee. CEFIA agrees, upon receipt of a written request from Owner, to make all payments otherwise payable to Owner under this Agreement to such secured party until Owner or such secured party shall have delivered to CEFIA a written release and termination of such assignment and CEFIA may conclusively rely on such notifications.

7. TRANSFER OF OWNERSHIP

7.1. Prior to Owner transferring its ownership interest in the Project or Equipment, Owner shall provide CEFIA written notice of Owner's intent to transfer ownership at least one hundred twenty (120) days prior to any such transfer. Any corporation/limited liability company/other legal entity to whom a transfer is made shall be required to demonstrate, to the reasonable satisfaction of CEFIA, that the transferee is: (1) duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, and (2) capable of fulfilling Owner's obligations in this Agreement.

7.2. Immediately upon the effective date of such transfer, the transferee becomes the Owner for purposes of this Agreement and assumes all obligations hereunder, provided that Cefia accepts as reasonable the information provided to Cefia pursuant to subsections (1) and (2) of section 7.1, above.

8. TERM; TERMINATION

8.1. **Term.** This Agreement shall remain in effect for fifteen (15) years from the Effective Date ("Term").

8.2. **Termination.** Either Party ("Non-Breaching Party") may terminate this Agreement upon written notice to the other Party ("Breaching Party") given after the occurrence of any one of the following events:

8.2.1. Any warranty or representation by such Breaching Party proves incorrect in any material respect, and if curable, such misrepresentation continues unremedied for ninety (90) days after written notice from such Non-Breaching Party to the Breaching Party; or

8.2.2. Such Breaching Party defaults in the due observance of any of the covenants or obligations of such Breaching Party set forth in this Agreement, and if curable, such default continues unremedied for ninety (90) days after written notice from such Non-Breaching Party to such Breaching Party.

8.3. **Remedies.** Except as expressly limited by this Agreement, upon termination of this Agreement, the Non-Breaching Party shall have all rights and remedies available hereunder, at law and in equity. The Non-Breaching Party shall not be required to terminate this Agreement to enforce any rights or remedies that it may have at law or in equity.

9. STATE CONTRACTING OBLIGATIONS

9.1. Owner understands and agrees that CEFIA is a political subdivision of the State of Connecticut and must comply with Conn. Gen. Stat. § 4a-60 and with Conn. Gen. Stat. § 4a-60a. Accordingly, for purposes of this Agreement, Owner agrees to comply for the Term of Agreement with the state contracting obligations in Conn. Gen. Stat. § 4a-60 and with Conn. Gen. Stat. § 4a-60a. In addition to other

requirements, these statutes provide that every contract to which a political subdivision of the state other than a municipality is a party must contain the provisions below. For purposes of this Section 9, Contractor and Owner shall have the same meaning and Contract and Agreement shall have the same meaning

9.2. Conn. Gen. Stat.§ 4a-60(a):

"Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut; and the contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved;

(2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission;

(3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(4) The contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; and

(5) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56."

9.3. Conn. Gen. Stat. § 4a-60a(a):

"Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation;

(2) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(3) The contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and

(4) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56."

9.4. Nondiscrimination Certification. Contractor represents and warrants that, prior to entering into this Agreement, the Contractor has provided CEFIA with documentation evidencing Contractor's support of the nondiscrimination agreements and warranties described above. A form of the Nondiscrimination Certification to be signed by the Contractor is attached.

9.5. Campaign Contribution Restrictions. For all state contracts, as defined in Conn. Gen. Stat. § 9-612(g)(1)(C), having a value in a calendar year of $50,000 or more or a combination or series of such agreements or contracts having a value of $100,000 or more, Owner expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See SEEC Form 11, attached.

10. MISCELLANEOUS

10.1. **Waivers**. By written instrument duly executed by both Parties, the Parties may (a) extend the time for the performance of any of the obligations or other actions herein; (b) waive any inaccuracies in the representations or warranties herein; (c) waive compliance with any of the covenants herein; and (d) waive or modify performance of any of the obligations herein. Except as provided in the preceding sentence, no action taken pursuant to this Agreement, including any investigation by or on behalf of any Party, shall be deemed to constitute a waiver by the Party taking such action of compliance with any representations, warranties, covenants, or obligations contained herein. The waiver by any Party of a breach of any provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach.

10.2. **Notices.** All notices, requests, demands, and other communications which are required or may be given under this Agreement shall be in writing and shall be deemed to have been duly given if sent by registered or certified mail, return receipt, postage prepaid, or delivered either by hand, overnight commercial courier service, or by messenger, or sent via facsimile, computer mail, or other electronic means, addressed as follows:

(a) If to CEFIA, to:

865 Brook Street
Rocky Hill, Connecticut 06067-3444
Attention:
Telephone: (860) 257-xxxx
Facsimile: (860) 563-4877
Email:

(b) If to Owner, to:

INSERT OWNER NAME
INSERT OWNER ADDRESS
INSERT OWNER TELEPHONE NUMBER
INSERT OWNER FACSIMILE NUMBER
INSERT OWNER EMAIL ADDRESS

Or to such other person or address as a Party shall have specified by notice in writing to the other Party. Any notice so addressed and delivered shall be deemed to be given when actually received by the addressee.

10.3. **Entire Agreement.** This Agreement, together with the Schedules and Appendices hereto, constitute the entire agreement between the Parties with respect to the subject matter hereof and supersedes any proposals and preliminary agreements between the Parties generated in connection with the Project. No prior oral or written understanding shall be of any force or effect with respect to any matter covered hereunder. This Agreement may be amended only by a written instrument signed by the Parties.

10.4. Further Assurances. Each Party will execute and deliver such documents, instruments and agreements and take such action as the other Party may reasonably request and as may be reasonably necessary, proper, or advisable, to the extent permitted by applicable law, to fulfill the purposes and intent of this Agreement.

10.5. Governing Law. This Agreement shall be governed by, construed, and enforced in accordance with the laws of the State of Connecticut, without regard to its principles relating to conflicts of law. EACH PARTY HEREBY CONSENTS TO THE EXCLUSIVE JURISDICTION OF THE COURTS OF THE STATE OF CONNECTICUT FOR THE PURPOSES OF ALL LEGAL PROCEEDINGS ARISING OUT OF OR RELATING TO THIS AGREEMENT AND THE TRANSACTIONS CONTEMPLATED HEREBY. EACH PARTY HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, (a) ANY OBJECTION TO THE LAYING OF VENUE OF ANY SUCH PROCEEDING BROUGHT IN SUCH A COURT; AND (b) ANY CLAIM THAT ANY SUCH PROCEEDING BROUGHT IN SUCH COURT HAS BEEN BROUGHT IN AN INCONVENIENT FORUM.

10.6. Severability. If any court or arbitrator should find any particular provision of this Agreement void, illegal or unenforceable, then that provision shall be regarded as severable and stricken from this Agreement, and the remainder of this Agreement shall remain in full force and effect. Except as expressly set forth in Section 10.10 below, if and to the extent that any laws or regulations that govern any aspect of this Agreement shall change, so as to make any aspect of this transaction unlawful, then the Parties shall make such modifications to this Agreement as may be reasonably necessary for this Agreement to accommodate any such legal or regulatory changes.

10.7. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument. Facsimile or PDF signatures shall be deemed original signatures.

10.8. Construction. Ambiguities or uncertainties in the wording of this Agreement will not be construed for or against any Party, but will be construed in the manner that most accurately reflects the Parties' intent as of the Effective Date. The Parties acknowledge that they have been represented by legal counsel in connection with the review and execution of this Agreement, and accordingly, there shall be no presumption that this Agreement or any provision hereof be construed against the Party that drafted this Agreement.

10.9. Limitation on Recourse. All liabilities and obligations of CEFIA under this Agreement are subject and limited to the funding available under Connecticut law.

10.1. Available Funding. CEFIA shall not be obligated to provide the Grant or any portion of the Grant under this Agreement if there are insufficient funds for such purpose because of any legislative or regulatory action expressly curtailing, reducing, or eliminating CEFIA funding.

10.2. Freedom of Information Act. CEFIA is a "public agency" for purposes of the Connecticut Freedom of Information Act ("FOIA"). Accordingly, this Agreement and information received pursuant to this Agreement will be considered public records and will be subject to disclosure under the FOIA, except for information falling within one of the exemptions in Conn. Gen. Stat. Section 1-210(b).

Owner acknowledges that (1) CEFIA has no obligation to notify Owner of any FOIA request received by CEIAF, (2) CEFIA may disclose materials claimed by Owner to be exempt if in CEFIA's judgment such materials do not appear to fall within a statutory exemption, (3) CEFIA may in its discretion notify Owner of FOIA requests and/or of complaints made to the Freedom of Information Commission concerning items for which an exemption has been claimed, but CEFIA has no obligation to initiate, prosecute, or defend any legal proceeding, or to seek to secure any protective order or other relief to prevent disclosure of any information pursuant to an FOIA request, (4) Owner will have the burden of establishing the availability of any FOIA exemption in any such legal proceeding, and (5) in no event shall CEFIA or any of its officers, directors, or employees have any liability for the disclosure of documents or information in CEFIA's possession where CEFIA, or such officer, director, or employee, in good faith believes the disclosure to be required under the FOIA or other law.

[Signature page follows]

This Agreement is effective as of the first date written above.

THE CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY

By: _____
Bryan T. Garcia, President
Clean Energy Finance and Investment Authority

By: _____
George D. Bellas, Vice President, Finance and Administration
Connecticut Innovations, Inc, acting solely as administrative support of the Clean Energy Finance and Investment Authority

INSERT OWNER NAME

By: _____
[Insert Name]
[Insert Title]

SCHEDULE A

Project Site:

INSERT ADDRESS

Equipment:

Photovoltaic Module	Inverter
Manufacturer: (or equivalent)	Manufacturer: (or equivalent)
Model: (or equivalent)	Model: (or equivalent)
Quantity:	Quantity:

Estimated Project Costs:

Project Economics	**Cost**	**$/kilowatt**
Generating Equipment	$	/kW_{PTC}
Engineering & Permitting	$	/kW_{PTC}
Construction & Installation	$	/kW_{PTC}
TOTAL	$	**/kW_{PTC}**

kW Capacity: kW_{STC} kW_{PTC}

Projected Annual AC Production: kWh at meter

Ownership of Renewable Energy Credits: Owner

APPENDIX I

Equipment Delivery to Site

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067-3444
Attention:

Re: Photovoltaic Project at INSERT ADDRESS

Delivery Date: _____

Dear:

In accordance with the Standard Grant Agreement ("Agreement") between _____ ("Owner") and the Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner represents and warrants to CEFIA that the fuel cell equipment has been delivered to the Project Site in good condition, and that Owner has insured the fuel cell equipment.

Owner certifies that it is in full compliance with all of the terms and conditions in the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA a Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

INSERT OWNER NAME

By: _____

Its: _____

Attachments: 1) Equipment packing slips or other documentation of delivery to Project Site
2) Certificate of insurance
3) Proof of contractor's and subcontractor's insurance

APPENDIX II

Equipment Acceptance

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067-3444
Attention:

Re: Photovoltaic Project at INSERT ADDRESS

Commissioning Date: _____

Dear:

In accordance with the Standard Grant Agreement (the "Agreement") between _____ ("Owner") and the Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner represents and warrants to CEFIA that Owner has properly installed and tested the fuel cell equipment ("Equipment") and has determined that the Equipment is operable. Owner certifies that it has accepted the Equipment as having been installed satisfactorily.

Manufacturers' warranties on equipment are as follows:

[Insert Warranty Description]

Owner certifies that it has complied with all of the energy monitoring system requirements in Section 3.2.2 of this Agreement.

Owner certifies that it is in full compliance with all of the terms and conditions of the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA a Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

INSERT OWNER NAME

By: _____

Its: _____

Attachments:
1) Cost Report
2) Municipal Inspector's Report
3) Utility Inspection/Test Report and Interconnection Agreement
4) Electrical Diagram (one-line)
5) Proof of energy monitoring system

APPENDIX III

Form of Final Funding Request

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067-3444
Attention:

Re: Photovoltaic Project at INSERT ADDRESS

Dear:

Pursuant to the Standard Grant Agreement (the "Agreement") between _____ ("Owner") and Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner requests from CEFIA the final Grant payment of $_____.

Owner certifies that the projected production for the Project for the first six (6) full months after the Commissioning Date (INSERT DATE RANGE) was _____kWh. Owner also certifies that the actual system AC production in kWh for the same period was _____kWh, which is at least seventy percent (70%) of the projected production.

Owner certifies that it is in full compliance with all of the terms and conditions of the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA the final Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

INSERT OWNER NAME

By: _____

Its: _____

Attachments: Six-month production report

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor,* with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or *solicit* contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee;

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties--$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of $2000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or $5000 in fines, or both.

Contract Consequences

Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided.

Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban."

Definitions:

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan or a loan to an individual for other than commercial purposes.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

STATE OF CONNECTICUT

NONDISCRIMINATION CERTIFICATION — Affidavit

By Entity

For Contracts Valued at $50,000 or More

Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson, member, or other corporate officer duly authorized to adopt corporate, company, or partnership policy that certifies the contractor complies with the nondiscrimination agreements and warranties under Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended

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INSTRUCTIONS:

For use by an entity (corporation, limited liability company, or partnership) when entering into any contract type with the State of Connecticut valued at $50,000 or more for any year of the contract. Complete all sections of the form. Sign form in the presence of a Commissioner of Superior Court or Notary Public. Submit to the awarding State agency prior to contract execution.

AFFIDAVIT:

I, the undersigned, am over the age of eighteen (18) and understand and appreciate the obligations of an oath. I am _____ of _____, an entity
Signatory's Title Name of Entity

duly formed and existing under the laws of _____.
Name of State or Commonwealth

I certify that I am authorized to execute and deliver this affidavit on behalf of

_____ and that _____
Name of Entity Name of Entity

has a policy in place that complies with the nondiscrimination agreements and warranties of Connecticut General Statutes §§ 4a-60(a)(1)and 4a-60a(a)(1), as amended.

_____
Authorized Signatory

_____
Printed Name

Sworn and subscribed to before me on this _____ day of _____, 20____.

_____ _____
Commissioner of the Superior Court/ Notary Public **Commission Expiration Date**

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

865 Brook Street
Rocky Hill, CT 06067-3444
Phone 860.563.0015
Fax 860.563.4877
info@ctcleanenergy.com
www.ctcleanenergy.com

Projects that have received or will receive a grant from CEFIA under this solicitation are not eligible to participate in any future ZREC or LREC programs.

On-Site Renewable Distributed Generation

Request for Proposals

Fuel Cells and Other Non-Solar Photovoltaic Projects

Program Opportunity # CEFIA-RFP-002

Applications will be accepted on a rolling submission basis through March 30, 2012, by 5:00 p.m. EST

Version 1
October 18, 2011

Important Dates:

Request for Proposals (RFP) Released	October 18, 2011
Closing Date for Accepting New Applications	March 30, 2012, by 5:00 p.m. EST

Questions or clarifications about this RFP should be directed to:

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, CT 06067-3444
Telephone: 860.563.0015
Fax: 860.563.4877
E-mail: info@ctcleanenergy.com

This RFP is available on the following Web sites:

Clean Energy Finance and Investment Authority (CEFIA)

www.ctcleanenergy.com/bestofclass

Department of Energy and Environmental Protection (DEEP)

http://www.ct.gov/deep/site/default.asp

Questions will be accepted via email from the release date, October 18, 2011, through March 30, 2012. At any time, CEFIA staff will be available to answer general questions regarding process or timetables.

Any oral communication concerning this RFP is not binding and shall in no way alter a specification, term or condition of this RFP or indicate any selection preference other than that identified herein.

The RFP for Fuel Cell and Other Non-Solar Photovoltaic Projects will be accepting Applications on a rolling submission basis. **There is no competitive component to this RFP.** Each **complete** Application package will be reviewed on a first come, first served basis.

Contents

Executive Summary

The purpose of the rolling submission OSDG Program RFP is to solicit Applications from eligible entities working with experienced renewable energy developers (Applicants). There will be a strong emphasis on evaluating the financial feasibility of each proposed OSDG installation (Project) as well as the Applicant's ability to complete construction of the Project in a timely manner. Applications for this RFP will only be accepted during the timeframe specified in this RFP, Section 2.

Important Dates
RFP Release: October 18, 2011
Closing Date for Accepting Applications: March 30, 2012, by 5:00 p.m. EST

The following technologies are eligible for grants under this RFP:

- Wind
- Fuel cell
- Landfill gas
- Waste heat recovery – power generation
- Low-emission advanced biomass conversion – power generation
- Hydropower meeting the standards of the Low-Impact Hydropower Institute

This RFP is a financial support program for new renewable energy generating equipment at commercial, industrial and institutional facilities in Connecticut. Through this RFP, CEFIA will offer financial support to buy down the cost of renewable energy generating equipment for Projects in the development phase that have not yet commenced the construction phase. The level of support for individual awards is not a fixed amount based on size or cost; it will vary based on the specific technology, efficiency and economics of the installation. The intent of the funding is to enable owners of renewable energy systems to "break even" over the life of the Project, with a fair and reasonable return on investment, compared with purchasing the equivalent amount of power from the utility.

This RFP is intended to provide Project funding during the transition from grant-based, CEFIA supported Project funding to the market-based, Public Utility Regulatory Authority (PURA) and electric distribution companies (EDCs) regulated Zero-emission Renewable Energy Certificate (ZREC) and Low-emission Renewable Energy Certificate (LREC) programs. **Projects that have received or will receive a grant from CEFIA under this solicitation are not eligible to participate in any future ZREC or LREC programs.** The ZREC and LREC programs were created by Public Act 11-80, Sections 107, 108 and 110 (PA 11-80) in July 2011. The ZREC and LREC programs will be implemented by PURA, formerly the Connecticut Department of Public Utility Control (DPUC), and EDCs. Currently, the program has not yet been developed, but it is expected that final program information will be available in late 2011 with program implementation beginning in early 2012. PA 11-80 specifies the following about the ZREC and LREC programs:

- ZRECs will have a $350/MWh price ceiling
- LRECs will have a $200/MWh price ceiling

- Contracts will be awarded in a competitive bidding environment with competitive bid RFPs issued by the following EDCs:
    - Connecticut Light & Power (CL&P)
    - United Illuminating Company (UI)
- ZRECs and LRECs will be rate-payer funded
- Contracts will have a fifteen (15) year duration

CEFIA was created by the Connecticut General Assembly in 2011. It is the successor organization to the Connecticut Clean Energy Fund (CCEF). CEFIA's mission is to promote, develop and invest in clean energy and energy efficiency projects in order to strengthen Connecticut's economy, protect community health, improve the environment, and promote a secure energy supply for the state. As the nation's first full-scale clean energy finance authority, CEFIA will leverage public and private funds to drive investment and scale-up clean energy deployment in Connecticut.

Section 1 - Introduction

1.1. Objectives of the Request for Proposals

CEFIA's rolling submission OSDG Program RFP is the only vehicle through which CEFIA will identify and qualify non-solar photovoltaic (PV) renewable energy installations for RFP funding. Under this RFP, CEFIA intends to recommend only those Projects that (1) use commercially available renewable energy generation technologies, (2) have already achieved substantial progress in permitting and site control, (3) require minimal investment from CEFIA, (4) are ready for deployment and (5) are installed at sites that have taken advantage of available energy efficiency incentive programs. If an Application does not meet the minimum criteria or does not include all required documentation listed in Section 2 of this RFP, additional information will be requested by CEFIA. The Application will not be reviewed by CEFIA staff until all required documents have been submitted to CEFIA's satisfaction.

Projects that have received or will receive a grant from CEFIA under this solicitation are not eligible to participate in any future ZREC or LREC programs.

The specific objectives of the RFP are to:

- Fund a geographically and size-diverse portfolio of Projects from a variety of renewable resources;
- Select Projects with a high probability of reaching successful installation and operation;
- Focus on Projects that fully utilize the characteristics of the technology and maximize benefits to a Connecticut property or facility (the Customer Site);
- Select Projects that include investments in energy efficiency with short (≤5-year) payback periods;
- Select Project Customer Sites that will disseminate lessons learned, barriers overcome and benefits of the installation to peers; and
- Select projects that provide the broadest public benefits.

Assist the market in becoming more acquainted with a performance-based incentive program such as the ZREC and LREC programs currently being developed in the State of Connecticut.

The total funding allocated for all selected Projects under this RFP is $3.5MM. This solicitation offers grant funding, on a rolling submission basis, as shown below:

Fuel Cell and Non-Solar Request for Proposals		
Technology Type	Fuel Cell	Other Technologies
Funding Allocation	**$2,500,000**	**$1,000,000**

Other Technologies' funds may be reallocated to the Fuel Cell category at CEFIA's discretion. Unused funds from this RFP will be added to future RFP solicitations or will be reallocated at CEFIA's discretion.

The Application for this solicitation is posted on CEFIA's Web site at: www.ctcleanenergy.com/bestofclass.

1.2. Eligible Technologies

To be eligible, an Applicant must propose to install commercially available renewable energy generating equipment at the Customer Site. The Project must utilize technology that falls within one or more of the following categories:

- Wind
- Fuel cell
- Landfill gas
- Waste heat recovery – power generation
- Low-emission advanced biomass conversion – power generation
- Hydropower meeting the standards of the Low-Impact Hydropower Institute

1.3. Eligible Applicants

CEFIA will review Applications only from developers, Customer Sites or companies who are engaged in the development of a renewable energy system. The Applicant must establish to CEFIA's satisfaction which entity will be primarily responsible for the overall managerial and financial control for the proposed Project. Projects must be located in either CL&P or UI territories.

The following commercial entities may apply under this RFP:

- For-profit companies
- Not-for-profit companies
- Religious organizations
- Condominium associations
- Municipalities
- State and federal agencies
- School districts
- Not-for-profit and for-profit affordable housing companies
- Public housing agencies

1.4. Eligible Projects

Under this RFP, CEFIA will accept only Projects in the development phase. Projects that have begun construction prior to executing a Financial Assistance Agreement (FAA) with CEFIA will not be eligible for funding under this program. **Customer Sites that have already received a grant from CCEF under past OSDG solicitations for the technologies listed in this RFP are not eligible under this program.**

An eligible Project under this RFP must also meet the following criteria:

- The Project must generate power from a Connecticut Class I renewable resource as defined by C.G.S. § 16-1(a)(26) , or the resource must be within the scope of CEFIA's funding authorization as defined by C.G.S. § 16-245n(a).
- As required under Connecticut law, the Project must be located within the state of Connecticut.
- If the Application is structured as a Power Purchase Agreement (PPA), Energy Services Agreement (ESA) or a lease, the contract duration of the proposed agreement must be between 10 and 20 years.
- The Project must generate electricity for use on site.
- The Applicant must agree to accept the standard FAA "as is" except for technical revisions or Project-specific revisions required due to special features of a particular Project.

Applications not meeting all of the requirements outlined above will not be further evaluated by the CEFIA under this RFP.

1.5. Project Cost

For economic evaluation purposes, Applications must include firm costs not subject to revision through the evaluation process and Board review proceedings. Applicants must also disclose all other sources of funding that will be applied to the Project. Final determination of whether a Project has quoted reasonable costs will be made by CEFIA at the time of Application review.

For Projects using natural gas for fuel, such as fuel cells, cost estimates should include the commodity and transportation costs as part of total delivered cost for the energy.

For-profit, tax-paying Applicants should include all applicable state and federal tax benefits in their financial analysis. Federal and investment tax credits are to be retained by the Applicant. **Not-for-profit Applicants are not eligible for state and federal tax benefits.**

1.6. Funding

CEFIA will award a grant to each Project selected under this RFP through the evaluation process and approved by the Board. Funding will be provided in the form of a monetary grant under standardized terms, and grant payment(s) will be contingent upon the following items:

- Execution of an FAA with CEFIA.
- Reaching the in-service date within one (1) year of FAA execution.

CEFIA will provide a contingent funding offer letter to Projects approved by the Board. Execution of the FAA will occur within ninety (90) days of the Board approval.

No one Customer Site owner may receive more than $4.0MM in CEFIA funding during any two (2) year period for all types of renewable energy technologies under the OSDG programs. Final funding amounts offered by CEFIA to an Applicant will be at the sole discretion of CEFIA.

Section 2 - Application Process

2.1. RFP Schedule

As shown on the following schedule, the closing date for this RFP is March 30, 2012, at 5:00 p.m. EST.

Other key milestones for this RFP are presented below. Any modifications to this schedule or this RFP will be posted at www.ctcleanenergy.com/bestofclass. **Applicants are strongly encouraged to check CEFIA's Web site for any modifications.**

Activity	Activity Date
Issue RFP document	October 18, 2011
Issue press release	October 18, 2011
Questions or clarifications accepted	October 18, 2011 to March 30, 2012
RFP Closing date	March 30, 2012, 2012 5:00 p.m. EST
Eligibility rejection/acceptance letters Issued	Three (3) to six (6) weeks from receipt of complete application
CEFIA staff recommendations to Projects Committee	Next available scheduled meeting after project owner accepts preliminary grant offer in writing from CEFIA
Funding authorization letters issued	**Within two (2) weeks of Board Approval**

2.2. Minimum Criteria

All Applications must meet the minimum requirements outlined below to be considered for eligibility. **If an Application does not meet the minimum requirements outlined below further information will be requested from the Applicant. No Applications will be reviewed by CEFIA staff until is it clear the Applicant has met the minimum criteria to be eligible under this RFP**. Applicants that are not eligible will receive a rejection letter from CEFIA clarifying why the Application failed to meet the minimum criteria. **Applications will be reviewed for minimum compliance on a rolling submission basis.** CEFIA recommends Applicants thoroughly review all requirements to ensure a complete Application.

Minimum eligibility requirements:

- Customer Sites must be commercial, industrial, or institutional facilities.
- Portable or mobile systems will not be considered under this RFP.
- Seasonal, temporary, or limited-use facilities will be closely scrutinized for high value and visibility, and may be excluded.
- Projects must use energy-generation devices that are commercially available and offer warrantees, spare parts, and service commensurate with their commercial status.
- Applicants must be the owner and operator of the Customer Site where the Project is to be located, or a third-party energy services provider willing to own and operate the energy-generation equipment for the contract term.
- Projects must be located in Connecticut within the CL&P or UI service territories.

- The Project must intend to generate energy primarily for consumption at the Customer Site at the moment it is generated. Net metering may be used to accommodate occasional excess production, but if significant excess energy is anticipated, the incentive will be calculated on the proportion of the Project's capacity that does not result in excess production.
- A specific Project location must be identified at the Customer Site.

2.3. Minimum Documentation

All Applicants must submit the minimum documentation outlined below to be considered for eligibility. If an Applicant does not supply the information requested below, CEFIA staff will request additional information. No Applications will be reviewed until all required documentation has been submitted to CEFIA's satisfaction. . **Applications will be reviewed for minimum documentation on a rolling submission basis.**

All Applicants must provide the following minimum documentation to be considered for a CEFIA grant:

1. **Utility Bills** – This requirement is applicable only to existing buildings. If the Customer Site is using a separate generation provider, provide the following information for both the generation provider and the transmission and distribution information from the utility.
    - Copies of the most recent twelve (12) months of electricity bills (complete bill – all pages).
    - Last 12-months of 15-minute utility interval meter data (electronic file).
2. **Usage Information for New Construction** – This requirement is only applicable to buildings with less than six (6) months of utility history. If six (6) months of usage history or less is available, provide any available usage history as listed under the utility bills requirement. In addition to the utility bills requirement above, Customer Sites with less than six (6) months of usage history will provide the following information:
    - Engineering calculations specifying anticipated monthly electrical consumption in kWh, over a 12-month period, for the site.
    - Engineering calculations specifying the anticipated maximum annual peak in kW for the site.
    - A letter from the engineer who performed the calculations explaining calculation methodology. The letter should be signed by the engineer and on the engineer's letterhead.
3. **Financial Information** – Provide verifiable evidence of financial capability to undertake this Project from the Applicant. This should include the following:
    - Proof of funding resources for the Project in the form of a bank letter of reference/credit. This letter should be addressed to CEFIA on the bank's letterhead, signed by the appropriate bank officer, reference the length of time

the Applicant has been a customer of the bank and the minimum balance carried by the Applicant.

- Recipients of a grant under this RFP must provide a detailed statement of all sources and uses of funds for their project before receiving the final grant payment. Such statement must be certified as correct by the chief financial or principal officer of the grant recipient.

4. **Site Plans** – Site plans cannot be hand-drawn. Site plans shall include:

   - Electrical one-line diagram – This diagram clearly shows all major system components, identifies the make and model number of all major system components, and identifies the interconnections among all major system components.
   - Project Site Plan – A detailed drawing of the proposed Project site and surrounding territory. The drawing must clearly identify the specific location of the equipment installation and the expected point of electric interconnection (showing fuel, water and thermal interfaces when applicable – e.g. for fuel cell projects).

5. **Site Energy Efficiency Measures for Existing Buildings** – Documentation must be submitted indicating the Customer Site has participated in one or more of the local utility's conservation programs funded by the Connecticut Energy Efficiency Fund (CEEF) or has had an energy audit performed by a qualified third-party energy services company. The Applicant must submit evidence that an energy efficiency audit has been performed at the Customer Site during the sixty (60) months **prior** to the submission of its Application. Audits conducted by Customer Site personnel or the Project developer/contractor will not be accepted. If an energy efficiency audit has not been performed at the Customer Site within this timeframe, the Application will not be reviewed under this RFP.

   CEFIA prefers applicants work with CEEF to perform an energy audit. However, if this is not possible, a full-building system audit may be performed by a qualified third party energy services company, including Professional Engineers (PEs) or Certified Energy Managers (CEMs). An energy audit includes a review of the entire building system – the envelope and all mechanical systems. The entity performing the energy audit cannot be related to the Customer Site, installation contractor, PPA provider or any other entity directly involved with the renewable energy project.

   The Applicant will submit the following documentation to evidence participation in a CEEF program:

   - A copy of the completed energy efficiency audit, including the report's findings and payback periods for any recommended energy efficiency measures.
   - Notarized affidavit signed by the Customer Site stating all recommendations in the energy efficiency audit with a payback of five (5) years or less will be implemented prior to the installation of the renewable energy generating equipment.

- If available, a copy of the financial agreement with CL&P or UI executed by the following parties:
    - Customer Site
    - Energy efficiency contractor
    - Local utility

The Applicant will submit the following documentation to evidence completion of an energy efficiency audit conducted at the Customer Site by a qualified third-party energy services company:

- A copy of the completed energy efficiency audit, including the report's findings and payback periods for any recommended energy efficiency measures.
- Notarized affidavit signed by the Customer Site stating all recommendations in the energy efficiency audit with a payback of five (5) years or less will be implemented prior to the installation of the renewable energy generating equipment.
- If available, invoices marked paid for all measures with a payback of five (5) years or less recommended in the energy efficiency audit.

No payments will be made by CEFIA until all energy efficiency recommendations in the energy efficiency audit with a payback of five (5) years or less have been implemented and proof, in the form of invoices marked paid or a signed financial agreement with CL&P or UI, has been provided to CEFIA's satisfaction. **CEFIA reserves the right to request more information regarding energy efficiency audits prior to making a grant payment.**

6. **Site Energy Efficiency Measures for New Construction or Gut Rehabilitations** – If a Customer Site has been constructed or gut-rehabilitated within the sixty (60) months **prior** to the submission of the Application, the Applicant **does not** have to evidence the Customer Site's participation in a CEEF program. CEFIA will require a letter from the general contractor or architect – on the general contractor or architect's letterhead – stating the date of construction or gut rehabilitation completion and listing all the energy efficiency measures included in the construction or gut rehabilitation. The letter must also state the site has been brought up to all current Connecticut electrical codes, building codes and regulations. The general contractor or architect and the Customer Site must both sign and date this letter.
7. **Project Agreements** – All Project agreements must be in place at the time of Application. Agreements must be signed by both the Applicant/Customer Site and the Project developer/contractor. Agreements should be made contingent upon receipt of a CEFIA grant award. Submit an executed copy of all Project agreements that demonstrate the ability of the Applicant to successfully develop and operate the proposed Project. Copies of the following contracts must be submitted, as applicable:
    - For third-party ownership Projects, where the Applicant plans to sell the Project's energy to the Customer Site, a copy of the PPA, ESA or lease between the Applicant and the Customer Site.

- Letters of intent to negotiate any necessary easements.
- Contracts to acquire, install, operate and maintain all major pieces of equipment.
- Contracts or letters of commitment from financing firms or guarantors.

8. **Resource Information** – Each technology requires different resource information.

Wind Projects

- The electricity production from the wind unit should not exceed 80% of the peak load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The project must have acquired **all** local, state and federal approvals prior to Application submission. This includes:
  - Local zoning
  - Local permits
  - Applicable state and federal permits
- Provide a copy of the wind map for the Customer Site.
- Project sites of 100kW or less must have collected at least three (3) months of wind resource data at the site or have a wind resource assessment report done using a site specific computer analysis from a qualified meteorologist (e.g., study by AWS TruePower, 3Tier Corp or WindLogics Inc.);.
- Sites larger than 100kW require six (6) months of on-site SODAR or anemometer data.

A full manufacturer's warranty must be provided to cover major components of the generating system, balance of plant, and inverter (if required) against breakdown or degradation in electrical output. The warranty shall cover the full costs, including labor and repair or replacement of defective components or systems. The warranty must be a minimum of five (5) years for all equipment.

Fuel Cell Projects

- The electricity production from the fuel cell unit should not exceed 100% of the average load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The Project's eligibility will be determined by overall Project economics. CEFIA will review total Project costs, including:
  - All installation costs
  - Gas usage costs
  - Local contracted gas prices
  - Annual service and maintenance costs
  - Avoided costs based on fuel cell thermal availability, as applicable
  - Avoided electricity savings at the Project's location

The calculation for the value of avoided electricity savings will be based on the Project's stated equipment capacity, capacity factor and availability.

- A full manufacturer's warranty must be provided to cover major components of the generating system, balance of plant, and inverter against breakdown or degradation in electrical output. The warranty shall cover the full costs, including labor and repair or replacement of defective components or systems. The warranty must be a minimum of one (1) year for all equipment.
- Cost for annual service and maintenance contracts should be included in the Application's Project cost breakdown for the ten (10) year term of the FAA. Service and maintenance contracts should cover, in full, the cell stack and major fuel processing components as well as the balance of plant for a period of ten (10) years to ensure operation of the power plant for the term of the FAA.
- The project must secure delivery of natural gas or other appropriate fuel on a long-term basis [at least one (1) year].

Landfill Gas Projects

- The electricity production from the landfill gas unit should not exceed 100% of the average load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The project must have acquired **all** local, state and federal approvals prior to Application submission. This includes:
    - Local zoning
    - Local permits
    - Applicable state and federal permits
- The installation must use at least 50% of the available thermal energy from the waste heat of the equipment. The estimate for thermal use should be based on the past twelve (12) months' usage data.
- The fuel source must be identified and secured with, at a minimum, a letter of intent.
- A full manufacturer's warranty must be provided to cover major components of the renewable energy generating system and balance of plant against breakdown or degradation in electrical output. The warranty shall cover the full costs, including labor and repair or replacement of defective components or systems. The warranty must be a minimum of five (5) years for all equipment.

Waste Heat Recovery – Power Generation Projects

- The electricity production from the waste heat recovery unit should not exceed 100% of the average load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The project must have acquired **all** local, state and federal approvals prior to Application submission. This includes:

  - Local zoning
  - Local permits
  - Applicable state and federal permits
- Must prove the heat source is sufficient and reliable to support the proposed generator.
- Cost for annual service and maintenance contracts should be included in the Application's Project cost breakdown, for the ten (10) year term of the FAA. Service and maintenance contracts should cover all major system components as well as balance of plant, in full, for ten (10) years to ensure operation of the power plant for the term of the FAA.

Biomass (Low-Emission Advanced Biomass Conversion) Projects

- The electricity production from the biomass unit should not exceed 100% of the average load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The installation must use at least 50% of the available thermal energy from the waste heat of the equipment. The estimate for thermal use should be based on the last twelve (12) months' usage data.
- The project must have acquired **all** local, state and federal approvals prior to Application submission. This includes:
  - Local zoning
  - Local permits
  - Applicable state and federal permits
- The fuel source must be identified and secured with, at a minimum, a letter of intent.
- A full manufacturer's warranty must be provided to cover major components of the renewable energy generating system and balance of plant against breakdown or degradation in electrical output. The warranty shall cover the full costs, including labor and repair or replacement of defective components or systems. The warranty must be a minimum of five (5) years for all equipment.

Hydropower (Meeting the standards of the Low-Impact Hydropower Institute) Projects

- The electricity production from the hydropower unit should not exceed 100% of the average load demand of the facility based on the past twelve (12) months' usage data. Any equipment capacity above this amount will not be eligible for CEFIA funding.
- The project must have acquired **all** local, state and federal approvals prior to Application submission. This includes:
  - Local zoning
  - Local permits
  - Applicable state and federal permits

- Hydropower must meet the standards of the Low-Impact Hydropower Institute
- The installation must have a current Federal Energy Regulatory Commission (FERC) license, for low-impact hydro operation, that requires operation in run-of-river mode or a demonstrated FERC license exemption.

  A full manufacturer's warranty must be provided to cover major components of the generating system and balance of plant against breakdown or degradation in electrical output. The warranty shall cover the full costs, including labor and repair or replacement of defective components or systems. The warranty must be a minimum of five (5) years for all equipment.

9. **Not-for-profit Documentation** – This requirement is applicable only to not-for-profit Applicants. Provide a copy of a 501(c)3 letter from the Internal Revenue Service (IRS) indicating the Customer Site is a not-for-profit enterprise.
10. **Affordable Housing Documentation** – This requirement is applicable only to not-for-profit affordable housing Applicants.

    - Submit a copy of the page in the not-for-profit's by-laws which indicates the primary mission of the Customer Site is to develop, manage, promote and/or construct affordable housing.
    - Submit a letter from a Federal, State or local government agency listing the Project's address and certifying the site is part of a Federal, State or locally recognized affordable housing development.

2.4. Evaluation Process

The Applications submitted under this RFP will be assessed through three evaluation steps. CEFIA may use department staff, staff of other agencies, private consultants, industry experts or other designated representatives to evaluate the Applications throughout the evaluation process. The RFP evaluation process steps are as follows:

- Minimum RFP Requirements – The information provided in each response will be evaluated first for completeness and consistency with the minimum RFP requirements and documentation outlined above. These are the minimum requirements all responses must meet to be eligible for further evaluation. Further information will be requested from all Applications with deficiencies.
- Project Analysis and Evaluation – After the evaluation of the complete Application, including receipt of responses to any follow-up questions, Applications will be evaluated by CEFIA staff based on the following criteria:

  - Project Economics
  - Deployment of the Eligible Resource/Technology
  - Probability of Project Completion and Project Feasibility
  - Public and Unique Ratepayer Benefits

  Based on this evaluation, CEFIA staff will review Projects and develop its recommendation of Projects for funding to the Board.

- Selection of Projects for Funding – At a regularly scheduled Board meeting, CEFIA staff will present recommendations to the Board for review and funding authorization. All Projects approved by the Board will receive a conditional funding offer from CEFIA.

Applications can be rejected at any point in the evaluation process at the sole discretion of CEFIA.

2.5. Evaluation Criteria

Those Applications meeting the minimum requirements will be evaluated by CEFIA for funding based on the following evaluation criteria: -

- Project Economics
- Deployment of the Eligible Resource/Technology
- Probability of Project Completion and Project Feasibility
- Public and Unique Ratepayer Benefits

2.5.1. Project Economics

This review will include an assessment of the Project's pro forma and the commitment of non-CEFIA financing sources to determine if the costs of the equipment and installation are reasonable.

The key Project economic values to be evaluated are:

- Ratio of grant request to total Project cost
- Staff grant calculation
- Cash flow net present value (NPV) and Internal rate of return (IRR)
- Cash flow consistency
- Simple payback

2.5.2. Deployment of the Eligible Resource/Technology

Key issues to be addressed in the Deployment of the Eligible Resource/Technology evaluation:

- How well are the technology's attributes matched with the Customer Site's energy needs and requirements?
- Has the proposed renewable energy generating equipment been appropriately sized to the Customer Site's electrical and thermal loads?
- Does the Project reflect a thorough understanding of the renewable energy generating equipment's limitations and capabilities?
- Is the quality, reliability and operational track record of the equipment adequate to assure reliable operation and ease of maintenance?
- How reliable is the fuel source or resource and how well matched is it with the proposed equipment?

2.5.3. Probability of Project Completion and Project Feasibility

Key issues to be addressed in the Probability of Project Completion and Project Feasibility evaluation:

- Does the Applicant exhibit financial strength, technical expertise and experience with similar Projects?
- Does the Applicant demonstrate recognition of all required permits, licenses and zoning considerations?
- Has the Project made significant progress in all major permitting and zoning activities (exception for fuel cell projects)?
- Does the Applicant demonstrate awareness and experience with community issues that could influence the Project's success and schedule?
- Has the Applicant made efforts to interface with community and special interest groups?
- Is the Customer Site located in close proximity to the proposed fuel source/resource?
- If applicable, does the Applicant understand the interconnection/delivery cost of the proposed fuel source/resource?
- Has the Applicant completed a fuel source/resource availability assessment?
- For buildings complying with the most current Connecticut State Building Code or ASHRAE standard 90.1-2004, whichever is more stringent, and demonstrating 10.5% or better minimum energy performance, is the Customer Site certified as:
    - EPA Energy Star compliant
    - Green Globes rating system - Two (2) Globes or better
    - Compliant with the Connecticut regulations regarding High Performance Building Standards
    - LEED Silver or better
      Or
    - Energy efficient under an equivalent standard
- Does the Applicant exhibit a strong understanding of the Project's expected production of renewable energy?
- Is the Application economically sound?
- Is funding secured for the balance of the costs not funded by CEFIA?
- What is the level of financial commitment from the Customer Site?
- What is the likelihood the Project will meet its proposed operational date?

2.5.4. Public and Unique Ratepayer Benefits

Important in CEFIA's evaluation is the degree to which the proposed Project relates to the broader interests of Connecticut ratepayers. All Applications will be evaluated on their ability to provide the state's ratepayers with a high level of benefits.

Key elements of the Public and Unique Ratepayer Benefits evaluation will include:

- In-state job creation, including purchases of major system components manufactured or assembled in Connecticut.
- Additional consideration for manufacturing or assembling major system components in a distressed municipality in Connecticut.
- Generation output and reliability at time of system peaks.
- Environmental benefits of the project (i.e. avoided emissions)
- Project financials (i.e. avoided cost of proposed project, present value of all energy savings for term of analysis, and required subsidy based on all project).

- Project diversity in terms of technology, location and size.
- Outreach efforts to promote the application of the renewable technology to non-residential entities and the general public.
- Efforts to promote the renewable technology in schools through curriculum, programs and events.
- Unique Project attributes (e.g., part of larger municipal or corporate sustainability plan, etc.)
- Has the Customer Site implemented the recommendations from a third-party energy efficiency audit?
- Applicable to municipal and school projects only – Is the project located in a CEFIA Clean Energy Community?

Section 3 - Application Submission Requirements

This section outlines the content and format requirements for all Applications submitted in response to this RFP. Applications that do not include the information requested in this section will be ineligible for further evaluation. CEFIA is permitted, but not obligated, to contact the Applicant to clarify or obtain any information inadvertently omitted from an Application.

All Applications must address the requirements outlined in the following sections of this RFP document.

3.1. Application Delivery

Applicant must submit a sealed package that includes:

- Original application (labeled “ORIGINAL”) with confidential material separated and placed in a sealed envelope clearly marked “CONFIDENTIAL” in accordance with Section 6 of this RFP
- One (1) electronic copy on compact disc or thumb drive

E-mail and facsimile (fax) transmissions are not acceptable under any circumstances. Applications must be submitted as complete packages, not piecemeal. The Application package will be date-stamped by CEFIA upon receipt, and this time and date shall determine when the package was received.

3.2. Application Format

All Applications must conform to the following format guidelines:

- 12-point font, 1.5-line spacing, standard 8.5 X 11” paper.
- Double-sided printing where possible.
- Bound using binder clip or other soft method. No three-ring binders.
- No handwritten applications.

3.3. Application Content Requirements

An Application will include a complete set of Application forms and all additional documentation as required.

3.4. Application Instructions

All Applications must include a complete set of forms for each Project. Using the forms will ensure consistency in Project submission, interpretation and evaluation. Information requested on each of the forms must be completed in detail and cannot refer to other sections of the response, even if the information is redundant.

Each Customer Site owner is allowed to submit one Application under this RFP. Each Application must be submitted by the Customer Site/Applicant. If an Applicant is an ESA or PPA provider submitting more than one Application for separate Customer Sites, a separate set of forms must be submitted for each Project. **Additionally, for ESA and PPA Providers,**

the Customer Site owner must sign the Form A – Application Certification along with the ESA or PPA Provider's representative.

The Application and all required forms are provided on-line at www.ctcleanenergy.com/bestofclass.

Brief descriptions for each section of the Application are provided below.

3.4.1. Form A – Application Certification

This section requests general information about the Applicant, Customer Site and proposed Project, including contact information, Project description, funding sources, REC ownership and grant request.

A duly authorized officer of the Applicant must complete and sign the Application Certification. This will certify the information in the Application is accurate, the pricing includes all costs for the proposed term of service, and the Applicant agrees to be bound by the terms and conditions contained in this RFP. At least one (1) original signature must be provided.

If the Applicant is a third-party ESA or PPA provider, the Customer Site, in addition to the duly authorized representative of the ESA or PPA provider, must sign Form A.

3.4.2. Form B – Project Summary

This section requests both general and specific information about the Applicant and the proposed Project including contact information, renewable energy generation technology, location and size.

3.4.3. Form C – Technology-Specific Data

This section requests information about the technology being utilized, the cost and the Project schedule and milestone dates for the proposed renewable energy generating facility. Applicants should format the schedule using a number of months from a reference date.

3.4.4. Form D – Team Experience and Qualifications

This section requests information regarding the key team members responsible for the development, installation, coordination and/or maintenance of the proposed renewable energy generating facility.

3.4.5. Form E – Estimated Job Creation Information

This section requests estimated information regarding the number of owner(s), fulltime and/or part-time employees working directly on installing the renewable energy system. The Applicant will be responsible for collecting all relevant data from the Project contractor(s) and/or any subcontractor(s) working on the Project. Required information includes:

- Name of company
- Location of company headquarters
- Location of any other company offices, if applicable
- Total number of people employed by company

- Total number of employees located in Connecticut, if applicable
- Total number of employees working directly on the Customer Site
- Number of new employees hired to complete the Customer Site, if applicable
- Hours worked per employee directly on Customer Site
- Hourly wages per employee working directly on Customer Site
- Employee job classifications for those working directly on the Customer Site, including but not limited to:
    - Master/Journeyman/Apprentice Tradesman
    - Roofer
    - Design Engineer
    - Installation Project Manager
    - Heavy Machinery Operator
    - Volunteer
    - Student
    - Owner

3.4.6. Form F – Fuel Source/Resource Plan

Applicants may be required to compose a detailed fuel source/resource plan for the Project, which will provide CEFIA with all the information needed to conduct an evaluation of the Project's fuel supply, procurement plan and transportation arrangements, as applicable. All required fuel source/resource plans must be performed by a credible third party. **A credible third party means an independent expert or professional with substantial experience in the energy industry or industry-recognized published material.**

The requested information is organized by technology. Applicants should respond only to sections relevant to the technology used in their Project. For a Project using other qualifying renewable energy generation resources/technologies not mentioned in the Application, the fuel source/resource plan should provide a thorough assessment of the available fuel sources/resources and projected annual energy production profile for the Project.

3.4.7. Form G – Permitting Plan

This section requests information about the land use, zoning, environmental permits and approvals required to develop the Project. Explain the strategy for acquiring the permits, as well as the status of the permitting process.

3.5. Change Orders

If an Applicant is selected by the Board for a grant award, and changes to the Application are required the Applicant must submit the following documentation:

1. Updated Application Forms A, B and C
2. Updated site plan
3. Updated electrical one-line drawing
4. Letter from Applicant, signed by both the Applicant and the Project developer/contractor, explaining the circumstances and nature of the change order.

Section 4 - Incentive Limits and Calculation

4.1. Project kW Size Limit Calculation

See Section 2.3, Minimum Documentation, bullet number eight (8) for maximum system sizing by technology type.

4.2. Renewable Energy Certificates (RECs)

Applicants will have several options regarding the ownership of the Connecticut Class I RECs generated by the proposed renewable energy system. Applicants may:

- Retain ownership of the RECs.
- Retire the RECs.
- Sell the RECs to CEFIA at a set price.

If an Applicant elects to retain ownership of the RECs, CEFIA will include the estimated, positive annual cash flow generated by these RECs in the grant calculation.

If an Applicant chooses to retire or sell the RECs to CEFIA, the value of the RECs will not be included in the grant calculation.

Applicants that sell the RECs to CEFIA will receive a larger grant than Applicants opting to retain or retire the RECs. For Applicants opting to sell their Connecticut Class I RECs to CEFIA, the purchase price will be estimated using a value of $10.00 per MWh ($0.010 per kWh) for a fifteen (15) year period.

4.3. Funding and Disbursement

Grant funding will vary based on the specific economics of the installation up to a funding cap (Table 1). To transition from a grant-based incentive structure for commercial projects to a REC-based model, the grant funding caps are based on the LREC caps. For systems less than two (2) MW, the grant incentive cap is $2.40 per Watt. Given that the LREC structure does not provide different incentives for systems based on commercial customer type (i.e. private, government, or non-profit), no premium for customer type is built in to the incentive block structure. The grant caps are comparable to a fifteen (15) year present value stream of LREC payments. The assumptions used by CEFIA to determine the grant funding caps are presented in Table 2.

The actual funding amount will be determined by an assessment of the difference between the Customer Site's cost of energy displaced by the proposed renewable energy generating equipment and the total cost and value of the energy provided by the new renewable energy generating equipment. Each site will be individually analyzed by CEFIA, and each technology will be evaluated over the reasonable life cycle of the equipment.

Table 1 – Funding Limits for Non-PV Projects

		Maximum Incentive				
Technology	**Fuel Cells**	**Small Wind**	**Small Biomass**	**Landfill Gas**	**Waste Heat Recovery**	**Hydro**
Funding cap	**$2.40/W**	**$2.40/W**	**$2.40/W**	**$2.40/W**	**$2.40/W**	**$2.40/W**
Evaluation timeframe	20 yrs*	20 yrs	20 yrs	20 yrs	20 yrs	20 yrs

* The FAA term will be 10-years for all fuel cell manufacturers

Table 2 - Assumptions used to Determine LREC Based Grant Incentive

Fuel Cell & Other Technology Projects	
Maximum Project Size	<2 MW
LREC Rate Cap	$0.200 /kWh
Internal Rate of Return	10.220%
Debt Interest Rate	8.000%
Initial Debt Term	15 Years
Debt to Total Cost Ratio	70.0%
Federal Investment Tax Credit	30.000%
Combined Federal and State Income Tax	39.445%
Avoided Utility Rate	$0.14883 /kWh
Avoided Utility Cost Inflation Rate	2.000%
General Inflation Rate	2.500%
Depreciation	5-Yrs. MACRS w/50% Bonus
Availability (fuel cells)	95%
Availability (wind)	25%
Availability (all other technologies)	85%
Capacity Factor	100%

Awarded grants will be disbursed in installments to the owner of the renewable energy generating equipment based on Project milestones according to the schedule in Table 3. **Payments may not be assigned to a third party for any reason.**

Table 3 - Disbursement Schedule – Basic Grant

Milestone	Payment
Delivery of generating equipment to site	50%
Startup, commissioning, and inspection	40%
After six (6) months of successful operation	10%

The final grant payment will be made only if the system has produced at least ninety (90) percent of the FAA's projected AC energy production during the first six (6) months of operation. This data will be verified by production reports generated by on-site metering and/or a data acquisition system such as Fat Spaniel, or an equivalent data monitoring service. Data will be "weather normalized" by taking into consideration weather conditions such as severe snow, hurricanes, etc. when calculating the ninety (90) percent AC energy production.

Additionally, the final grant payment will not be made until actual job creation information has been submitted. With the final payment request the Applicant must submit job information for all employees working directly on the installation of the renewable energy generating system. The Applicant will be responsible for collecting all relevant data to satisfy this requirement. Requisite information includes:

- New employees hired to complete the Project
- Employee job classifications, for example:
  - Electrician
  - Plumber
  - Design Engineer
- If applicable, employee license type, for example:
  - Journeyman Plumber (P-2)
  - Master Electrician (E-1)
  - Home Improvement Contractor (HIC)
- Hours worked per employee
- Hourly wages per employee

The actual job creation information will be compared to the estimated job creation information submitted in Form E of the Application. As a development agency for the State of Connecticut CEFIA will be collecting job creation information to gauge the effectiveness of development programs in Connecticut.

Section 5 - Terms and Conditions of CEFIA Financing

Applicants accepting a grant award must be willing to accept terms and conditions substantially similar to those found below. **An FAA detailing the terms and conditions of the award is expected to be negotiated and executed within ninety (90) days of award notification, after which time the financing offer from CEFIA may be retracted if an FAA has not been executed.** An outline of the basic terms and conditions of CEFIA financing is provided below.

No Commitment; Reserved Rights

This program is not an offer. Neither this program nor any subsequent discussion shall give rise to any commitment on the part of CEFIA or confer any rights on any Applicant unless and until a binding written FAA is executed by CEFIA and the Applicant. CEFIA reserves the right to reject any or all Applications; waive defects or irregularities in any Application; enter into discussions with selected Applicants; discontinue discussions with any Applicant at any time and for any reason; correct inaccurate awards; change the timing or sequence of activities related to this program; modify, suspend or cancel this program; and condition, modify or otherwise limit awards pursuant to this program.

Applicant's Costs

The Applicant shall bear all costs associated with the preparation of its Application, any related investigative or due diligence activities and any resulting discussions or negotiations.

Applicant Representations

By responding to this program, the Applicant shall be deemed to have represented and warranted: (1) that the Applicant's Application is not made in connection with any competing Applicant submitting a separate response to the program and is in all respects fair and without collusion or fraud; provided, that this requirement shall not be construed to prohibit any person or entity from being involved in more than one project or Application; (2) that the Applicant did not participate in the program development process; (3) that no Board member, consultant to CEFIA or employee of CEFIA participated directly or indirectly in the Applicant's response preparation; (4) that the Applicant has not been convicted of bribery or attempting to bribe a public official or employee of the state, has not been disqualified for contract awards by any agency of the state and is not in default under any contract with an agency of the state; (5) that the Applicant has not provided any gift or benefit to any state official or employee having direct influence over the evaluation of this proposal; (6) that the Applicant has disclosed all affiliates, partnerships and relationships; and (7) that the information contained in the Application is true, accurate and complete and includes all information necessary to ensure that the statements therein are not misleading.

Freedom of Information Act and Confidential Material

CEFIA is a "public agency" for purposes of the Connecticut Freedom of Information Act (FOIA). Accordingly, upon receipt at CEFIA's office, the Application, the request for financial assistance, and any files or documents associated with this Application, including e-mails or other electronic files, will be considered a public record and will be subject to disclosure under FOIA. Under C.G.S. §1-210(b), FOIA includes exemptions for, among other things, "trade secrets" and "commercial or financial information given in confidence, not required by statute." Only the particular information falling within a statutory exemption can be withheld by CEFIA if CEFIA receives a FOIA request that encompasses a particular proposal or request for financial assistance.

All Applicants submitting responses to this program must specifically identify particular sentences, paragraphs, pages, sections or exhibits it claims are confidential and should be exempt, and provide these confidential materials in a separate sealed envelope clearly marked "Confidential." All Application materials not placed in a separate, sealed envelope clearly marked as confidential will not be treated as confidential and will be made available for public view upon an FOIA request. Applicants may not submit the entire program response marked as confidential.

The Applicant must also provide a statement of the basis for each claim of exemption. It will not be sufficient to state generally that the proposal is proprietary or confidential in nature and not, therefore, subject to release to third parties. A convincing explanation and rationale sufficient to justify each exemption consistent with C.G.S. § 1-210(b) must be provided.

Further, Applicants should be aware:

(i) CEFIA has no obligation to notify any Applicant of any FOIA request received by CEFIA, although it may make an effort to do so;

(ii) CEFIA may disclose materials claimed to be exempt if in its judgment such materials do not appear to fall within a statutory exemption;

(iii) CEFIA may in its discretion notify Applicants of FOIA requests and/or of complaints made to the Freedom of Information Commission concerning items for which an exemption has been claimed, but CEFIA has no obligation to initiate, prosecute or defend any legal proceeding or to seek to secure any protective order or other relief to prevent disclosure of any information pursuant to an FOIA request;

(iv) the Applicant will have the burden of establishing the availability of any FOIA exemption in any such legal proceeding; and

(v) in no event shall CEFIA or any of its officers, directors or employees have any liability for the disclosure of documents or information in CEFIA's possession where CEFIA, or such officer, director or employee in good faith believes the disclosure to be required under FOIA or other law.

In the event of a public records request for an Application, CEFIA may request from the Applicant a version of such Application from which all information for which an FOIA exemption has been claimed has been redacted. By submitting such an Application, the Applicant agrees to provide such a redacted version upon request by CEFIA.

Use of Information and Ownership of Work Product

Except for information falling within a statutory FOIA exemption as described in the section above dealing with the FOIA, CEFIA is not restricted in its right to use or disclose any or all of the information contained in any Application and can do so without compensation to the Applicant, notwithstanding any language in the Application to the contrary. Except as otherwise expressly provided in an agreement with CEFIA, all work products developed under a contract awarded as a result of this program shall be the sole property of CEFIA.

State Contracting Requirements

This program and any FAA awarded pursuant to this program shall be subject to and incorporate all applicable legal requirements arising under federal or state law, including applicable state statutes and Executive Orders relating to maintenance and examination of

records, nondiscrimination, sexual discrimination, the Americans with Disabilities Act, violence in the workplace and whistleblower protection. A more complete description of such state contracting requirements is available on request directed to CEFIA in accordance with the communications protocol set forth above.

Project Operation

The Applicant is required to operate the Project for the "financeable life" of the equipment, which is assumed to be a minimum of ten (10) years for fuel cells and fifteen (15) years for all other technologies. Language will be incorporated into the FAA allowing temporary cessation of operation if it can be documented that continued operation would cause significant economic hardship.

Term of FAA

The term of the FAA will be ten (10) years for fuel cells and fifteen (15) years for all other technologies.

Project Characteristics

In addition to the funding terms discussed above, successful Applicants will be required to:

- Operate the equipment in Connecticut for the duration of the FAA.
- Make available, in real-time, via a publicly accessible web link, downloadable operating and historical data from the Project, through an energy monitoring system for all installations.
- Make available, in real-time, operating data that would show the energy balance (i.e. energy in versus energy out) of the power generating equipment. CEFIA must be able to stream the data to its own data collection and reporting systems.
- Allow and cooperate fully with CEFIA regarding any request for access to generating equipment performance data or real-time data monitoring.
- Provide CEFIA with reasonable access to the site.
- Show proof of contractor, subcontractor and Applicant/Customer Site's insurance policies evidencing a minimum of $1,000,000 liability insurance coverage.
- Insure the equipment and list CEFIA as an additional loss payee.
- Repay the total grant amount from the date of disbursement in the event of a default.
- Provide prominent and visible signage at the Project site and acknowledgment in any and all of the customer and owner's promotional materials recognizing CEFIA's contribution to the Project in a form acceptable to CEFIA.
- Meet certain standards that include documentation, operational, warranty and hardware requirements.

The details of these requirements can be found in the sample FAAs posted on the CEFIA Web site at www.ctcleanenergy.com/bestofclass.

STANDARD GRANT AGREEMENT

THIS STANDARD GRANT AGREEMENT ("Agreement") is made on INSERT DATE ("Effective Date"), by and between THE CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY ("CEFIA"), a quasi-public agency of the State of Connecticut under Section 16-245n of the Connecticut General Statutes ("Conn. Gen. Stat."), acting as the successor agency to Connecticut Innovations, Incorporated for the purposes of administrating the Connecticut Clean Energy Fund ("CCEF") created under said Section 16-245n, having a place of business at 865 Brook Street, Rocky Hill, Connecticut 06067, and INSERT OWNER NAME ("Owner") a INSERT STATE corporation having a place of business at INSERT OWNER ADDRESS with each referred to as a "Party" and collectively as the "Parties" in this Agreement.

BACKGROUND

WHEREAS, in accordance with the CEFIA mandate to foster the growth, development and commercialization of renewable energy sources and related enterprises, and to stimulate demand for renewable energy and deployment of renewable energy sources that serve end use customers in the State of Connecticut, the Board of Directors of CEFIA ("CEFIA Board") has determined that it is in keeping with Conn. Gen. Stat. Section 16-245n for CEFIA to fund certain commercial activities that support projects involving the use of fuel cell technology for distributed generation ("DG") power production;

WHEREAS, Owner submitted an application for financial assistance under CEFIA's On-Site Renewable DG Program for the procurement and installation of fuel cell power generating equipment ("Equipment" or "Project") to be installed at Owner's facility located at INSERT ADDRESS ("Project Site" or "Customer Site"); and

WHEREAS, after reviewing and careful consideration of Owner's proposal, the CEFIA Board has determined that it is prudent for CEFIA to provide financial assistance in the form of a monetary grant to Owner for the procurement and installation of the Equipment for the Project under CEFIA's On-Site Renewable DG Program.

NOW, THEREFORE, in consideration of the mutual promises herein contained, the Parties hereby agree as follows:

1. FUNDING AND DELIVERABLES

1.1. Grant. CEFIAI shall provide financial assistance to Owner in the aggregate amount not-to-exceed $INSERT AMOUNT ("Grant") subject to the terms and conditions of this Agreement.

1.1.1. Initial Grant Payment. CEFIAI will pay Owner fifty percent (50%) of the Grant when:

1.1.1.1. All Equipment identified in Schedule A of this Agreement has been delivered to Owner at the Project Site;

1.1.1.2. Owner has provided proof to CEFIA of Owner's contractor's and subcontractor's insurance policies evidencing a minimum of $1,000,000.00 liability insurance coverage through the Commissioning Date;

1.1.1.3. Owner has provided to CEFIA proof of insurance coverage pursuant to Section 3.5 of this Agreement; and

1.1.1.4. CEFIA will make the payment to Owner within ten (10) business days of the receipt of a letter substantially in the form of Appendix I (Equipment Delivery to Site) of this Agreement attesting to the delivery to Project Site of all Equipment, including appropriate documentation of delivery of said Equipment, and including proof of insurance.

1.1.2. Interim Grant Payment. CEFIA will pay Owner forty percent (40%) of the Grant when the Equipment has been installed, tested, and accepted by Owner ("Commissioning Date"), but only if all of the following requirements shall have been met:

1.1.2.1. The Equipment is operational and complies with all of the details and specifications set forth in this Agreement;

1.1.2.2. Owner has provided to CEFIA supporting documentation regarding the Equipment and its installation as reasonably requested by CEFIA, including but not limited to manufacturer's warranties and satisfactory inspection and test reports;

1.1.2.3. CEFIA has received an inspection report from an independent engineer selected by and paid for by CEFIA certifying that the Equipment has been installed at the Project Site: (1) in accordance with the manufacturer's instructions and all applicable code requirements, (2) has been tested, and (3) is operational and is capable of power generation in substantially the amounts projected in Schedule A;

1.1.2.4. Owner has provided to CEFIA written proof of Owner's compliance with the energy monitoring requirements pursuant to Section 3.2.2 of this Agreement; and

1.1.2.5. CEFIA has received from Owner an executed letter substantially in the form of Appendix II (Equipment Acceptance) attached to this Agreement, certifying the completion of the system commissioning and entry into operational service of the generating Equipment, and requesting the interim funding.

1.1.3. Final Grant Payment. Six (6) months after the Commissioning Date described in Section 1.2.1, CEFIA shall pay to Owner the remaining ten percent (10%) of the Grant, but only if:

1.1.3.1. Owner has demonstrated to CEFIA's reasonable satisfaction that the Equipment has produced during said six (6) months on an annualized basis at least seventy percent (70%) of the projected net kWh production; and

1.1.3.2. Owner has provided CEFIA with an executed funding request substantially in the form of Appendix III (Form of Funding Request) attached to this Agreement.

1.2. Other Deliverables. In addition to the terms and conditions in Section 1.1 above, Owner shall comply with the following to CEFIA's reasonable satisfaction unless waived by CEFIA:

1.2.1. Owner shall use reasonable commercial efforts to cause the Commissioning Date to occur on or before the date that is one (1) year from the Effective Date;

1.2.2. Within ten (10) business days of the interconnection date, Owner shall certify, in writing or via email, to CEFIA that interconnection is complete;

1.2.3. High Schools. If the Project Site is a high school, then within sixty (60) days of the Effective Date of this Agreement Owner shall provide CEFIA with a "letter of intent" from the superintendent of the high school indicating that the high school will send at least two educators from the high school to participate in a Learning for Clean Energy Innovation ("LCEI") professional development workshop during the current or next full school year; and

1.2.4. Grade Schools and Middle Schools. If the Project Site is a grade school or middle school, then within sixty (60) days of the Effective Date of this Agreement Owner shall provide CEFIA with a "letter of intent" from the superintendent of the grade school or middle school indicating that the school will make reasonable efforts to send school educators, on a voluntary basis, to participate in professional development programs offered by the Connecticut Clean Energy Fund or the Connecticut Energy Efficiency Fund.

1.3. Waiver. CEFIA may waive satisfaction of any deliverable or condition for any Grant payment under this Agreement, but each waiver must be in writing and no such waiver shall extend to any subsequent Grant payment.

2. REPRESENTATIONS AND WARRANTIES

2.1. Of Owner. Owner represents and warrants to CEFIA, as of the Effective Date, as follows:

2.1.1. Owner represents and warrants that it is a corporation/limited liability company/other legal entity duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, with all requisite power and authority to (i) develop the Project, and install, own, and operate the Equipment; and (ii) enter into and perform this Agreement, and to incur the obligations herein provided. The execution, delivery, and performance by Owner of this Agreement have been or will be duly authorized and approved by all necessary governmental authorities or other third-parties and do not and will not violate Owner's organizational documents or any applicable law or any agreement or instrument to which Owner is a party or by which it is bound or by which any of its properties may be affected. This Agreement is the legal, valid, and binding obligation of Owner, enforceable against it in accordance with this Agreement's terms;

2.1.2. There are no actions, suits, or proceedings pending, or to Owner's knowledge, threatened against Owner before any court or other governmental authority or before any arbitrators that could reasonably be expected to affect the installation and operation of the Equipment;

2.1.3. Owner's proposal resulting in this Agreement accurately reflects all material costs and expenses reasonably expected to be incurred in connection with the installation and operation of the Equipment, and accurately reflects the anticipated time period for the implementation of each material part of the Project;

2.1.4. All required approvals and permits necessary for the installation and operation of the Equipment at the Project Site have been obtained or will be obtained prior to the installation of the Equipment;

2.1.5. Owner has selected the Equipment based on its own judgment and expressly disclaims reliance on any statements made by CEFIA or its agents relating thereto. Owner understands and acknowledges that CEFIA did not select, manufacture, or supply the Equipment. Owner will look solely to the manufacturer for delivery of the Equipment. Owner hereby waives any claim (including any claim based on strict or absolute liability in tort) it may have against CEFIA for any loss, damage (including incidental or consequential damage), or expense caused by the Project or the Equipment other than claims or liabilities resulting from the gross negligence or willful misconduct of CEFIA;

2.1.6. An energy efficiency audit was conducted at the Project Site by an independent third party or by the Connecticut Energy Efficiency Fund. All

energy efficiency measures recommended in the energy efficiency audit, with a payback period of five (5) years or less, have been implemented at the Project Site. Alternatively, if the Project Site is a new construction or major renovation, then Owner shall provide written confirmation that the energy efficiency standards employed at the Project Site comply with the current Connecticut building code as of the Effective Date of this Agreement; and

2.1.7. State Code of Ethics:

2.1.7.1. Owner has not provided to any employee of CEFIA on or after July 1, 2005, any items of value for which full payment has not been made;

2.1.7.2. In connection with the application for, and solicitation and award of, the financial assistance provided pursuant to this Agreement, Owner has not committed any violation of the Connecticut Code of Ethics for Public Officials and Lobbyists, Conn. Gen. Stat. Chapter 10 ("Codes of Ethics"), or intentionally and knowingly violated any applicable requirement of the request for proposals or other applicable law; and

2.1.7.3. Owner has not been found to have violated the Codes of Ethics or Conn. Gen. Stat. § 4a-100, and has not been suspended or disqualified from bidding on contracts with the State of Connecticut or any department, agency, or quasi-public agency thereof.

2.2. Of CEFIA. CEFIA represents and warrants as follows:

2.2.1. CEFIA represents and warrants to Owner that CEFIA has all requisite power and authority to enter into and perform this Agreement and to incur the obligations herein provided. The execution, delivery, and performance by CEFIA of this Agreement have been or will be duly authorized by all necessary federal, state, and local agencies and boards and do not and will not violate any law (including without limitation Conn. Gen. Stat. § 16-245n) or any agreement, instrument, or evidence of indebtedness to which CEFIA is a party or by which it is bound or by which any of its properties may be affected. This Agreement is the legal, valid, and binding obligation of CEFIA, enforceable against it in accordance with this Agreement's terms; and

2.2.2. CEFIA neither makes nor shall be deemed to have made any warranty or representation, express or implied, concerning the Equipment, including, without limitation, any warranty or representation as to design, quality, capability, title, or condition, or as to merchantability or fitness for any particular purpose.

3. COVENANTS

3.1. Status and Location. Owner, or its assignee(s) or transferee(s), shall maintain a legal existence in its jurisdictions of organization with authority to transact business in the State of Connecticut. Owner, or its assignee(s) or transferee(s), shall operate the Equipment in the State of Connecticut for the Term of Agreement.

3.2. Taxes. Owner understands and agrees that it, not CEFIA, is responsible for all applicable taxes associated with the Equipment.

3.3. Equipment. Owner shall install the Equipment, or cause the Equipment to be installed, in a manner consistent with any installation manual prepared by the manufacturer or supplier of the Equipment. Owner shall make commercially reasonable efforts, within a reasonable period, to notify CEFIA of the occurrence of any event or contemplated action (including the threat and/or commencement of any legal proceedings) which could have a material adverse effect on the Equipment (including a material deviation from the specifications set forth in Schedule A), together with a recommended course of action.

3.4. Operation of the Project.

3.4.1. Owner, or its assignee(s) or transferee(s), shall maintain the Equipment at the Project Site and shall use and operate the Equipment solely to meet Owner's energy needs.

3.4.2. Owner shall enter into an annual operations and maintenance agreement with the Equipment vendor and Owner shall provide a copy of that agreement to CEFIA.

3.4.3. Owner shall (a) operate the Equipment in accordance with the supplier's or manufacturer's instructions, consistent with warranty and insurance requirements; and (b) maintain the Equipment in good repair, working order, and condition and make all needed and proper repairs, renewals, replacements, additions, or improvements thereto and immediately notify CEFIA of any event causing loss or depreciation in the value of the Equipment other than ordinary wear and tear.

3.4.4. Owner shall use commercially reasonable efforts to ensure that the Equipment is continually operated for its intended purpose for at least the Term of this Agreement (as defined in Section 8 herein), provided that Equipment down time due to maintenance, repairs, or Force Majeure shall not constitute a violation of this obligation.

3.5. Access to and Public Notice of Information. Owner agrees to the following obligations:

3.5.1. Except as otherwise set forth in this Section, CEFIA shall have the right to collect, review, analyze, utilize, and disseminate to third parties and the public all information relating to the Project, including data directly related to the Project's economic, social, and operational benefits, as well as Equipment performance, installation costs, and operating costs. Owner shall, upon reasonable request of CEFIA, use commercially reasonable efforts to obtain the authorization, in any applicable contract or otherwise, of each such person or entity furnishing reports with respect to the Project to specifically allow CEFIA to rely on such reports and work product; provided, however, the person or entity supplying such reports and work product (i) may limit its liability with respect to the reuse thereof for purposes unrelated to the Project and (ii) may restrict, subject to applicable law (including the Freedom of Information Act), CEFIA's public disclosure of any non-public confidential and/or proprietary information or trade secrets by conspicuous written indication of such restriction at the time of disclosure. Without limiting the generality of the foregoing, CEFIA shall be entitled to reasonable access to, and the right to obtain and use copies of, all operation, maintenance, and similar data relating to the Project; and

3.5.2. Owner shall describe the fuel cell system and make all real-time and historical operating information with respect to the Project available to CEFIA, including operating hours, power output, and any other available operating data reasonably requested by CEFIA, through the installation and continued operation of an energy monitoring system such as Fat Spaniel or an equivalent system reasonably acceptable to CEFIA. If Owner chooses Fat Spaniel, then Owner shall subscribe to Fat Spaniel's "Five-Year Connecticut CEF Agency Report" feature. If Owner subscribes to Fat Spaniel's Insight Manager, then Owner shall provide CEFIA with a unique user name and password for as long as Owner subscribes to Insight Manager, but in no case for longer than the Term of this Agreement. Owner shall provide a live-information, publicly accessible hyperlink between its energy monitoring website, CEFIA's website, and any other websites as CEFIA may reasonably request.

3.6. Compliance with Laws. Owner shall comply with all applicable laws affecting or applicable to the Project. Without limiting the generality of the foregoing, Owner shall timely secure, preserve, renew, and maintain all governmental approvals and its material private rights and licenses relating to the Project.

3.7. Payment of Obligations. Owner shall pay and discharge all lawful claims and demands whatsoever, including trade obligations, arising in connection with, and/or relating to, the Project; provided, however, that the payment of any obligations may be postponed so long as they are being diligently contested in good faith. Owner shall defend the Equipment against all claims and demands of any party at any time claiming any interest therein.

3.8. Insurance. Owner shall maintain fire, extended coverage and other hazard insurance policies with respect to the Equipment, in amounts not less than the replacement value of the Equipment and listing CEFIA as an additional loss payee; and shall maintain liability insurance in form and amount reasonably satisfactory to CEFIA. Each policy of insurance shall (a) include a clause that it cannot lapse or be canceled or modified except upon at least thirty (30) days' prior written notice to CEFIA; and (b) be issued by a company licensed to provide such insurance in the State of Connecticut and reasonably acceptable to CEFIA.

3.9. No Corrupt Practices. Owner shall not pay, offer or promise to pay, or give any money or anything of value, directly or indirectly, to any party involved with the Project, any officer or employee of a governmental authority, or to any political party or candidate for political office for the corrupt purpose of inducing any such party, official, political party, or candidate to misuse its position or to influence any act or decision of a governmental authority in order to obtain, retain, or direct business to or otherwise influence a decision in favor or for the direct or indirect benefit of Owner, in violation of any applicable law.

3.10. Financial Management Systems. Owner shall keep a full and complete account of all Project costs. Owner also shall maintain complete books, records, and financial management systems for the Project until three (3) years from the Commissioning Date. Such systems shall provide: (a) accurate, current, and complete disclosure of the financial activity relating to the Project, (b) separate accounting for Project funds from other activities and accounts of Owner, (c) effective control over and accountability for all Project funds, property, and other assets, (d) comparison of actual outlays for Project costs with budgeted amounts, and (e) accounting records supported by source documentation. All of such systems shall be subject to audit by CEFIA, at the election of CEFIA and at its expense.

3.11. Access to the Project Site. Owner shall provide to CEFIA reasonable access to the Project Site during normal business hours for educational purposes, case study development, Project inspection, public relations, or other reasonable purposes, provided that access to the Project Site shall be subject to reasonable confidentiality, security, and insurance requirements of Owner. CEFIA shall contact Owner at least three (3) business days in advance to request access.

3.12. Renewable Energy Certificates. Owner shall be entitled to all Class I Renewable Energy Credits or Certificates ("Class I RECs") produced by the Project.

3.13. Interconnection. Owner understands and agrees that it is responsible for ensuring the appropriate interconnection of the Equipment to any utility service providers responsible for the provision of electricity, gas, and telecommunications services to the Project.

3.14. Indemnification. Owner agrees to indemnify CEFIA, and its officers, directors, employees, agents, and affiliates against, and defend and hold each of them harmless,

from any and all claims or liabilities related to or arising in any manner from this financing or the Project other than claims or liabilities resulting from the gross negligence or willful misconduct of CEFIA.

3.15. Education and Outreach: Owner shall make reasonable efforts to cooperate with CEFIA's marketing and outreach activities as stated below:

3.15.1. Subject to approval as to form by CEFIA, Owner will make reasonable efforts to acknowledge CEFIA's financial assistance in Owner's promotional materials relating to the Project, signage at the Project Site, and on its website to the effect of "**THIS CLEAN ENERGY PROJECT WAS MADE POSSIBLE BY A GRANT FROM THE CLEAN ENERGY FINANACE AND INVESTMENT AUTHORITY.**";

3.15.2. Owner agrees to make reasonable efforts to issue press releases and seek out periodicals interested in publishing articles mentioning the Project in connection with CEFIA On-Site Renewable DG Program;

3.15.3. Owner agrees to host a "dedication" event to be coordinated with CEFIA and to be attended by such persons as CEFIA may reasonably request; and

3.15.4. CEFIA and Owner agree to make reasonable efforts to discuss collaboration, on a voluntary basis, on other projects or programs that may be reasonably suggested by either Party, and which are consistent with the objectives of both organizations, to jointly promote employee or community participation in other clean energy projects or outreach/educational programs. Examples of such projects or programs include:

3.15.4.1. Encouraging enrollment in the CTCleanEnergyOptions Program offered to all customers of CL&P and UI;

3.15.4.2. Publicizing practicable renewable energy and energy conservation technologies and encouraging employees and others in the local community to implement them;

3.15.4.3. Directly supporting renewable energy generation through the purchase of Renewable Energy Credits, thereby offsetting a percentage of electricity use; and

3.15.4.4. Publicizing "green" activities (including this Project) or programs that may be of interest to each other's constituencies on each other's websites, newsletters or other media, as appropriate.

3.16. Advertising.

3.16.1. Neither Party nor its subcontractors or agents shall use in any advertising or sales promotion, any endorsements, direct or indirect quotes, or pictures that

imply endorsement by the other Party or any of its employees without such Party's prior written approval.

3.16.2. Owner agrees to submit to CEFIA and CEFIA will submit to Owner, for review, prior to publication, all press releases relating to the Project that mention or display one another's name and/or marks or contain language from which a connection to said name and/or marks may be inferred or implied. Nothing herein, however, shall be construed as preventing either Party from publicly stating the fact that it has executed this Agreement with the other Party.

3.16.3. Nothing in this Agreement shall grant, suggest, or imply any authority for one Party to use the name, trademarks, service marks, logos, or trade names of the other Party in any advertising, press releases, publicity matters, marketing and/or promotional materials or for any other commercial purpose without prior written approval from such other Party.

3.17. Information and Inspection. Owner shall allow CEFIA on at least one occasion in each fiscal year, and more frequently upon the occurrence of an Event of Default by Owner under this Agreement, upon reasonable notice, to inspect Owner's financial records, properties, and assets related solely to the Project under this Agreement.

4. DEFAULT AND REMEDIES

4.1. Default by Owner. The occurrence of any one or more of the following events shall constitute an event of default by Owner (an "Event of Default"):

4.1.1. Owner significantly deviates from Schedule A of this Agreement without the prior written consent of CEFIA;

4.1.2. Any Warranty or Representation of Owner in this Agreement is incorrect in any material respect at the time it was made;

4.1.3. Owner is in material default of any of its Covenants made under this Agreement;

4.1.4. Bankruptcy, reorganization, receivership, insolvency or liquidation proceedings, or other proceedings under similar law for the relief of debtors are instituted by or against Owner; or

4.1.5. Owner fails to provide one or more of the deliverables under this Agreement.

4.2. Remedies upon Event of Default. Upon and during the continuation of an Event of Default, and if the default remains unremedied for a period of ninety (90) days after written notice from CEFIA ("Cure Period"), CEFIA may terminate any obligation on its part to make any further Grant payments to Owner under this Agreement and may

seek repayment by Owner of the Grant payments received from CEFIA according to the following schedule: If the Event of Default occurs within the first three (3) years of the Term of Agreement, then the repayment shall be the full amount of the Grant amounts paid by CEFIA to Owner. If the Event of Default occurs after the 3rd year of the Term of Agreement, then the repayment shall be reduced at a rate of $1/7^{th}$ per year for the remaining seven (7) years under the Term of Agreement.

4.3. Security Interest.

4.3.1. To secure prompt and complete payment and performance of the Obligations (as defined below), Owner hereby pledges, assigns, transfers and grants to CEFIA a continuing security interest only to the extent of Owner's Obligations as set forth in this Section 4.3, which shall be subordinate to all existing debt as of the Effective Date, and any existing debt as of the Effective Date that is later refinanced, in all Collateral (as defined below). In connection therewith, Owner hereby agrees to take any and all actions that CEFIA may reasonably request from time to time by way of obtaining, executing, delivering and filing financing statements, assignments, landlord's or mortgage's waivers, and other notices and amendments and renewals thereof, and Owner will take any and all steps and observe such formalities as CEFIA may request in order to create and maintain a valid and enforceable lien upon, and security interest in, the Collateral. CEFIA is authorized to file financing statements without the signature of Owner and to execute and file such financing statements on behalf of Owner as specified by the Uniform Commercial Code of the State of Connecticut ("UCC") to perfect or maintain the security interest granted herein. So long as any Obligations remain outstanding, Owner shall (i) not permit to incur or suffer any loss, theft, substantial damage or destruction of any of the Collateral that Owner does not repair or replace within ninety (90) days, and (ii) provide written notice to CEFIA of any change of location of the Collateral or any change in the jurisdiction of organization/incorporation/formation of Owner within five (5) business days of the occurrence thereof.

4.3.2. As used in Section 4.3, the following terms shall have the following definitions:

4.3.2.1. "**Collateral**" means all equipment purchased (at any time) by Owner with proceeds of the Grant, including without limitation the Equipment, and any and all accessions and additions thereto, and any and all replacements and proceeds thereof (including proceeds of insurance policies payable by reason of loss of the foregoing).

4.3.2.2. "**Obligations**" means the obligations of Owner (i) to pay to CEFIA any amounts due to CEFIA under this Agreement, including without limitation the repayment to CEFIA of a dollar amount up to the total amount of the Grant received by Owner plus interest

upon and after the occurrence of an Event of Default as set forth in Section 4.2 above, and/or (ii) to reimburse CEFIA, on demand, for all of CEFIA's expenses and costs, including the reasonable fees and expenses of its legal counsel, in connection with any enforcement of this Agreement, including the security interest granted hereunder, and including, without limitation, any proceeding brought or threatened to enforce payment of any of the obligations referred to in the foregoing.

4.3.2.3. All undefined terms used in this Section 4.3 shall have the meanings for such terms set forth in the UCC, including without limitation the definitions of "proceeds" and "accessions".

4.3.3. Owner hereby irrevocably constitutes and appoints CEFIA as Owner's true and lawful attorney-in-fact with full irrevocable power and authority in the place and stead of Owner and in the name of Owner or in CEFIA's own name, from time to time in CEFIA's discretion, for the purpose of carrying out the terms of this Section 4.3, to take any and all appropriate action and to execute any and all documents and instruments which may be necessary or desirable to accomplish the purposes of this Section 4.3. Owner also authorizes CEFIA, at any time and from time to time, to execute, in connection with the sale provided for in Section 4.3.4 hereof, any endorsements, assignments or other instruments of conveyance or transfer with respect to the Collateral. The powers conferred on CEFIA hereunder are solely to protect CEFIA's interests in the Collateral and shall not impose any duty upon CEFIA to exercise any such powers. CEFIA shall be accountable only for amounts that it actually receives because of the exercise of such powers, and neither it nor any of its officers, directors, employees or agents shall be responsible to Owner for any act or failure to act hereunder, except for CEFIA's own gross negligence or willful misconduct.

4.3.4. If an Event of Default shall occur, CEFIA may exercise, in addition to all other rights and remedies granted to it in this Agreement and in any other instrument or agreement securing, evidencing or relating to the Obligations, all rights and remedies of a secured party under the UCC.

4.3.5. All authorizations and agencies herein contained with respect to the Collateral are irrevocable and powers coupled with an interest.

4.4. Force Majeure. It shall not be an Event of Default under this Agreement if the Equipment cannot operate as expected due to circumstances beyond Owner's reasonable control, and as long as Owner makes commercially reasonable efforts to repair or replace such Equipment, Owner shall be excused from performance as long as such circumstances remain in effect.

5. RELATIONSHIP OF PARTIES; LIMITATIONS.

5.1. **No Joint Venture.** This Agreement does not create a partnership or joint venture between the Parties. Without limiting the generality of the foregoing, except for the funding contemplated in the Agreement, CEFIA shall not be liable under any circumstances for the obligations and liabilities of Owner and/or any other obligations and liabilities arising out of, or relating to, the activities of Owner, including without limitation, under the Project.

5.2. **No Consequential Damages**. Neither Party shall be liable to the other Party for any special, indirect, incidental, consequential, punitive, or exemplary damages of any kind whatsoever, whether based on contract, warranty, tort (including negligence or statutory liability), or otherwise, in connection with the performance of this Agreement. Any liability of Owner hereunder (including with respect to any breach of any Covenant hereunder) shall be limited to those Grant payments actually delivered to, and received by, Owner for the benefit of Owner.

5.3. **No Third-Party Beneficiaries**. Nothing in this Agreement, expressed or implied, is intended to confer any rights, remedies, obligations, or liabilities under or by reason of this Agreement on any other person or entity other than the Parties, their respective successors, or permitted assigns.

5.4. **Waiver of Sovereign Immunity**. Without limitation of any other provisions herein, CEFIA agrees that the execution, delivery, and performance of this Agreement is a commercial act, and should any action be brought against CEFIA in connection with this Agreement, CEFIA shall not claim immunity, and CEFIA hereby waives any rights to any claim of immunity from such proceedings in any jurisdiction or from any judgment rendered in such proceedings and the enforcement of such judgment.

6. ASSIGNMENT

6.1. Except as specified below, the rights and obligations herein of Owner may not be assigned by Owner, and such assignment shall be void, except upon the express written consent of CEFIA, which consent shall not unreasonably be withheld, conditioned, delayed, or denied; provided that Owner may elect to use subcontractors in meeting its obligations hereunder and such use of subcontractors shall not be considered an assignment hereunder. Any corporation/limited liability company/other legal entity to whom an assignment is made shall be required to demonstrate, to the reasonable satisfaction of CEFIA, that the assignee is: (1) duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, and (2) capable of fulfilling Owner's obligations hereunder.

6.2. Notwithstanding Section 6.1, Owner shall have the right to assign, without the consent of CEFIA, (i) this agreement to an affiliate of Owner, or (ii) Owner's rights to any payments received under this Agreement to any bank, insurance company or similar financial institution providing financing to Owner, provided that no such

assignment under this subsection shall relieve Owner of responsibility or liability for the due performance of this Agreement by its assignee. CEFIA agrees, upon receipt of a written request from Owner, to make all payments otherwise payable to Owner under this Agreement to such secured party until Owner or such secured party shall have delivered to CEFIA a written release and termination of such assignment and CEFIA may conclusively rely on such notifications.

7. TRANSFER OF OWNERSHIP

7.1. Prior to Owner transferring its ownership interest in the Project or Equipment, Owner shall provide CEFIA written notice of Owner's intent to transfer ownership at least one hundred twenty (120) days prior to any such transfer. Any corporation/limited liability company/other legal entity to whom a transfer is made shall be required to demonstrate, to the reasonable satisfaction of CEFIA, that the transferee is: (1) duly organized/incorporated/formed and validly existing under the laws of the jurisdiction of its organization or incorporation and, if relevant under such laws, in good standing, and (2) capable of fulfilling Owner's obligations in this Agreement.

8. TERM; TERMINATION

8.1. **Term.** This Agreement shall remain in effect for ten (10) years from the Effective Date ("Term of Agreement").

8.2. **Termination.** Either Party ("Non-Breaching Party") may terminate this Agreement upon written notice to the other Party ("Breaching Party") given after the occurrence of any one of the following events:

8.2.1. Any Warranty or Representation by such Breaching Party proves incorrect in any material respect, and if curable, such misrepresentation continues unremedied for ninety (90) days after written notice from such Non-Breaching Party to the Breaching Party; or

8.2.2. Such Breaching Party defaults in the due observance of any of the Covenants or obligations of such Breaching Party set forth in this Agreement, and if curable, such default continues unremedied for ninety (90) days after written notice from such Non-Breaching Party to such Breaching Party.

8.3. **Remedies.** Except as expressly limited by this Agreement, upon termination of this Agreement, the Non-Breaching Party shall have all rights and remedies available hereunder, at law and in equity. The Non-Breaching Party shall not be required to terminate this Agreement to enforce any rights or remedies that it may have at law or in equity.

9. STATE CONTRACTING OBLIGATIONS

9.1. Owner understands and agrees that CEFIA is a political subdivision of the State of Connecticut and must comply with Conn. Gen. Stat. § 4a-60 and with Conn. Gen. Stat. § 4a-60a. Accordingly, for purposes of this Agreement, Owner agrees to comply for the Term of Agreement with the state contracting obligations in Conn. Gen. Stat. § 4a-60 and with Conn. Gen. Stat. § 4a-60a. In addition to other requirements, these statutes provide that every contract to which a political subdivision of the state other than a municipality is a party must contain the provisions below. For purposes of this Section 9, Contractor and Owner shall have the same meaning and Contract and Agreement shall have the same meaning.

9.2. Conn. Gen. Stat.§ 4a-60(a):

"Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut; and the contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved;

(2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission;

(3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(4) The contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; and

(5) The contractor agrees to provide the Commission on Human Rights and

Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56."

9.3. Conn. Gen. Stat. § 4a-60a(a):

"Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation;

(2) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(3) The contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and

(4) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56."

9.4. Nondiscrimination Certification. Contractor represents and warrants that, prior to entering into this Agreement, the Contractor has provided CEFIA with documentation evidencing Contractor's support of the nondiscrimination agreements and warranties described above. A form of the Nondiscrimination Certification to be signed by the Contractor is attached.

9.5. Campaign Contribution Restrictions. For all state contracts, as defined in Conn. Gen. Stat. § 9-612(g)(1)(C), having a value in a calendar year of $50,000 or more or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of

state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See SEEC Form 11, attached.

10. MISCELLANEOUS

10.1. **Waivers**. By written instrument duly executed by both Parties, the Parties may (a) extend the time for the performance of any of the obligations or other actions herein; (b) waive any inaccuracies in the Representations or Warranties herein; (c) waive compliance with any of the Covenants herein; and (d) waive or modify performance of any of the obligations herein. Except as provided in the preceding sentence, no action taken pursuant to this Agreement, including any investigation by or on behalf of any Party, shall be deemed to constitute a waiver by the Party taking such action of compliance with any Representations, Warranties, Covenants, or obligations contained herein. The waiver by any Party of a breach of any provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach.

10.2. **Notices.** All notices, requests, demands, and other communications which are required or may be given under this Agreement shall be in writing and shall be deemed to have been duly given if sent by registered or certified mail, return receipt, postage prepaid, or delivered either by hand, overnight commercial courier service, or by messenger, or sent via facsimile, computer mail, or other electronic means, addressed as follows:

(a) If to CEFIA, to:

865 Brook Street
Rocky Hill, Connecticut 06067
Attention: Rick Ross, Senior Project Manager
Telephone: (860) 257-2887
Facsimile: (860) 563-4877
Email: Rick.Ross@ctcleanenergy.com

(b) If to Owner, to:

INSERT OWNER NAME
INSERT OWNER ADDRESS
INSERT OWNER TELEPHONE NUMBER
INSERT OWNER FACSIMILE NUMBER
INSERT OWNER EMAIL ADDRESS

Or to such other person or address as a Party shall have specified by notice in writing to the other Party. Any notice so addressed and delivered shall be deemed to be given when actually received by the addressee.

10.3. **Entire Agreement.** This Agreement, together with the Schedules and Appendices hereto, constitute the entire agreement between the Parties with respect to the subject

matter hereof and supersedes any proposals and preliminary agreements between the Parties generated in connection with the Project. No prior oral or written understanding shall be of any force or effect with respect to any matter covered hereunder. This Agreement may be amended only by a written instrument signed by the Parties.

10.4. Further Assurances. Each Party will execute and deliver such documents, instruments, and agreements and take such action as the other Party may reasonably request and as may be reasonably necessary, proper, or advisable, to the extent permitted by applicable law, to fulfill the purposes and intent of this Agreement.

10.5. Governing Law. This Agreement shall be governed by, construed, and enforced in accordance with the laws of the State of Connecticut, without regard to its principles relating to conflicts of law. EACH PARTY HEREBY CONSENTS TO THE EXCLUSIVE JURISDICTION OF THE COURTS OF THE STATE OF CONNECTICUT FOR THE PURPOSES OF ALL LEGAL PROCEEDINGS ARISING OUT OF OR RELATING TO THIS AGREEMENT AND THE TRANSACTIONS CONTEMPLATED HEREBY. EACH PARTY HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, (a) ANY OBJECTION TO THE LAYING OF VENUE OF ANY SUCH PROCEEDING BROUGHT IN SUCH A COURT; AND (b) ANY CLAIM THAT ANY SUCH PROCEEDING BROUGHT IN SUCH COURT HAS BEEN BROUGHT IN AN INCONVENIENT FORUM.

10.6. Severability. If any court or arbitrator should find any particular provision of this Agreement void, illegal or unenforceable, then that provision shall be regarded as severable and stricken from this Agreement, and the remainder of this Agreement shall remain in full force and effect. Except as expressly set forth in Section 10.10, below, if and to the extent that any laws that govern any aspect of this Agreement shall change, so as to make any aspect of this transaction unlawful, then the Parties shall make such modifications to this Agreement as may be reasonably necessary for this Agreement to accommodate any such legal or regulatory changes.

10.7. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument. Facsimile or PDF signatures shall be deemed original signatures.

10.8. Construction. Ambiguities or uncertainties in the wording of this Agreement will not be construed for or against any Party, but will be construed in the manner that most accurately reflects the Parties' intent as of the Effective Date. The Parties acknowledge that they have been represented by legal counsel in connection with the review and execution of this Agreement, and accordingly, there shall be no presumption that this Agreement or any provision hereof be construed against the Party that drafted this Agreement.

10.9. Limitation on Recourse. All liabilities and obligations of CEFIA under this Agreement are subject and limited to the funding available under Connecticut law.

10.10. Available Funding. CEFIA shall not be obligated to provide the Grant or any portion of the Grant under this Agreement if there are insufficient funds for such purpose because of any legislative or regulatory action expressly curtailing, reducing, or eliminating CEFIA funding.

10.11. Freedom of Information Act. CEFIA is a "public agency" for purposes of the Connecticut Freedom of Information Act ("FOIA"). Accordingly, this Agreement and information received pursuant to this Agreement will be considered public records and will be subject to disclosure under the FOIA, except for information falling within one of the exemptions in Conn. Gen. Stat. Section 1-210(b).

Owner acknowledges that (1) CEFIA has no obligation to notify Owner of any FOIA request received by CEIAF, (2) CEFIA may disclose materials claimed by Owner to be exempt if in CEFIA's judgment such materials do not appear to fall within a statutory exemption, (3) CEFIA may in its discretion notify Owner of FOIA requests and/or of complaints made to the Freedom of Information Commission concerning items for which an exemption has been claimed, but CEFIA has no obligation to initiate, prosecute, or defend any legal proceeding, or to seek to secure any protective order or other relief to prevent disclosure of any information pursuant to an FOIA request, (4) Owner will have the burden of establishing the availability of any FOIA exemption in any such legal proceeding, and (5) in no event shall CEFIA or any of its officers, directors, or employees have any liability for the disclosure of documents or information in CEFIA's possession where CEFIA, or such officer, director, or employee, in good faith believes the disclosure to be required under the FOIA or other law.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective duly authorized representatives as of the date first above written.

[Signature page follows.]

THE CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY

By: _____
Bryan T. Garcia, President
Clean Energy Finance and Investment Authority

By: _____
George D. Bellas, Vice President, Finance and Administration
Connecticut Innovations, Inc, acting solely as administrative support of the Clean Energy Finance and Investment Authority

[INSERT OWNER NAME]

By: _____ Date: _____
[Insert Name]
[Insert Title]

SCHEDULE A

Project Site:

INSERT ADDRESS

Equipment:

Fuel Cell Module

Manufacturer: (or equivalent)
Model: (or equivalent)
Quantity:

Estimated Project Costs:

Project Economics	**Cost**	**$/kilowatt**
Generating Equipment	$	$/$kW_{PTC}$
Engineering & Permitting	$	$/$kW_{PTC}$
Construction & Installation	$	$/$kW_{PTC}$
TOTAL	**$**	**$/$kW_{PTC}$**

kW Capacity: kW_{STC} kW_{PTC}

Projected Annual AC Production: kWh at meter

Ownership of Renewable Energy Credits: Owner

APPENDIX I

Equipment Delivery to Site

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067
Attention: Rick Ross

Re: Fuel Cell Project at INSERT ADDRESS

Delivery Date: _____

Dear Mr. Ross:

In accordance with the Standard Grant Agreement ("Agreement") between _____ ("Owner") and the Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner represents and warrants to CEFIA that the fuel cell equipment has been delivered to the Project Site in good condition, and that Owner has insured the fuel cell equipment.

Owner certifies that it is in full compliance with all of the terms and conditions in the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA a Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

_____

By: _____

Its: _____

Attachments: 1) Equipment packing slips or other documentation of delivery to Project Site
2) Certificate of insurance
3) Proof of contractor's and subcontractor's insurance

APPENDIX II

Equipment Acceptance

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067
Attention: Rick Ross

Re: Fuel Cell Project at INSERT ADDRESS

Commissioning Date: _____

Dear Mr. Ross:

In accordance with the Standard Grant Agreement (the "Agreement") between _____ ("Owner") and the Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner represents and warrants to CEFIA that Owner has properly installed and tested the fuel cell equipment ("Equipment") and has determined that the Equipment is operable. Owner certifies that it has accepted the Equipment as having been installed satisfactorily.

Manufacturers' warranties on equipment are as follows:

[Insert Warranty Description]

Owner certifies that it has complied with all of the energy monitoring system requirements in Section 3.2.2 of this Agreement.

Owner certifies that it is in full compliance with all of the terms and conditions of the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA a Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

_____

By: _____

Its: _____

Attachments:
1) Cost Report
2) Municipal Inspector's Report
3) Utility Inspection/Test Report and Interconnection Agreement
4) Electrical Diagram (one-line)
5) Proof of energy monitoring system

APPENDIX III

Form of Final Funding Request

_____, 2011

Clean Energy Finance and Investment Authority
865 Brook Street
Rocky Hill, Connecticut 06067
Attention: Rick Ross

Re: FUEL CELL Project at INSERT ADDRESS

Dear Mr. Ross:

Pursuant to the Standard Grant Agreement (the "Agreement") between _____ ("Owner") and Clean Energy Finance and Investment Authority ("CEFIA") dated _____ ___, 2011, Owner requests from CEFIA the final Grant payment of $_____.

Owner certifies that the projected production for the Project for the first six (6) full months after the Commissioning Date (INSERT DATE RANGE) was _____kWh. Owner also certifies that the actual system AC production in kWh for the same period was _____kWh, which is at least seventy percent (70%) of the projected production.

Owner certifies that it is in full compliance with all of the terms and conditions of the Agreement.

Pursuant to the Agreement, Owner requests from CEFIA the final Grant payment of $_____.

Please send payment to: ***Payee name***
Payee accounts payable address

Very truly yours,

_____

By: _____

Its: _____

Attachments: Six-month production report

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor,* with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or *solicit* contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee;

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties--$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of $2000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or $5000 in fines, or both.

Contract Consequences

Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided.

Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban."

Definitions:
"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract,* (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan or a loan to an individual for other than commercial purposes.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

STATE OF CONNECTICUT

NONDISCRIMINATION CERTIFICATION – Affidavit

By Entity

For Contracts Valued at $50,000 or More

Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson, member, or other corporate officer duly authorized to adopt corporate, company, or partnership policy that certifies the contractor complies with the nondiscrimination agreements and warranties under Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended

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INSTRUCTIONS:

For use by an entity (corporation, limited liability company, or partnership) when entering into any contract type with the State of Connecticut valued at $50,000 or more for any year of the contract. Complete all sections of the form. Sign form in the presence of a Commissioner of Superior Court or Notary Public. Submit to the awarding State agency prior to contract execution.

AFFIDAVIT:

I, the undersigned, am over the age of eighteen (18) and understand and appreciate the obligations of an oath. I am _____ of _____, an entity
Signatory's Title Name of Entity

duly formed and existing under the laws of _____.
Name of State or Commonwealth

I certify that I am authorized to execute and deliver this affidavit on behalf of

_____ and that _____
Name of Entity Name of Entity

has a policy in place that complies with the nondiscrimination agreements and warranties of Connecticut General Statutes §§ 4a-60(a)(1)and 4a-60a(a)(1), as amended.

_____
Authorized Signatory

_____
Printed Name

Sworn and subscribed to before me on this _____ day of _____, 20____.

_____ _____
Commissioner of the Superior Court/ Notary Public **Commission Expiration Date**

865 Brook Street
Rocky Hill, Connecticut 06067-3444
T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Deployment Committee, Clean Energy Finance and Investment Authority

From: Jessica Bailey, Bryan Garcia and David Ljungquist

Date: April 25, 2012

Re: Campus Efficiency Now

For Discussion

CEFIA proposes a $1M pilot loan program for university building upgrades, named Campus Efficiency Now. CEFIA is working with the CT Council of Independent Colleges (CCIC) to aggregate demand for energy efficiency. We are also working with GreenerU to establish a wholly-owned LLC for the project. Greener U would act as the general partner, auditor and the contractor for the upgrades through the LLC.

In providing an innovative financing approach for colleges and universities, the program offers CEFIA an opportunity to be part of a creative clean energy financing program that takes advantage of what we've learned in the solar financing arena. That is, solar really took off when the industry developed and perfected PPA-style transactions. In spite of superior returns for EE, the efficiency industry hasn't been nearly as innovative in designing new ways to accelerate EE through more user-friendly financing programs. The proposed Campus Efficiency Now program provides the opportunity to pilot something new that could really catch on in efficiency financing.

Summary of Campus Efficiency Now:

GreenerU has developed a financing structure and project implementation approach that the company believes has the ability to overcome significant challenges for colleges, while at the same time providing an attractive, risk-adjusted return to CEFIA and other third party investors.

The concept for the pilot project is to create an energy efficiency investment fund that supports the installation of retro-commissioning based efficiency measures at Connecticut colleges and universities. The goal would be to have the proposed fund capitalized at $5 million, though it would begin with a $1 million investment from CEFIA, helping to initiate the pilot phase of the program.

Here is a brief description of how the program will work:

- CEFIA and GreenerU will work together to structure an investment fund. CEFIA would be the first investor into "the Fund."
- GreenerU, in partnership with CCIC, would go into the campus and identify where the energy savings could be found. They represent their services as "within 90 days, we can reduce energy costs by 20%" for systems that they address with their measures, over the term of their agreement. They can offer this because these early measures are not capital-intensive, involving mostly labor costs for minor repairs and retro-commissioning of building management and control systems. The service is expected to generate an appetite for much deeper measures, for which an energy audit and a more conventional ESPC or PPA is required.
- "The Fund" invests in a retro-commissioning program that GreenerU implements at selected universities in CT, currently anticipated to be Connecticut College, St. Joseph College and the University of New Haven. The University of Hartford is also interested in participating, but has not yet provided a definitive positive response.
- College buys generated EE with approximately 20% discount to current energy costs (5 year deal). GreenerU would structure agreement with university through the Fund whereby the university pays back the upgrade costs over 5 years through the savings they are getting on their energy bill. In other words, university doesn't have to provide any upfront capital; rather they have to agree that they will pay back 80% of the energy bill savings they get to the Fund that has been set up. For example, if GreenerU upgrade saves university $1,000/month in energy costs, the university gets $200 a month and "the Fund" gets $800 a month. (these numbers are for example only)
- Savings verified through thorough Evaluation, Measurement &Verification protocol that is agreed to by the college.
- Regular payments to investors over 5 years at 7% Yield To Maturity (YTM).

Rationale for CEFIA:

We believe Campus Efficiency Now fits squarely in the new mission of CEFIA, and represenst a "strategic investment" as defined in CEFIA's Operating Procedures. The investment is intended to generate a modest return, and meets three of the characteristics required for such investments:

a) special capabilities of the party presenting the investment opportunity – CCIC provides a ready and willing market into independent colleges for energy efficiency and Greener U is a company with a track record and a focus on university sustainability initiatives

b) uniqueness of the opportunity- the project would pilot a new concept for energy efficiency financing that adapts a model used in the solar PV market to energy efficiency

c) strategic importance to the mission of CEFIA – financing energy efficiency projects is a strategically important and new area for CEFIA. Trying to demonstrate that the innovative financing tools from renewable energy can be applied to energy efficiency,

if proven, can lead to a rapid expansion of end-users undertaking energy efficiency measures.

This program allows CEFIA to test the aggregation model with CCIC. Judy Greiman, the president of CCIC, has been working with CEFIA since it was created and has built demand among her colleges for financial products to help colleges undertake energy efficiency programs.

While the first phase of this program would rely on CEFIA financing alone, the near term goal is to build a track record of success which CEFIA and GreenerU would use to attract third party capital. In other words, this short term pilot has strong long term potential to grow into a larger financing product for this important market segment if the PPA model for energy efficiency can be proven with the participating colleges.

Consumer Information

College	Founded	# faculty/students
Connecticut College	1911	178/1900
St. Joseph College	1932	89/1059
University of New Haven	1920	395/5949

CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY

CCIC Connecticut Conference of Independent Colleges

GREENER U Campus Sustainability & Energy Solutions

CAMPUS EFFICIENCY NOW

Campus Efficiency Now is an innovative energy and sustainability initiative that provides a cost effective way for Connecticut colleges to reduce energy costs, become more sustainable, and reduce carbon emissions.

Designed as a modular offering, Campus Efficiency Now enables colleges to move forward with energy saving measures that can be implemented quickly. The program combines the best parts of many well-known clean energy transactions in a contract structure that requires no upfront funding by the college. Thus, schools can take meaningful action now in spite of challenging budgetary times.

Campus Efficiency Now is a pilot program developed with the Connecticut Conference of Independent Colleges (CCIC) and the Clean Energy Investment Authority (CEFIA). In the pilot phase, there will be 3-4 CCIC member colleges participating, with investment funding provided by CEFIA in view of their mission to promote, develop and invest in clean energy and energy efficiency projects. As the nation's first clean energy finance authority, CEFIA will leverage public and private funds to accelerate clean energy investment and deployment in Connecticut.

Upwards of $250,000 Invested in Your College

What is Campus Efficiency Now?

Campus Efficiency Now produces cost savings through the implementation of energy efficiency measures resulting from a process that is highly effective, fast to implement, and non-intrusive to building operations and use. The program is delivered on a building by building basis in combination with appropriate campus outreach and sustainability activities.

How is Campus Efficiency Now delivered?

The Campus Efficiency Now program will be delivered by GreenerU, a company that focuses on providing energy and sustainability solutions to colleges and universities. GreenerU is a leader in its field, specializing in integrating energy and sustainability approaches for colleges that meet the school's specific needs. Its team members have many years of experience in implementing large-scale energy efficiency, cogeneration and renewable energy projects.

In the pilot phase of the Campus Efficiency Now program, GreenerU will work with individual colleges to identify the most cost effective measures that would be appropriate for the energy saving project. Focusing on buildings that would be selected for the program, GreenerU will work through a retrocommissioning process in which it performs rigorous diagnostics and testing, making critical adjustments, and where required, replacing existing mechanical and electrical systems to achieve energy savings.

Campus Efficiency Now will assist in optimizing the energy use and reduce utility costs in the selected buildings. And as mentioned, under the program design utilized here, all of this work - including the investment in energy saving measures - will be undertaken by GreenerU with no upfront cost to the college.

How is Campus Efficiency Now paid for?

The Campus Efficiency Now program is an innovative way for colleges to become more

energy efficient without having to use their own funding. Building on the success that has been achieved in solar energy project financing, the program is based on a modified solar power purchase agreement (PPA). However, where solar PPAs require long agreements (typically 15-20 years) between a solar provider and a customer, the Campus Efficiency Now agreement is a short, 5 year contract to pay for delivered energy efficiency – or "negawatts"[i] – at discounted levels.

In paying for these energy savings, the college's purchase price of the negawatts is set at a rate that is less than the market rates for electricity purchases. In the case of the Efficiency Now agreement, this rate is generally set at 80% of the current market rate for purchase of the supply side energy. In other words, the college buys the negawatts at a 20% discount relative to what the school would have paid for the energy. As part of the program, a rigorous monitoring and verification protocol is utilized to verify the energy savings.

Upwards of $100,000 Saved by Your College

As in the case of solar financing agreements, a participating college only pays for the negawatts that are delivered by the Campus Efficiency Now project. Schools do not pay for any of the costs associated with implementing or delivering the project components, nor do they incur any performance risk with respect to the Efficiency Now project's ability to successfully deliver negawatts. To underscore this point, as a participating college in the Campus Efficiency Now program, ***schools only pay for efficiency savings - not equipment or installations.*** Each month the college will receive a Campus Efficiency Now statement that documents the negawatts delivered by the project and an associated invoice that factors in the 20% savings. In addition, ***at the end of 5 years, all the energy efficiency improvements belong to the college and no further obligation is due in spite of continued savings.***

Getting started

For the initial pilot program, 3 – 4 CCIC member colleges will be selected to participate in the Campus Efficiency Now program. For those participating schools, GreenerU will begin a three step process that begins with a preliminary feasibility assessment, including data gathering, budgeting, and sustainability goal setting. These Phase I steps culminate in a mutually agreed upon project and the signing of the Campus Efficiency Now agreement. This agreement sets forth the terms under which the project will be installed and operated on the campus and the terms by which the college will pay for the delivered negawatts. This phase can be completed in approximately one to two months.

In Phase II, GreenerU will begin the implementation of the Campus Efficiency Now program components. The timing of this phase will vary based on program size and complexity, but typically lasts 3 to 6 months.

Once the Phase II implementation is completed, the Campus Efficiency Now program will start delivering negawatts, cost savings, and a reduction in carbon emissions to the campus. GreenerU will then monitor the project over the 5 year term of the agreement and provide on-going support as needed to maximize utility savings and the energy and sustainability benefits to the college. At the conclusion of the 5 year term, all of the improvements to the college's buildings belong to the school with no further payments due.

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[i] A negawatt is a unit representing an amount of energy saved (measured in watts). The energy saved is a direct result of energy conservation or increased efficiency delivered by the Efficiency+ project. The term negawatt was originally coined in 1989 by Amory Lovins, the Chief Scientist of the Rocky Mountain Institute.

Note: All investment and savings figures contained herein are estimates. Final program size and expected savings to be determined following Phase I activities.

GREENER U | Campus Sustainability & Energy Solutions

Document Purpose

The following document provides an internal briefing paper for the Clean Energy Finance and Investment Authority on the proposed "Pilot Program for Energy Savings at Connecticut Colleges" as outlined in a summary originally sent to CEFIA by GreenerU on March 5, 2012 (see Appendix A).

Contents

Executive Summary

There are many challenges to the implementation of energy efficiency projects generally and in the college marketplace specifically. This proposal to CEFIA addresses one of the most significant of these challenges – the need for new financial models to assist colleges in implementing more aggressive energy efficiency programs.

Based on empirical research conducted by Lawrence Berkeley National Laboratory and others, as well as GreenerU's own experience in the field, GreenerU has developed a financing structure and project implementation approach that the company believes has the ability to overcome significant challenges for colleges while at the same time providing an attractive, risk-adjusted return to CEFIA and other third party investors.

The following briefing paper addresses the proposed energy efficiency investment fund that would support the installation of retrocommissioning based efficiency measures at Connecticut colleges and universities. The goal would be to have the proposed fund capitalized at $5 million, though it would begin with a $1 million investment from CEFIA, helping to initiate the pilot phase of the program.

CEFIA's initial funding would catalyze the rapid startup of an innovative, higher education energy efficiency program that would bring about early action by colleges. This early success would provide a model that could be replicated at other Connecticut schools, and it would lay the groundwork for larger energy efficiency projects that would be identified as a result of the retrocommissioning installations. As a result, there will be far more clean energy implementation, and the CEFIA funding will help to leverage the next round of further clean energy implementation at Connecticut colleges, most often with third party financing.

Overall Market Opportunity for EE and Cogeneration

The state of Connecticut is home to numerous colleges and universities with an estimated annualized opportunity for campus based energy efficiency and supply side activities of upwards of $32 million per year.

This $32M per year forecast is based on a pool of 37 colleges with a combined student population of over 198,000 and includes energy efficiency and cogeneration installations that may be part of new or retrofitted construction.

The total annual opportunity in Connecticut is broken down in the table to the right by both type of college as well as size.

Annualized Opportunity in Millions $

Type	Small (1-3K)	Medium (3-10K)	Large (10K+)	Total
Public	0	7	8	16
Private	3	11	4	17
	$ 3	$ 17	$ 12	$ 32

The following colleges are represented in this market opportunity:

Private

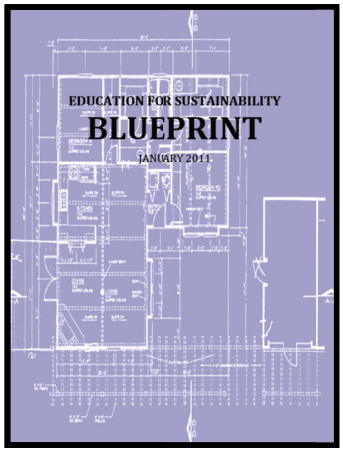
1. Yale University
2. Quinnipiac University
3. University of Hartford
4. Sacred Heart University
5. University of New Haven
6. Fairfield University
7. University of Bridgeport
8. Post University
9. Wesleyan University
10. Goodwin College
11. Porter and Chester Institute of Stratford
12. Trinity College
13. Saint Joseph College
14. Albertus Magnus College
15. Connecticut College
16. Lincoln Technical Institute - East Windsor
17. Lincoln Technical Institute - New Britain
18. Lincoln Technical Institute - Shelton

Public

1. University of Connecticut
2. Central Connecticut State University
3. Southern Connecticut State University
4. Manchester Community College
5. Gateway Community College
6. Naugatuck Valley Community College
7. Norwalk Community College
8. Western Connecticut State University
9. Housatonic Community College
10. Eastern Connecticut State University
11. Three Rivers Community College
12. Tunxis Community College
13. Capital Community College
14. Middlesex Community College
15. Quinebaug Valley Community College
16. Charter Oak State College
17. Asnuntuck Community College
18. Northwestern Connecticut Community College
19. United States Coast Guard Academy

Steps taken to catalyze energy efficiency action through the proposed pilot program could stimulate action at a good number of Connecticut's colleges in the coming years. GreenerU believes that the program has a total 3 year opportunity of approximately $5 million. The important aspect to emphasize is that this pilot program, through Phase I retrocommissioning projects, will bring about much larger Phase II energy efficiency implementation projects, as the colleges begin to understand the opportunities available to them by taking advantage of their "energy waste asset" and what can be achieved through innovative financing and multi-year, energy savings initiatives. At that point, the annual $32 million opportunity estimated above may occur or even be exceeded.

Supporting Research



Education for Sustainability Blueprint January 2011

Throughout 2010 over forty-one organizations in the US higher education sector came together through the leadership of Second Nature and the Campaign for Environmental Literacy to create a "blueprint" to map out the best ways to accelerate sustainability in higher education. Financing was identified as one of the seven key Gaps to success. More specifically:

> *"Financing sustainability efforts is one of the most commonly identified barriers to change by individual colleges and universities. …. **New financial models need to be developed and disseminated to help schools address lack of capital for making change** as well as to favor a more sustainable future for these institutions"*

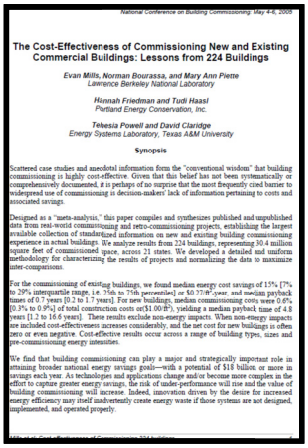
GreenerU is working to help colleges and universities overcome this financing barrier in a number of ways and one of GreenerU's financial innovations serves as the basis of the proposed CEFIA pilot program.

The proposed pilot program would be structured and designed around the following core concepts:

1) Structured as an Energy Efficiency PPA to build on the success of solar power purchase agreements.
2) No up-front funding is needed from the participating CCIC colleges.
3) Program focuses on short payback measures that are not operationally disruptive to a campus.
4) Colleges pay for discounted energy savings, not installation or implementation costs.
5) At the end of a 5 year term, the colleges own the EE measures, with no further obligation.
6) CEFIA would provide initial capital to catalyze a fund that would attract 3rd-party investors.

The structure's ability to provide positive, low-risk returns to its investors is based on empirical research conducted by organizations such as Lawrence Berkeley National Laboratory, Portland Energy Conservation and the Energy Systems Laboratory at Texas A&M University; GreenerU's actual operating experience on client campuses; as well as more than 100 years of combined experience in the energy efficiency field by members of the GreenerU team.

From a research perspective, the seminal study upon which GreenerU's estimate of a minimum 7% expected investor return is the Mills et al. study of 2005[1] and the updated study, also by Mills of 2009[2] which expanded significantly on the original work.


National Conference on Building Commissioning: May 4-6, 2005

The Cost-Effectiveness of Commissioning New and Existing Commercial Buildings: Lessons from 224 Buildings

Evan Mills, Norman Bourassa, and Mary Ann Piette
Lawrence Berkeley National Laboratory

Hannah Friedman and Tudi Haasl
Portland Energy Conservation, Inc.

Tehesia Powell and David Claridge
Energy Systems Laboratory, Texas A&M University

Synopsis

Scattered case studies and anecdotal information form the "conventional wisdom" that building commissioning is highly cost-effective. Given that this belief has not been systematically or comprehensively documented, it is perhaps of no surprise that the most frequently cited barrier to widespread use of commissioning is decision-makers' lack of information pertaining to costs and associated savings.

Designed as a "meta-analysis," this paper compiles and synthesizes published and unpublished data from real-world commissioning and retro-commissioning projects, establishing the largest available collection of standardized information on new and existing building commissioning experience in actual buildings. We analyze results from 224 buildings, representing 30.4 million square feet of commissioned space, across 21 states. We developed a detailed and uniform methodology for characterizing the results of projects and normalizing the data to maximize inter-comparisons.

For the commissioning of existing buildings, we found median energy cost savings of 15% [7% to 29% interquartile range, i.e. 75th to 75th percentiles] or $0.77/ft²/year, and median payback times of 0.7 years [0.2 to 1.7 years]. For new buildings, median commissioning costs were 0.4% [0.3% to 0.9%] of total construction costs or($1.00/ft²), yielding a median payback time of 4.8 years [1.2 to 16.6 years]. These results exclude non-energy impacts. When non-energy impacts are included cost-effectiveness increases considerably, and the net cost for new buildings is often zero or even negative. Cost-effective results occur across a range of building types, sizes and pre-commissioning energy intensities.

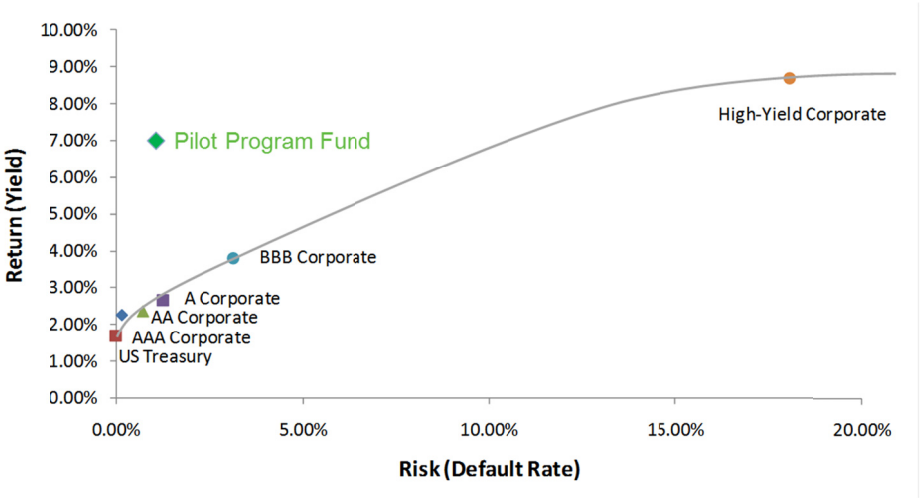
We find that building commissioning can play a major and strategically important role in attaining broader national energy savings goals—with a potential of $18 billion or more in savings each year. As technologies and applications change and/or become more complex in the effort to capture greater energy savings, the risk of under-performance will rise and the value of building commissioning will increase. Indeed, innovation driven by the desire for increased energy efficiency may itself inadvertently create energy waste if those systems are not designed, implemented, and operated properly.

The Mills "meta-analysis" research compiled and synthesized published and unpublished data from real-world commissioning and retro-commissioning projects performed on 643 buildings, representing 100 million square feet of commissioned space, across 26 states. For the commissioning of existing buildings, Mills et al. found energy cost savings with a median energy cost savings of 16%.

[1] http://eetd.lbl.gov/emills/pubs/pdf/ncbc_mills_6apr05.pdf
[2] http://cx.lbl.gov/documents/2009-assessment/LBNL-Cx-Cost-Benefit.pdf

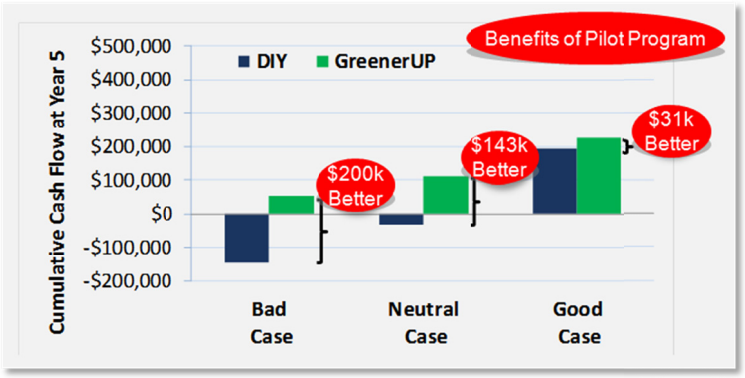
Mills et al. went on to conclude that "building commissioning can play a major and strategically important role in attaining broader national energy savings goals—with a potential of $18 billion or more in savings each year. As technologies and applications change and/or become more complex in the effort to capture greater energy savings, the risk of under-performance will rise and the value of building commissioning will increase. Indeed, innovation driven by the desire for increased energy efficiency may itself inadvertently create energy waste if those systems are not designed, implemented, and operated properly."

GreenerU's internal research and modeling of the returns available to CEFIA and other investors are based on the Mills study as well as the GreenerU team's experience in the field. The results of this modeling is summarized in the Risk/Return Profile graph shown to the right.



The GreenerU research shows that a portfolio of Energy Efficiency PPA's is expected to return a much higher risk adjusted return to investors than any other class of debt securities[3].

Likewise, GreenerU's research and modeling clearly shows that the Pilot Fund supports the delivery of great value to colleges since the Energy Efficiency PPA accelerates realized energy savings and shields the college from performance risk. The graph to the left compares the benefits of the Pilot Program to an internal "do it yourself" (DIY) implementation of the same measures. [4]



[3] Fixed income yield information are pre-tax and are based on 5-year maturities current as of 7/19/2010. Default rates are average cumulative 5-year default rates of bonds rated by Moody's from 1920-2009. GreenerU's projected default rate is based on a 1 million iteration Monte Carlo simulation. Sources: US Treasury, IHS Global Insight, Barclays Capital, Moody's Investor Service, GreenerU. Pilot Program Fund returns are not guaranteed.

[4] DIY assumes the university internally rolls out EE measures that would otherwise be covered by the EE PPA structure incrementally over 5 years, starting 1 year from now. Pilot Program assumes the full $250,000 RCx is implemented now; "Good Case" scenario assumes 20% annual energy savings on implemented square feet; "Neutral Case" scenario assumes 10% annual energy savings; "Bad Case" scenario assumes 5% annual energy savings.

Summary – Goals, Attributes, and Benefits of the Program

The following list provides a summary of the various goals, attributes, and benefits of the pilot program:

- **Goals of the Proposed Pilot Program**
  - Offering to private colleges that brings about a quick decision to go forward
  - Sets the stage for much larger energy efficiency projects
  - Illustrates CEFIA's innovation in energy efficiency financing
  - Offering that generates attractive risk adjusted returns for investors
  - Initiative lends itself to third party financing in upcoming phases

- **What it is - Solar PPA model applied to EE**
  - Fund invests in a retrocommissioning program that GreenerU implements
  - College buys generated EE with approximately 20% discount to current energy costs (5 year deal)
  - Savings verified through thorough M&V protocol
  - Regular payments to investors over 5 years at 7% Yield To Maturity (YTM)
  - Financing through low cost transaction fund structure LLC

- **Differs from traditional Energy Performance Contracts**
  - Limited retrocommisioning with focus on quick payback measures vs. large-scale, long term project
  - Service focus vs. Infrastructure focus
  - Small project size ($250-$500K per campus)
  - Short contract term (generally 5 years)
  - Portfolio Funded vs. One-off Project Financed
  - Financing cost embedded in PPA offering
  - More interaction with colleges and greater EE learning opportunities

- **Impacts of Differences**
  - Retrocommissioning = Reduced risk & reduced costs
  - Service focus = Fast to implement, low barrier to client acceptance
  - Small project size = Completed quickly, energy efficiency payments start within months
  - Short contract term = Reduced investor risk
  - Portfolio funded = Reduced transactional costs
  - Payment for energy savings = Reduced college barriers to "Yes"

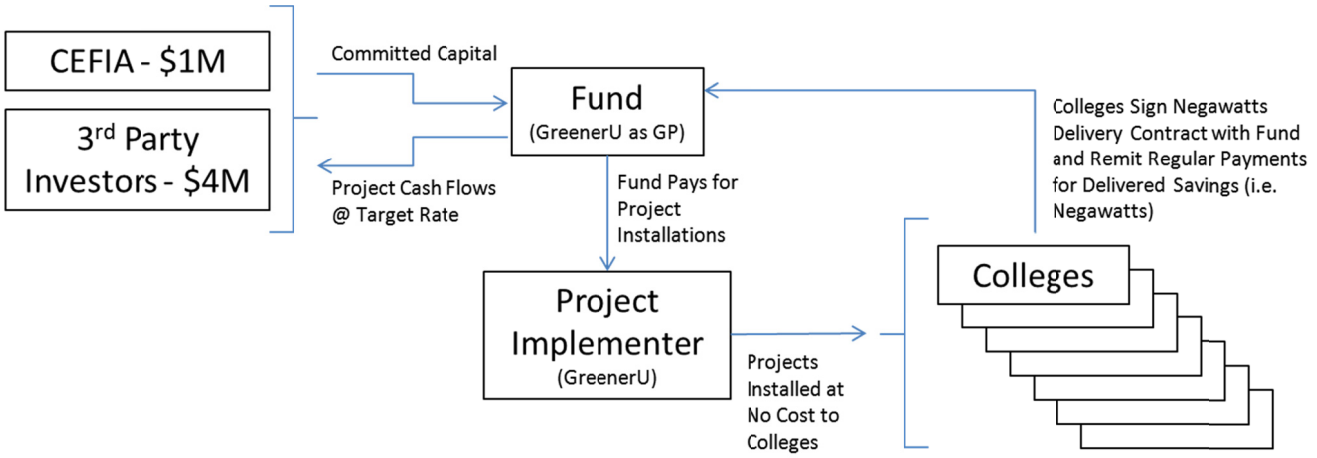
Proposed Legal Structure

GreenerU has worked with it attorneys at Foley Hoag to explore various legal structures that we believe will properly support the program's key goals, attributes, and benefits. Based on this work it is believed that the optimal financial structure is an investment fund "("Fund") with the following main attributes and indicative terms:

Investment Restrictions	Fund would invest solely in energy efficiency opportunities at colleges and universities within the state of Connecticut with other criteria to be defined in greater detail upon fund formation.
Target Fund Size	$ 5,000,000 (Total Committed Capital)
Investment Period	3 Years
Fund Term	8 Years (with 2 one year extensions)
Preferred Return	7%
GP	GreenerU
Carry	TBD
Management Fees	None

CEFIA would be the first investor in the Fund, with the goal that CEFIA and GreenerU would collaborate in raising an additional $4M after CEFIA's initial $1M investment. CEFIA may wish to encourage and support third party investors by agreeing to receive a lower than target return in the unlikely event that the Fund underperforms the Preferred Rate.

A simplified graphical representation of the Fund structure and cash flows from investors into projects at multiple colleges and then back from the colleges to investors would look as follows:



GreenerU Experience

While most members of the GreenerU engineering team will be involved in delivering the CEFIA college pilot program, the following individuals will be responsible for the innovation behind the program, its design, and implementing the initiative.

Rob Pratt

Rob Pratt is the Chairman and CEO of GreenerU, a company he founded to help colleges and universities become sustainability leaders while reducing energy, water and infrastructure costs. Previously, Rob was the founder, Chairman, and CEO of Energia Global International (EGI, now Enel Latin America), a company that became one of the leading renewable energy development companies in Central America. Prior to GreenerU, Rob was the Senior Vice President of the Henry P. Kendall Foundation, where he worked with cities, states and nonprofit organizations in developing innovative, large-scale energy efficiency implementation projects. He also served as Director of the Massachusetts Renewable Energy Trust, a $250 million state fund to promote renewable energy and clean energy economic development.

Rob is a nationally renowned expert in clean energy and serves as Chairman Emeritus of the American Council on Renewable Energy. He is Chairman of the board of the International Institute for Energy Conservation, an organization he founded in 1984. Rob is Treasurer and a board member of the Alliance to Save Energy, a founding board member of the New England Clean Energy Council, and President and board member of the Cambridge Energy Alliance. He earned an MPA degree from the Kennedy School of Government at Harvard University, a JD degree from Georgetown University Law Center, and a Bachelor's degree from Wesleyan University.

David Adamian

David Adamian is co-founder and Vice President for Engineering and Operations for GreenerU, bringing nearly 20 years of experience in project management and corporate management. Previously, David was Regional Manager for HEC/Select Energy Services where he developed, designed, and implemented major upgrades to central utility plants, installed cogeneration facilities, and completed large energy efficiency projects for the University of Massachusetts, Bridgewater State College, and Portsmouth Naval Shipyard. David was also a Vice President for Carter & Burgess, a major national engineering firm, and founded an engineering consulting firm focusing on energy efficiency and cogeneration, boiler, and chiller plants. David earned a Bachelor's degree from Hampshire College. He is registered as a Professional Engineer in the Commonwealth of Massachusetts and is a LEED Accredited Professional.

David Kopans

David Kopans is co-founder and Chief Financial Officer for GreenerU. Previously, Dave was head of finance/CFO for two publicly traded companies and is a serial entrepreneur who has started, operated, and advised software, hardware, biotech, and clean-energy companies. After starting his career as a CPA and CMA at Coopers & Lybrand, Dave has been actively involved in renewable energy. He co-founded Value Added Energy Information Systems (VAEIS) in 2003, a leading provider of metering and monitoring services for renewable energy. In 2005, VAEIS merged with Fat Spaniel Technologies and Dave assumed responsibility for business development and regulatory affairs. Today, he mentors teams in the MIT Ignite Clean Energy competition and is a member of the board of the Northeast Sustainable Energy Association (NESEA). Dave is a graduate of Brown University with a

Bachelor of Arts in economics and public policy. He also holds an MBA degree, with honors, in finance and accounting from New York University.

Kailash Viswanathan

Kailash Viswanathan is the Director of Energy Efficiency for GreenerU, with more than 17 years of experience in energy services. His primary responsibility is the development and implementation of energy efficiency and renewable energy projects, and in the course of his career, he has overseen many energy efficiency installations, including large-scale and campus wide projects. Prior to GreenerU, Kailash held senior positions for Johnson Controls Inc. (JCI), most recently as the Project Development Manager for its Solutions business and earlier as the technical lead for higher education and healthcare facilities in the Northeast. He was also Senior Project Manager at Select Energy Services, where he supervised energy efficiency and cogeneration projects. Kailash is a Certified Energy Manager and a LEED Accredited Professional. He holds a Bachelor of Science degree in Mechanical Engineering from Mumbai University, India. He is a member of the Association of Heating, Refrigeration and Air-conditioning Engineers, the Association of Energy Engineers, and the Project Management Institute.

Bonny Bentzin

Bonny is the Director of Sustainability at GreenerU. She is widely recognized as a leader in higher education sustainability as a result of her many accomplishments at Arizona State University (ASU). As Director of University Sustainability Practices at ASU's Global Institute of Sustainability, she worked with President Michael Crow in helping the University chart a course to achieve carbon neutrality and integrate sustainability into all of its operations and practices. In her seven years at ASU, Bonny was a key contributor to the university-wide solar initiative and the installation of 10 megawatts of solar photovoltaics; the establishment of a $3 million Sustainability Initiatives Revolving Loan Fund; a redesigned recycling program for over 70,000 students; and the highly acclaimed Carbon Neutrality Action Plan. She has provided guidance and support to numerous colleges and has mentored many students. Bonny is a board member of the Association for the Advancement of Sustainability in Higher Education (AASHE) and is active in the American College & University Presidents' Climate Commitment (ACUPCC). Bonny is a LEED Accredited Professional and has a BA in Environmental Sciences from Mt. Holyoke College.

Appendix A – Attachment to Email of 3/5 summarizing Pilot Program
The following summary of the proposed Pilot Program was sent to CEFIA by Rob Pratt in an email dated 3/5/12

Pilot Program for Energy Savings at Connecticut Colleges

Demonstrating Innovative EE Financing Approaches for Higher Education

Summary – This proposal outlines a collaborative energy efficiency (EE) pilot program involving the Connecticut Conference of Independent Colleges (CCIC), the Clean Energy Finance and Investment Authority (CEFIA) and GreenerU. The pilot program has been designed both to 1) help CCIC member colleges address energy efficiency opportunities and implement projects without having to identify funding sources, and 2) assist CEFIA in developing innovative financing approaches that take advantage of third party financing.

Colleges & EE Implementation - Making college buildings and campuses more energy efficient in order to reduce energy costs and make a school more sustainable is an attractive goal. It generally offers a good return on investment, projects can often be paid for through energy savings, deferred maintenance can be addressed, and schools reduce their greenhouse gas emissions. For this reason, virtually all Connecticut colleges have invested in energy efficiency (EE) at some level. Nevertheless, it is difficult to achieve the full potential of what can be done on most college campuses.

In working and interacting with colleges all over New England, GreenerU has found that the most frequently cited reasons for not undertaking a more aggressive energy efficiency implementation program are 1) bandwidth, lack of staff availability to identify opportunities, assemble EE projects, and carry them out; and 2) funding, in view of tight budgets at most schools. If these obstacles can be overcome, colleges usually move forward since administrators understand that energy efficiency is the most cost effective solution available to reduce their energy costs, lower their carbon footprints, and make their schools more sustainable.

Pilot Finance Program - GreenerU is proposing a pilot EE implementation and financing program that provides a creative way to overcome the obstacles mentioned above. The program would initially include three or four CCIC colleges, but this number could be expanded once the proof of concept has been demonstrated.

The pilot program would be designed around the following concepts:

1) No up-front funding is needed from the participating CCIC colleges.
2) EE programs can be implemented quickly by GreenerU.
3) The EE measures do not require substantial college facilities staff time.
4) Colleges pay for discounted energy savings, not installation and implementation costs.
5) At the end of a 5 year term, the colleges own the EE measures, with no further obligation.

Expanding on these organizing concepts, the pilot program can be summarized in the following way. GreenerU would work with the colleges in several buildings, performing retrocommissioning services

and improving the energy efficiency of the buildings through the installation of energy measures that the colleges approve. The colleges do not need to fund the energy installations. Rather, the pilot program is built on the success story of the solar industry's power purchase agreement (PPA) approach. However, rather than purchasing kilowatt hours – as is done under a solar PPA - the schools pay for energy savings – or negawatts[5] – at discounted levels.

In implementing the program, GreenerU and CEFIA would structure five year contracts with the colleges, premised on careful verification of energy savings. When the term is up at the end of the five year contract, the colleges own the installed energy efficiency measures, with no further payment obligations for continuing energy savings. In addition, the schools do not incur any performance risk with respect to the project's ability to successfully deliver energy savings.

The pilot program avoids the obstacles mentioned above – bandwidth and funding - that prevent colleges from moving forward on energy efficiency programs. First, GreenerU would work with the schools in implementing the retrocommissioning program, performing rigorous diagnostics and testing in carrying out the energy efficiency measures as well as in verifying energy savings. Second, through the use of the financing approach that will be used, college administrators do not need to identify the funding necessary to undertake this next level of energy efficiency progress on their campus.

CCIC & CEFIA - Under the proposed initiative, selected member colleges of the CCIC would participate in a CEFIA backed financing program that could grow significantly in the coming years. CCIC would assist GreenerU and CEFIA in identifying initial colleges that may be interested in participating in the pilot program, and meetings would be set up with appropriate college officials from those schools. Once the colleges are selected, GreenerU will work with the schools to determine which buildings would be included in the program and undertake the initial retrocommissioning work.

It is understood that CEFIA would like to demonstrate innovative financing approaches to accelerate energy efficiency and renewable energy implementation in Connecticut, preferably including third party financing. GreenerU and its finance team can work with CEFIA on ways that can meet the financing needs of the pilot program, estimated at around $750,000 to $1 million, and bring about the design and implementation of a program for CCIC member colleges in the near term.

It should be mentioned that while this proposal is designed as a Phase I energy efficiency initiative, to help catalyze initial EE action on college campuses, it will in many cases be an important precursor in assisting colleges move to larger scale Phase II efficiency projects that are likely to include multi-million dollar installation programs. This summary does not address the larger Phase II implementation, but it is understood that innovative CEFIA financing could be involved here as well, helping CCIC colleges become more energy efficient and further reducing their utility costs and carbon emissions.

[5] A negawatt is a unit representing an amount of energy saved (measured in watts). The energy saved is a direct result of energy conservation or increased efficiency delivered by the project. The term negawatt was originally coined in 1989 by Amory Lovins, the Chief Scientist of the Rocky Mountain Institute.

Campus Efficiency Now – CEFIA's Partners

Connecticut Conference of Independent Colleges

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Founded in 1932, the Connecticut Conference of Independent Colleges (CCIC) represents sixteen accredited nonprofit independent colleges and universities in Connecticut. CCIC serves its member institutions through government relations, public policy development, research analysis, communications and coordinated member services. The purposes of CCIC are:

- Lobbying and PR for the independent colleges at the State and national level
- Collaborating with the business community on workforce development
- Preserving the autonomy and independence of CCIC member institutions; and,
- Fostering cooperative efforts among members to improve services or reduce costs.

Membership

The presidents of member institutions comprise the CCIC Board. The following institutions are members of CCIC:

- Albertus Magnus College
- Connecticut College
- Fairfield University
- Goodwin College
- Mitchell College
- Quinnipiac University
- Rensselaer at Hartford
- Sacred Heart University
- Saint Joseph College
- St. Vincent's College
- Trinity College
- University of Bridgeport
- University of Hartford
- University of New Haven
- Wesleyan University
- Yale University

Board of Directors

Executive Committee FY 12-13:

- Chair - Rev. Jeffrey von Arx, S.J., Fairfield University
- Vice Chair - James Jones, Trinity College
- Secretary - Mary Ellen Jukoski, Mitchell College
- Treasurer - Michael Roth, Wesleyan University
- Past Chair - Neil Salonen, University of Bridgeport

Members at Large

- Pamela Trotman Reid, Saint Joseph College
- Mark Scheinberg, Goodwin College
- Martha Shouldis, Saint Vincent's College

Staff

- Judith B. Greiman, President
  860.678.0005 | Fax: 860.678.0006 |
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GreenerU, Inc.

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Waltham, MA 02453-5339

Main Phone Line: 781 891 3750

Email: Info@GreenerU.com

Website: http://www.greeneru.com/

GreenerU was founded in 2008 to help colleges and universities become sustainability leaders while reducing energy, water and infrastructure costs.

GreenerU's client projects include:

- Design and implementation of comprehensive, campus- wide energy efficiency and sustainability programs
- Dorm energy efficiency projects with an integrated student engagement component
- Program management and project implementation of multi- million dollar, multi-year energy efficiency initiative
- Preparation of energy and sustainability strategic plans
- Building-specific deep energy retrofit projects
- Retro-commissioning multiple building types, including academic, laboratory and athletic facilities
- Launch and management of college Office of Sustainability
- Redesign and management of Eco-Reps program
- Facilitation of STARS process
- Implementation of student engagement programs around energy, solid waste and other sustainability-related issues
- Development of staff recognition programs
- Development of Climate Action Plans

GreenerU clients include:

- Assumption College
- Babson College
- Brandeis University
- Brown University
- Clark University
- College of the Holy Cross
- Dartmouth College
- Hampshire College
- Phillips Academy
- Worcester Polytechnic Institute

Board of Directors

- John Cochrane - Mergers & Acquisitions Director for National Grid.
- Dave Dayton - CEO of Clean Energy Solutions, Inc.
- Doug Foy - founder and CEO of Serrafix, a developer of clean tech enterprises focused on energy efficiency, smart growth, sustainable development, and climate change.
- Paul Gromer – founder and president of Peregrine Energy Group
- Rob Pratt - chairman and CEO of GreenerU

Management

Rob Pratt - Chairman and CEO of GreenerU. Previously, Rob was the founder, chairman, and CEO of Energia Global International (EGI, now Enel Latin America), a company that became one of the leading renewable energy companies in Central America. Prior to GreenerU, Rob was the senior vice president of the Henry P. Kendall Foundation, where he worked with cities, states and nonprofit organizations in developing innovative, large-scale energy efficiency implementation projects. He also served as director of the Massachusetts Renewable Energy Trust, a $250 million state fund to promote renewable energy and clean energy economic development.

He earned an MPA degree from the Kennedy School of Government at Harvard University, a JD degree from Georgetown University Law Center, and a Bachelor's degree from Wesleyan University.

David Adamian - Co-founder and Vice President for Engineering and Operations. Previously, David was regional manager for HEC/Select Energy Services where he developed, designed, and implemented major upgrades to central utility plants, installed cogeneration facilities, and completed large energy efficiency projects. David was also a vice president for Carter & Burgess, a major national engineering firm, and founded an engineering consulting firm focusing on energy efficiency and cogeneration, boiler, and chiller plants. David earned a bachelor's degree from Hampshire College. He is registered as a Professional Engineer in the Commonwealth of Massachusetts and is a LEED Accredited Professional.

David Kopans - Co-founder and Chief Financial Officer. Previously, Dave was head of finance/CFO for two publicly traded companies and is a serial entrepreneur who has started, operated, and advised software, hardware, biotech, and clean-energy companies. After starting his career as a CPA and CMA at Coopers & Lybrand, Dave co-founded Value Added Energy Information Systems (VAEIS) in 2003, a leading provider of metering and monitoring services for renewable energy. In 2005, VAEIS merged with Fat Spaniel Technologies and Dave assumed responsibility for business development and regulatory affairs. Today, he mentors teams in the

MIT Ignite Clean Energy competition and is a member of the board of the Northeast Sustainable Energy Association (NESEA). Dave is a graduate of Brown University with a Bachelor of Arts in economics and public policy. He also holds an MBA degree, with honors, in finance and accounting from New York University.

Bonny Bentzin - Director of Sustainability at GreenerU. As Director of University Sustainability Practices at ASU's Global Institute of Sustainability, she worked with President Michael Crow in helping the University chart a course to achieve carbon neutrality and integrate sustainability into all of its operations and practices, installing 10 megawatts of solar photovoltaics; establishing a $3 million Sustainability Initiatives Revolving Loan Fund; redesigning a recycling program for over 70,000 students; and initiating the highly acclaimed Carbon Neutrality Action Plan. Bonny is a LEED Accredited Professional and has a BA in Environmental Sciences from Mount Holyoke College.

Kailash Viswanathan - Director of Energy Efficiency for GreenerU, with responsibility is the development and implementation of energy efficiency and renewable energy projects. Kailash held senior positions for Johnson Controls Inc. (JCI), most recently as the project development manager for its Solutions business and earlier as the technical lead for higher education and healthcare facilities for the Northeast. Kailash is a Certified Energy Manager and a LEED Accredited Professional. He holds a Bachelor of Science in Mechanical Engineering from Mumbai University, India. He is a member of the Association of Heating, Refrigeration and Air-conditioning Engineers, the Association of Energy Engineers, and the Project Management Institute.

ENERGY EFFICIENCY FUEL SUPPLY CONTRACT

BETWEEN

CAMPUS EFFICIENCY NOW LLC

And

[COLLEGE NAME]

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List of Appendices

RECITALS

This ENERGY EFFICIENCY FUEL SUPPLY CONTRACT ("Contract") is entered into as of [MONTH][DAY], 201X (the "Effective Date"), by and between Campus Efficiency Now LLC, a Delaware limited liability company, having a principal place of business at One Moody Street, Waltham MA 02453,("CEN" or "Seller"), and [COLLEGE NAME], a Connecticut not-for-profit corporation having a principal place of business at ADDRESS ("Buyer"). CEN and [COLLEGE NAME] shall at times individually be referenced herein as a "Party" and collectively as the "Parties".

WHEREAS, Buyer is an institution of higher education that owns and operates a campus serving a student body of INSERT NUMBER; and

WHEREAS, Buyer's ability to provide a dependable and reasonably priced supply of various energy types to its campus is vital to the economic and operational wellbeing of the organization; and

WHEREAS, energy efficiency has been deemed the "First Fuel" (referred to as the "Energy Efficiency Fuel" hereafter in this Contract); and

WHEREAS, Buyer desires to procure Energy Efficiency Fuel in the same manner and at competitive rates relative to other energy resources such as natural gas, electricity, solar energy, heating oil, and the like; and

WHEREAS, in its operation, Buyer requires a dependable source of Energy Efficiency Fuel along with a supplier with the experience and capability necessary to supply Buyer's Energy Efficiency Fuel requirements; and

WHEREAS, Seller is a competent supplier of Energy Efficiency Fuel, having the ability to deliver Energy Efficiency Fuel to meet a portion of the requirements of Buyer, and desires to supply Energy Efficiency Fuel to Buyer under a competitive supply contract; and

WHEREAS, Buyer desires to make various buildings on its campus available to CEN for the construction, operation and maintenance of an Energy Efficiency Fuel generating project ("Project"), and to purchase from CEN the Energy Efficiency Fuel produced by the Project; and

WHEREAS, Seller desires to develop, design, implement and operate the Project located on, [COLLEGE NAME]'s property, and sell to [COLLEGE NAME] the Energy Efficiency Fuel produced by the Project; and

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and such other good and valuable consideration the receipt thereof being hereby acknowledged, Seller agrees to sell Energy Efficiency Fuel and Buyer agrees to purchase Energy Efficiency Fuel on the terms and conditions set forth herein.

1 TERM

(a) Initial Term. The Initial term of this Contract shall commence on the Effective Date and continue until the date (the "Expiration Date") which is the last day of the month in which the fifth (5th) anniversary of the Commercial Operation Date occurs, unless terminated earlier pursuant to the terms of this Contract.

(b) Commercial Operation Date. The "Commercial Operation Date" for the Project means that date on which one or more of the measures and activities listed in Appendix B first become operational, as determined by Seller. Seller shall provide Buyer with notice after such operational status is attained, setting forth the Commercial Operation Date.

(c) Subsequent Term(s). This Contract can be extended by written agreement between the Parties. Twelve months prior to the Expiration Date, the Parties will meet to discuss the extension of this Contract on terms and conditions reflecting the then current market for Energy Efficiency Fuel and with such other amendments and additional terms and conditions as the Parties may agree. Neither Party shall be obligated to agree to an extension of this Contract.

2 PRICING, SALE, AND BILLING

(a) Pricing. Buyer shall pay Seller for Energy Efficiency Fuel produced under this Contract at the rates set forth in Appendix A attached hereto.

(b) Sale of Energy Efficiency Fuel. Seller shall sell to Buyer and Buyer shall buy from Seller all Energy Efficiency Fuel produced during the term of this Contract at the Sites listed in Appendix B.

(c) Limits on Obligation to Deliver. Seller does not warrant or guarantee the amount of Energy Efficiency to be produced under this Contract.

(d) Billing. Buyer shall pay for the Energy Efficiency Fuel produced under this Contract monthly in arrears. Promptly after the end of each calendar month, Seller shall provide Buyer with an invoice setting forth the quantity of Energy Efficiency Fuel produced under this Contract in such billing cycle, the applicable rates for such, and the total amount due, which shall be the product of the quantities and the applicable rates.

(e) Invoice Delivery. Invoices shall be in writing and shall be either (i) delivered by hand; (ii) mailed by first class mail; (iii) delivered by a reputable messenger service or a nationally recognized overnight courier; (iv) transmitted by facsimile (such transmission to be effective on the day of receipt if received prior to 5:00 pm local time on a Business Day or in any other case as of the next Business Day following the day of transmittal); or (v) transmitted by email addressed as follows:

[_____]

[_____]

[_____]

Attention: [_____]

Email: [_____]

(f) Payment. Buyer shall pay each invoice within thirty (30) days of receipt of the invoice. Payments shall be made by check or electronic funds transfer to an account designated by Seller in the invoice or in a written notice delivered to Buyer. Any amounts not paid when due, including any

amounts properly disputed and later determined to be owing, shall accrue interest on the unpaid amount at the rate equal to the lesser of (i) 1% per month, compounded monthly or (ii) the highest rate allowed by applicable law.

(g) Disputed Invoices. If Buyer objects to all or a portion of an invoice, Buyer shall, on or before the date payment of the invoice is due, (i) pay the undisputed portion of the invoice, and (ii) provide an itemized statement of its objections setting forth in reasonable detail the basis for its objections. If Buyer does not object prior to the date payment of any invoice is due, Buyer shall be obligated to pay the full amount of such invoices.

3 MEASUREMENT OF ENERGY EFFICIENCY FUEL PRODUCTION

(a) Guidelines for Measurement. Seller shall provide Buyer with written protocols for the measurement of all Energy Efficiency Fuel generated, and produce invoices accordingly, using applicable best practice techniques and guidelines as generally established. Initial guidance in all cases shall be those concepts, frameworks, and options detailed within the Efficiency Valuation Organization's International Performance Measurement and Verification Protocol Volume I, 2010 (IPMVP).

4 INSPECTION, REVIEW AND AUDIT

(a) Terms of Inspection, Review and Audit. Buyer (or its authorized representative) shall have the right to inspect, review, and audit Seller's books and records with respect to the methods by which disputed invoices for Energy Efficiency Fuel are calculated hereunder at any time during regular business hours, and upon reasonable notice to Seller. Seller shall maintain and cause its representatives to maintain, all data and information discovered pursuant to this Section in confidence except to the extent that disclosure thereof may be required by law.

5 DISPUTE RESOLUTION

(a) Non-Binding Mediation. Buyer and Seller will attempt to settle any controversy, dispute, difference, or claim between them concerning the performance, enforcement, or interpretation of this Contract (collectively, "Dispute") through direct discussion in good faith, but if unsuccessful, will submit any Dispute to non-binding mediation in [the nearest major metropolitan area of the state where the Project is performed]. If the parties are unable to agree on a mediator or a date for mediation, either party may request JAMS, Inc. to appoint a mediator and designate the time and procedure for mediation. Such mediator shall be knowledgeable, to each party's reasonable satisfaction, with respect to matters concerning implementation of energy efficiency measures. Neither Buyer nor Seller will file a lawsuit against the other until not less than sixty (60) days after the mediation referred to herein has occurred, unless one or both parties is genuinely and reasonably concerned that any applicable statute of limitations is on the verge of expiring.

6 ACCESS RIGHTS

(a) License to Sites. Buyer hereby grants to Seller and to the Implementation Partner (as defined below), at no cost to Seller or the Implementation Partner, the exclusive license to use, have access to, modify, store, install and maintain its equipment and perform its services on, in, and around the Sites as reasonably necessary to the performance or provision of its obligations hereunder.

This license includes, in accordance with the terms of this Contract, the rights to

(i) ingress and egress to the Sites,

(ii) place monitoring equipment on the Sites to measure various factors such as energy consumption, building occupancy, weather variables, if any,

(iii) place and maintain the Project on or in one or more buildings located on the Sites in accordance with the terms of this Contract,

(iv) use other parts of the Sites, including the roof(s) and utility rooms where the Project is located, or is to be located, as may be reasonably necessary in performance under this Contract,

(v) have access to and modify, as necessary, electrical panels and conduits to interconnect the Project with Sites electrical wiring, and

(vi) access to other necessary utilities, such as elevators and restrooms, all as reasonably necessary. The license provided hereunder shall include the right to provide a similar license to employees, contractors, sub-contractors and other agents. Buyer shall use commercially reasonable efforts to provide sufficient space for the temporary storage and staging of tools, materials and equipment and for the parking of construction crew vehicles and temporary construction trailers and facilities, and access for rigging and material handling. Buyer shall also provide Seller a reasonable area for construction laydown as required.

7 IMPLEMENTATION PARTNER

(a) GreenerU, Inc. Seller shall use GreenerU, Inc. (the "Implementation Partner") as its sole subcontractor to meet its obligations under this Contract, and the Implementation Partner may use its own contractors, subcontractors, employees and agents. Any right extended to Seller hereunder shall extend to the Implementation Partner to the extent necessary to enable the Implementation Partner to perform any obligation of Seller hereunder. Seller shall be responsible for the conduct of the Implementation Partner and the Implementation Partner's employees, agents, contractors and subcontractors, and Buyer shall have no contractual relationship with the Implementation Partner or the Implementation Partner's employees, agents, contractors or subcontractors in connection with the work on the Project. Seller shall ensure that the Implementation Partner maintains insurance that satisfy the requirements in Appendix C.

8 PLANNING AND INSTALLATION OF THE ENERGY EFFICIENCY FUEL PROJECT

(a) Planning. Prior to the Commercial Operation Date, Seller shall have the right, at its own expense, to assess the suitability of the Buyer's campus for the Project and shall act diligently in conducting such assessment. The assessment shall include the right to inspect the physical condition of the structures on which the Project will be located; to apply for any building permits or other governmental authorizations necessary for the construction of the Project; to make any applications to the appropriate Public Utilities Commission or other agencies for receipt of payments or rebates for the Project or portions thereof; to apply to any other governmental agencies or other persons for grants or other determinations necessary for the construction of or receipt of revenues from the Project; or to make any other investigation or determination necessary for the financing, construction, operation or maintenance of the Project.

(b) Termination of Development Activities. At any time prior to the Commercial Operation Date, Seller shall have the right to cease development of the Project on the Buyer's campus, for any reason, in its sole discretion. If Seller gives Buyer notice of such determination, this Contract shall terminate effective as of the delivery of such notice without any further liability of the Parties to each other, provided that (i) Seller shall remove any equipment or materials which Seller has placed on the Sites; (ii) Seller shall restore any portions of the Sites disturbed by Seller to its pre-existing condition; (iii) the Parties shall not be released from any payment or other obligations arising under this Contract prior to the delivery of the notice; and (iv) the confidentiality provisions of Section 15, the indemnity obligations under Section 17 hereof, and the dispute resolution provisions of Section 5 hereof shall continue to apply notwithstanding the termination of this Contract.

(c) Installation Timeline. At any time following the Effective Date the Seller, in its sole discretion, shall have the right to install the Project, or portions thereof, on the Buyer's campus.

(d) Installation Deadline. If within 90 days following the Effective Date, the Seller has not commenced the installation of the Project, or portions thereof, Buyer may terminate this Contract by delivering notice to Seller of its intention to terminate this Contract, and the Seller shall terminate twenty-one (21) days after Seller's receipt of such notice; provided, that if Seller commences installation of the Project within such twenty-one (21) day period, this Contract shall not terminate. Upon any termination in accordance with this Section 8(d) neither Party shall have any further liability to the other with respect to the Project, provided that (i) Seller shall remove any equipment or materials that Seller has placed on the Sites; (ii) Seller shall restore any portions of the Sites disturbed by Seller to their condition prior to the commencement of construction; (iii) the Parties shall not be released from any payment or other obligations arising under this Contract prior to the delivery of the notice; and (iv) the confidentiality provisions of Section 15, the indemnity obligations under Section 17 hereof, and the dispute resolution provisions of Section 5 hereof shall continue to apply notwithstanding the termination of this Contract.

(e) Timeline Extensions. If, due to Buyer's action or inaction, Seller is unable to, or is prevented from, commencing the installation of the Project, or portions thereof, Seller may terminate this Contract by delivering notice to Buyer. Seller shall be entitled to appropriate reimbursement and compensation for all development and other expenses incurred with respect to the Project prior to such notice as well as subsequent costs incurred to wind down the Project.

9 OPERATION OF THE ENERGY EFFICIENCY FUEL PROJECT

(a) Standard of Operations. Seller shall design, install, operate, and maintain the Project so as to keep it in good condition and repair, in compliance with all applicable laws and in accordance with the generally accepted practices of the electric, gas, and fuel oil industries, in general, and the energy efficiency industry, in particular.

(b) Cost of Project. All work required to design, install, operate, and maintain the Project shall be at Seller's sole expense.

(c) Performance of Work. Except for emergency situations or unplanned outages, Seller shall cause the work to be performed between the hours of 7:00 am and 7:00 pm, Monday through Saturday, in a manner that minimizes interference with Buyer and Buyer's students, employees, visitors, tenants and licensees to the extent commercially practical. Seller shall, and shall cause the Implementation Partner to, keep the Sites reasonably clear of debris, waste material and

rubbish, and to comply with reasonable safety procedures established by Buyer for conduct of business on the Sites.

(d) Site Security. Buyer will provide security for the Project to the extent of its normal security procedures, practices, and policies that apply to all of Buyer's campus, including the Project. Buyer will advise Seller immediately upon observing any damage to the Project. Upon request by Seller, such as Seller receiving data indicating irregularities or interruptions in the operation of the Project, Buyer shall, as quickly as reasonably practicable, send a person to observe the condition of the Project and report back to Seller on such observations.

10 PROGRAM INCENTIVES, TAX ATTRIBUTE, ENVIRONMENTAL ATTRIBUTES, AND OTHER

(a) Program Incentives. Seller shall receive all payments available under any rebate or incentive program. Buyer shall provide reasonable assistance to Seller in preparing all applications and other documents necessary for Seller to receive such payments. If Buyer receives any payments in respect of the Project, it shall promptly pay them over to Seller. Buyer's obligation to make any payments to Seller under this paragraph is limited to any payments actually received by Buyer.

(b) Tax Attributes. Seller shall be the sole owner of any tax attributes that may arise as a result of the operation of the Project and shall be entitled to transfer such tax attributes to any person. Buyer shall provide reasonable assistance to Seller in preparing all documents necessary for Seller to receive such tax attributes, and if Buyer is deemed to be the owner of any such tax attributes, Buyer shall assign the same (or the proceeds thereof) to Provider. If Buyer receives any payments in respect of such tax attributes, it shall promptly pay them over to Seller.

(c) Environmental Attributes. Buyer shall be the owner of any environmental attributes which may arise as a result of the operation of the Project and shall be entitled to transfer such environmental attributes to any person. Seller shall provide reasonable assistance to Buyer in preparing all documents necessary for Buyer to receive such environmental attributes, and if Seller is deemed to be the owner of any such environmental attributes, Seller shall assign the same (or the proceeds thereof) to Buyer. If Seller receives any payments in respect of such environmental attributes, it shall promptly pay them over to Buyer. Environmental attributes means any non-tax attribute that is in effect as of the Effective Date or may come into effect in the future, including, to the extent applicable and without limitation, RECs, carbon credits, Green-e products or other such attributes earned by or in connection with, or otherwise attributable to, the Project.

(d) Capacity or Ancillary Services. Seller shall be entitled to receive any payments for electric capacity or ancillary services that may become available as a result of the construction or operation of the Project. Buyer shall provide reasonable assistance to Seller in preparing all documents necessary for Seller to receive such payments, and if Buyer is deemed to be the owner or Seller of such capacity or services, Buyer shall assign the same to Seller. If Buyer receives any payments in respect of capacity or such services it shall promptly pay them over to Seller.

11 PERMITS, OWNERSHIP OF PROJECT, LIENS, MORTGAGES

(a) Permits. Seller shall pay for and obtain all approvals from governmental entities necessary for the construction and operation of the Project, including any approval, license, permit,

inspection, authorization or other consent which is or may be required for the performance of a Party's obligations or the exercise of Party's rights, as specified herein.

(b) Project Ownership. Except as provided for elsewhere, Seller shall be the legal and beneficial owner of the Project at all times. The Project is personal property and shall not attach to or be deemed a part of, or fixture to, the Sites. The Project shall at all times retain the legal status of personal property as defined under Article 9 of the Uniform Commercial Code. Buyer covenants that it will place all persons having an interest in or lien upon the real property comprising the Buyer's campus, on notice of the ownership of the Project and the legal status or classification of the Project as personal property. Buyer and/or Seller shall make any necessary filings to disclaim the Project as a fixture of Buyer's campus and Sites in the appropriate Land Registry in order to place all interested parties on notice of the ownership of the Project by Seller.

(c) Liens. To the extent permitted by applicable law, each Party shall not directly or indirectly cause, create, incur, assume or suffer to exist any mortgage, pledge, lien, (including mechanics', labor or materialman's lien), charge, security interest, encumbrance or claim of any nature, including claims by governmental authorities for taxes (collectively referred to as "Liens" and each, individually, a "Lien") on or with respect to the interests of the other in the Sites, the Buyer's campus, and the Project, and in the access rights granted hereunder. Each Party shall promptly notify the other of the imposition of a Lien on the property interests of the other Party, and shall promptly discharge such lien, provided however, that a Party may seek to contest the amount or validity of any Lien affecting the property of the other Party, provided it timely complies with all procedures for contesting such Lien, posts any bond or other security necessary under such procedures, and if such procedures do not require the posting of security, the Party establishes for the benefit of the other Party a deposit, letter of credit, or other security acceptable to the other Party to indemnify the other Party against any loss which could reasonably be expected to arise if such Lien is not removed or discharged.

(d) Non Disturbance Contracts. Buyer shall pay for and obtain all consents required for it to enter into and perform its obligations under this Contract from its lenders, landlord, tenants, and any other persons with interests in the Sites. If there is any mortgage or fixture filing against the Buyer's campus which could reasonably be construed as prospectively attaching to the Project, Buyer shall promptly upon request of Seller, provide an acknowledgement and consent from such lienholder, in form and substance reasonably acceptable to Seller, stating that the ownership of the Project remains in Seller and further acknowledging that the Project is personal property of Seller and agreeing not to disturb the rights of Seller in the Project and under this Contract. If Buyer is the fee owner of the Buyer's campus, Buyer consents to the filing of a disclaimer of the Project as a fixture of the Buyer's campus in the Land Registry. If Buyer is not the fee owner, Buyer will obtain such consent from such owner of the Buyer's campus. Such acknowledgment and consents, or acceptable notices thereof, shall be recorded, at Buyer's expense, in the appropriate Land Registry. Buyer may in the future mortgage, pledge, and grant security interests in all or a portion of the Site and the improvements thereon, provided the mortgagee or other grantee of the encumbrance acknowledges this Contract, the Project, the access rights granted hereunder, and the priority of Seller's rights in the Project and the access rights.

12 SHUTDOWNS OR SALE OF A SITE

(a) Buyer Requested Shutdown. Buyer from time to time may request Seller to temporarily stop operation of the Project, such request to be reasonably related to Buyer's activities in

maintaining and improving the Sites. During any such shutdown period, Buyer will pay Seller an amount equal to the amount that which the Buyer would have reasonably expected to be made to Seller hereunder for Energy Efficiency Fuel that would have reasonably expected to have been produced and supplied under this Contract during the period of the shutdown.

(b) Sale of a Site. In the event Buyer transfers (by sale, lease, or otherwise) all or a portion of its interest in any Site to a third party, Buyer shall remain primarily liable to Seller for the performance of the obligations of Buyer hereunder notwithstanding such transfer, unless Seller in its sole discretion, consents to the assignment of this Contract to such third party.

13 INSURANCE

(a) Coverage. Buyer and Seller shall each maintain the insurance coverage set forth in Appendix C in full force and effect until the termination of this Contract.

(b) Insurance Certificates. Each Party shall furnish current certificates indicating that the insurance required under this Section is being maintained. Each Party's insurance policy provided hereunder shall contain a provision whereby the insurer agrees to give the other Party thirty (30) days written notice before the insurance is cancelled or materially altered.

(c) Certain Insurance Provisions. Each Party's insurance policy shall be written on an occurrence basis and shall include the other Party as an additional insured as its interest may appear. A cross liability clause shall be made part of the policy. Each Party's insurer shall waive all rights of subrogation against the other Party except in the case of such Party's negligence or willful misconduct.

14 COOPERATION

(a) Cooperation. The Parties acknowledge that the performance of each Party's obligations under this Contract will frequently require the assistance and cooperation of the other Party. Each Party therefore agrees, in addition to those provisions in this Contract specifically providing for assistance from one Party to the other, that it will at all times until the termination of this Contract cooperate with the other Party and provide all reasonable assistance to the other Party to help the other Party perform its obligations hereunder.

15 PRESS RELEASES AND CONFIDENTIALITY

(a) Press Releases. The Parties acknowledge that they each desire to publicize information about this Contract and the Project. The Parties therefore agree that they shall collectively work to issue a mutually agreeable press release within 180 days of the Effective Date.

(b) Prior Written Consent. Prior written consent shall be required for all press releases detailing the Project.

(c) Limits on Disclosure of Confidential Information. Subject to the exceptions set forth herein each Party agrees that, (i) without the consent of the other Party, it shall not disclose any Confidential Information received from the other Party to any other person and (ii) it shall use any Confidential Information received from the other Party only for the purpose of fulfilling its obligations under this Contract.

(d) Confidential Information. "Confidential Information" means all trade secrets and confidential or proprietary information owned, possessed or used by a Party hereunder (whether in written, oral, graphical, machine-readable or other form) that is disclosed to the other Party hereunder

or to which the receiving Party has access, including all such information concerning the disclosing Party's present or future business plans and strategies, financial models, cost estimates and analyses, financial or legal structuring approaches, financing techniques, leasing or partnering arrangements, operations, commercial activities, customers, suppliers and business partners, products, research and development activities, and information of third parties that the disclosing Party has an obligation to keep confidential. Without limiting the foregoing, Confidential Information may include information concerning any approach, process, installation method, technique, design, activity, software, or test data. To the extent reasonably practicable, the disclosing Party will prominently mark "Confidential" on the cover page of all written materials containing Confidential Information which are to be provided to receiving Party hereunder.

(e) Enforcement of Confidentiality Provisions. Each Party acknowledges that it may be impossible to measure the damages which may result from a breach of this Section and agrees that the provisions of this Section may be required to be specifically performed and each Party shall have the right to obtain preliminary and permanent injunctive relief to secure specific performance of the terms of this Section. The provisions of this Section shall survive until three years after the date of the termination of this Contract.

16 HAZARDOUS MATERIALS

(a) Responsibilities With Respect to Hazardous Materials. The scope of work to be performed by Seller pursuant to this Contract and the compensation to be paid to Seller hereunder expressly exclude any work or service of any nature associated or connected with the identification, abatement, cleanup, control, or removal of any currently existing Hazardous Materials or Mold on, in or nearby a Site. Buyer agrees that all duties and obligations in connection with any Hazardous Materials or Mold currently located in, on or nearby a Site or brought into a Site by a party other than Seller are not Seller's responsibility. Should Seller become aware, discover or based on reasonable evidence suspect the presence of Hazardous Materials or Mold, Seller will immediately cease work in the affected area, and will promptly notify Buyer of the conditions discovered. Should Seller stop work because of such discovery or suspicion of Hazardous Materials or Mold, Buyer may suspend or terminate for convenience any work affected by Hazardous Materials or Mold in accordance with this Contract. Should Buyer elect to choose to continue such work after remedy thereof, then the term of this Contract will be reasonably extended to cover the period required for abatement, cleanup, or removal of the Hazardous Materials or Mold. Seller will not be held responsible for any claims, damages, costs, or expenses of any kind associated with such period during which work has been stopped as a result of Hazardous Materials or Mold.

(b) Buyer's Representations and Responsibilities With Respect to Hazardous Materials. Buyer warrants and represents that to the best of its knowledge, there are no Hazardous Materials or Mold in or on the premises that will affect, be affected by, come in contact with, or otherwise impact upon or interfere with the work to be performed by Seller pursuant to this Contract at any Site. Buyer further represents that Buyer has not retained Seller to discover, inspect, investigate, identify, or remediate Hazardous Materials or Mold or conditions caused by Hazardous Materials or Mold. Buyer will be responsible for taking all necessary steps to correct, abate, clean up, or control Hazardous Materials or Mold. Buyer specifically agrees, to the extent allowed by state law, to indemnify and to hold Seller, its officers, agents, contractors, subcontractors and employees harmless from and against any and all claims, demands, damages, or causes of action in any way arising out of its release of Hazardous Materials or

Mold into the air, soil, or any water system or water course, or any actions taken in connection with same, or any failure to act.

(c) Hazardous Materials Introduced to a Site by Seller. Notwithstanding anything to the contrary set forth in this Section 16, if any Hazardous Materials are introduced to a Site by Seller (specifically excluding light bulbs or lighting fixtures that may contain Hazardous Materials), then any response, removal, disposal, cleanup, or other remedial action required by applicable law shall be performed by Seller at its sole cost and expense. Except as to Seller's initial response to an emergency, any such remedial action(s) shall require the prior review and approval of Buyer.

(d) Hazardous Material. “Hazardous Material” means (a) any substance that is listed, defined, designated or classified under any state, federal, or local law relating to the protection of the environment or human health as a (i) hazardous material, substance, constituent, or waste, (ii) toxic material, substance, constituent, or waste, (iii) radioactive material, substance, constituent, or waste, (iv) dangerous material, substance, constituent, or waste, (v) pollutant, (vi) contaminant, or (vii) special waste; or (b) petroleum, petroleum products, radioactive matters, polychlorinated biphenyl, pesticides, asbestos, or asbestos-containing materials.

(e) Mold. "Mold" means any type or form of fungus or similar biological material or agent, including mold, mildew, moisture, yeast and mushrooms, and any mycotoxins, spores, scents, or by-products produced or released by any of the foregoing.

17 INDEMNIFICATION; LIMITATION

(a) Reciprocal Indemnity. Each party shall indemnify the other with respect to any third party claim alleging bodily injury, including death, or property damage to the extent such injury or damage is caused by the negligence or willful misconduct of the indemnifying party. A condition precedent to any obligation of a party to indemnify the other pursuant to this Section 17 shall be for the indemnified party to promptly advise the indemnifying party of the claim pursuant to the notice provision of this Contract.

(b) Limitation. NEITHER BUYER NOR SELLER WILL BE RESPONSIBLE TO THE OTHER FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, REMOTE, PUNITIVE, EXEMPLARY, LOSS OF PROFITS OR REVENUE, LOSS OF USE, OR SIMILAR DAMAGES, REGARDLESS OF HOW CHARACTERIZED AND REGARDLESS OF A PARTY HAVING BEEN ADVISED OF THE POSSIBILITY OF SUCH POTENTIAL LOSSES OR RELIEF, ARISING IN ANY MANNER FROM THIS CONTRACT. WITHOUT LIMITING THE FOREGOING, SELLER’S LIABILITY UNDER THIS CONTRACT, REGARDLESS OF THE FORM OF ACTION, SHALL IN NO EVENT EXCEED THE AMOUNT OF THE PAYMENTS ACTUALLY RECEIVED BY SELLER UNDER THIS CONTRACT.

18 MISCELLANEOUS

(a) Amendments. No amendment to this Contract shall be effective until and unless reduced to writing and executed by the Parties.

(b) No Waiver. No course of dealing or failure of the Buyer and/or Seller to enforce strictly any term, right or condition of this Contract shall be construed as a waiver of such term, right or condition. No express waiver of any term, right or condition of this Contract shall operate as a waiver of any other term, right or condition.

(c) Entire Agreement. This Contract represents the entire agreement between the Buyer and Seller with respect to the subject matter hereof, and supersedes and cancels all prior negotiations, representations or agreements, whether written or oral.

(d) Notices. Any information or notices required to be given under this Contract (other than invoices, which are addressed in Section 2(e)) shall be in writing and shall be delivered either by (i) certified mail, return receipt requested, in which case notice shall be deemed delivered three (3) Business Days after deposit, postage prepaid, in the U.S. mail; (ii) a reputable messenger service or a nationally recognized overnight courier, in which case notice shall be deemed delivered one (1) Business Day after deposit with such messenger or courier; (iii) personal delivery with receipt acknowledged in writing, in which case notice shall be deemed delivered when received; or (iv) facsimile, in which case notice shall be deemed delivered upon confirmation of sending (if sent during normal business hours or the next Business Day if sent at any other time). All notices shall be addressed to the applicable party at its address as set forth in the first paragraph of this Contract, as such address may be changed from time to time by notice to the other Party in the manner provided for in this Section 18(d).

(e) Governing Law. This Contract shall be governed by, and construed and enforced in accordance with, the laws of [*The Commonwealth of Massachusetts*], without respect to its conflicts of laws principles.

(f) Counterparts. This Contract may be executed in counterparts, each of which shall be deemed an original, and all of which counterparts shall constitute one agreement. To facilitate execution of this Contract, the Parties may execute and exchange facsimile counterparts of the signature pages, provided originally executed signature pages are exchanged promptly thereafter.

IN WITNESS WHEREOF, the parties have executed this Energy Efficiency Fuel Supply Contract as of the day and year written below.

[COLLEGE]

By:_____

Name:_____

Title:_____

Campus Efficiency Now LLC

By:_____

Name:_____

Title:_____

APPENDIX A – PRICING

Buyer shall pay Seller for Energy Efficiency Fuel produced under this Contract at the rates equal to the current electrical and natural gas prices discounted by YY% calculated as follows:

$0.XX per kWh * (1-0.20) = $0.ZZ per kWh

$X.XX per MMBTU * (1-0.20) = $Z.ZZ per kWh

APPENDIX B – PROJECT AND SITE DETAILS

Seller intends that the Project will generate Energy Efficiency Fuel at the following buildings or locations ("Sites"). At each of the Sites the measures and activities listed for each below will be evaluated by the Seller. If solely in the Seller's judgment, a measure or activity is deemed appropriate to produce Energy Efficiency Fuel at that Site, the Seller shall advise the Buyer and shall proceed with the installation or activity unless declined by the Buyer.

1. <INSERT BUILDING NAME>
    a. <INSERT POSSIBLE ECM>
    b. <INSERT POSSIBLE ECM>
    c. <INSERT POSSIBLE ECM>

2. <INSERT BUILDING NAME>
    a. <INSERT POSSIBLE ECM>
    b. <INSERT POSSIBLE ECM>
    c. <INSERT POSSIBLE ECM>

3. <INSERT BUILDING NAME>
    a. <INSERT POSSIBLE ECM>
    b. <INSERT POSSIBLE ECM>
    c. <INSERT POSSIBLE ECM>

APPENDIX C – INSURANCE

<INSERT INSURANCE REQUIREMENTS>

The Cost-Effectiveness of Commissioning New and Existing Commercial Buildings: Lessons from 224 Buildings

Evan Mills, Norman Bourassa, and Mary Ann Piette
Lawrence Berkeley National Laboratory

Hannah Friedman and Tudi Haasl
Portland Energy Conservation, Inc.

Tehesia Powell and David Claridge
Energy Systems Laboratory, Texas A&M University

Synopsis

Scattered case studies and anecdotal information form the "conventional wisdom" that building commissioning is highly cost-effective. Given that this belief has not been systematically or comprehensively documented, it is perhaps of no surprise that the most frequently cited barrier to widespread use of commissioning is decision-makers' lack of information pertaining to costs and associated savings.

Designed as a "meta-analysis," this paper compiles and synthesizes published and unpublished data from real-world commissioning and retro-commissioning projects, establishing the largest available collection of standardized information on new and existing building commissioning experience in actual buildings. We analyze results from 224 buildings, representing 30.4 million square feet of commissioned space, across 21 states. We developed a detailed and uniform methodology for characterizing the results of projects and normalizing the data to maximize inter-comparisons.

For the commissioning of existing buildings, we found median energy cost savings of 15% [7% to 29% interquartile range, i.e. 25th to 75th percentiles] or $\$0.27/ft^2$-year, and median payback times of 0.7 years [0.2 to 1.7 years]. For new buildings, median commissioning costs were 0.6% [0.3% to 0.9%] of total construction costs or($\$1.00/ft^2$), yielding a median payback time of 4.8 years [1.2 to 16.6 years]. These results exclude non-energy impacts. When non-energy impacts are included cost-effectiveness increases considerably, and the net cost for new buildings is often zero or even negative. Cost-effective results occur across a range of building types, sizes and pre-commissioning energy intensities.

We find that building commissioning can play a major and strategically important role in attaining broader national energy savings goals—with a potential of $18 billion or more in savings each year. As technologies and applications change and/or become more complex in the effort to capture greater energy savings, the risk of under-performance will rise and the value of building commissioning will increase. Indeed, innovation driven by the desire for increased energy efficiency may itself inadvertently create energy waste if those systems are not designed, implemented, and operated properly.

About the Authors

Evan Mills is a Staff Scientist at Lawrence Berkeley National Laboratory. He has worked in the energy efficiency field for over 20 years and led the commissioning cost-benefit study described in this paper.

Norman Bourassa is a Senior Research Associate in the Commercial Building Systems Group at LBNL. He has a BA in Architecture from UC Berkeley and an Electronics Engineering Technology degree from the Northern Alberta Institute of Technology in Edmonton, Canada.

Mary Ann Piette is a Staff Scientist at Lawrence Berkeley National Laboratory. Her research emphasizes energy efficiency in commercial buildings, and she has authored over a dozen papers related to commissioning.

Hannah Friedman is an engineer for new and existing building commissioning projects and programs at PECI. She led the development of the California Commissioning Collaborative's commissioning case study protocol, on which a portion of the methodology of this study is based.

Tudi Haasl is the Associate Director of Commercial Services for PECI. Her experience in the field of operation and maintenance and commissioning for commercial buildings spans over 20 years.

Tehesia Powell is with the Energy Systems Laboratory at Texas A&M University.

David Claridge is professor of Mechanical Engineering and Associate Director of the Energy Systems Laboratory at Texas A&M University.

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An electronic version of the full report upon which this paper is based and is available at
http://eetd.lbl.gov/emills/PUBS/Cx-Costs-Benefits.html

Introduction

Building performance problems are pervasive. Deficiencies such as design flaws, construction defects, malfunctioning equipment, and deferred maintenance have a host of ramifications, ranging from equipment failure, to compromised indoor air quality and comfort, to unnecessarily elevated energy use or under-performance of energy-efficiency strategies. Fortunately, an emerging form of quality assurance—known as building commissioning—can detect and remedy most deficiencies.

Scattered case studies and anecdotal information form the basis of the conventional wisdom among energy-management professionals that commissioning is highly cost-effective. However, given the lack of standardized information on costs and benefits of detecting and correcting deficiencies, it is perhaps of no surprise that the most frequently cited barrier to widespread use of commissioning is decision-makers' uncertainty about its cost-effectiveness.

Designed as a "meta-analysis," the major study summarized in this paper (Mills et al. 2004) compiles and synthesizes extensive published and unpublished data from buildings commissioning projects undertaken across the United States over the past two decades, establishing the largest available collection of standardized information on commissioning experience. Thorough documentation of source material, analytical approach, and detailed results can be found in the full study.

Methodology

To acquire projects for analysis, we reviewed publications from the open archival and informal literature (e.g. project reports) as well as commissioning-provider project files to identify projects that were sufficiently well documented to enable an analysis of cost-effectiveness and other factors of importance in this study. Use of the grey literature is essential for a study such as this, given that property owners who obtain commissioning services rarely fund formal publication of the process and results. Full detail on the methodology is provided in Mills et al (2004).

We developed a detailed and uniform framework for characterizing, analyzing, and synthesizing the information. The methodology expands upon the case-study protocol developed by the California Commissioning Collaborative, summarized in Friedman *et al*. (2004), placing increased emphasis on cost-benefit analysis and the characterization of deficiencies and measures. Our approach begins with defining desired metrics and indicators (Box 1), and, from these endpoints, the types of data required to enable the analysis. It is important to consider and define desirable metrics in advance of data collection efforts. We characterized and grouped buildings according to definitions used by the U.S. Department of Energy's CBECS surveys.

Documentation of project scope—steps included in the commissioning process—was collected when available (this included 69 percent of the existing buildings studied and 38 percent of the cases of new construction) (Figures 1 and 2). We identified fifteen potential steps for existing-

buildings commissioning and sixteen steps for new-construction commissioning. There is no industry standard for characterizing commissioning scope.

We sought to include relevant commissioning costs born by all parties (although it may be of interest to conduct sub-analyses to evaluate the implications for different commissioning team members). Commissioning may be funded by any combination of the building owner, tenant, utility, or other third parties such as providers of research grants. Commissioning may be implemented by various parties, including but not limited to the Commissioning Agent. An important "grey area" is the cost of labor for in-house participants.

From a practical perspective, there is no one single "correct" range of commissioning costs to be included. This will depend on the audience for the analysis, e.g., a building owner may want to exclude utility rebates or financial assistance from other parties, as it is not an out-of-pocket cost, whereas a policy analyst or program evaluator would likely want to include such costs (as we have done in this study). Of primary importance is that a standard definition is used when comparing multiple projects. Using the rules laid out in Table 1, we have standardized definitions, to the extent allowed by the source data. We include costs borne by all participants, e.g. building owners, utilities, but exclude costs associated strictly with research (e.g. demonstration projects). Commissioning agent fees are often only a part of the total cost—albeit complicated to define and track—of implementing the commissioning process. (Among the projects reporting the breakdown in our sample, the median contribution of commissioning-agent fees to total commissioning costs was 67% for existing buildings and 80% for new construction.)

Two key normalizations—rarely if ever done by others--include correcting for inflation so as to meaningfully compare projects occurring across long periods of time (we used 2003 dollars), and normalizing for variations in energy prices across project (we used 2003 U.S. averages for commercial buildings). Lacking such standardization, inter-comparisons of projects are confounded in ways that can result in a loss of value for higher-level audiences such as policymakers or program evaluators. For building owners, of course, local costs and currencies are the most relevant. To illustrate the importance of these adjustments, raw (non-inflation-corrected) energy prices varied widely across our sample: electricity from $0.025 to $0.159/kWh, fuel from $2.50 to $10.22/MBTU, and hot/chilled water from $2.58 to $8.30/MBTU. Commissioning project costs from 1985 are doubled when expressed in 2003 dollars.

As commissioning is a highly variable process, it is important to develop a consistent and sufficiently specific framework for describing the problems (deficiencies) discovered through the commissioning process and the measures applied to address them. We developed the "Measures Matrix," a completed example of which is shown in Table 2. The matrix captures information on deficiencies, correlates it with the applicable building system, and characterizes these specific combinations with a unique code.

Measuring building energy use and savings is clearly central to the question of assessing cost-effectiveness. We qualified energy use and savings data by grouping it into five categories: estimated and measured, and within measured four levels of detail per the IPMVP protocols. We

limited comparative pre-/post-commissioning analyses based on measured data to cases with weather-normalized data, and used all data based on engineering estimates, as weather is not a confounding factor in this case.

Irrespective of the method of determining energy savings, it should be kept in mind that a commissioning report's recommendations may be in the process of being implemented at the time energy savings data are collected. If estimates of ultimate savings are available, they should be incorporated in cost-benefit analyses. However, attention must be given to the fact that not all recommendations will necessarily have been implemented as of the time of evaluation, especially since primary documents (e.g., commissioning reports) are typically created immediately upon delivery of the recommendations. In this study, we attempted to exclude savings for measures known not to have been implemented, but otherwise included savings for measures that had not yet been implemented as of the date the project was documented.

An important caveat is that few of the primary sources quantified the benefits of all identified savings opportunities. Perhaps the largest conservatism in any cost-benefit analysis for commissioning is that energy savings are only one of many quantifiable and non-quantifiable impacts (positive or negative) (Table 3). Non-energy impacts (NEIs) include changes in maintenance costs, changes in equipment lifetime, improved productivity, reduced change orders, and improved indoor air quality. Where available, we included these impacts in our economic analysis.

Sample

Our data collection efforts yielded 224 buildings (175 projects), spanning 21 states and representing 30.4 million square feet of floor area (73 percent in existing buildings and 27 percent in new construction). These projects collectively embody $17 million ($2003) of commissioning investment. The new-construction cohort represents $1.5 billion of total construction costs.

The information represents the work of 18 known commissioning providers (Table 4). The provider is unknown (unreported in our source documents) for 16 percent of existing building project's floor area and for 62 percent of new construction project's floor area.

Among the existing buildings projects we analyzed, the most common locations were Texas and California, while for new-construction projects the most common locations were Washington, Oregon, and Montana. The median building size was 151,000 square feet for existing buildings (95,101 to 271,650 square feet inter-quartile range, i.e. 25th to 75th percentiles) and 69,500 square feet for new construction (32,268 to 151,000 square feet inter-quartile range). With the exception of the "religious worship" and "vacant" categories, our sample covered all major building types identified in the US Energy Information Administration's periodic Commercial Buildings Energy Consumption Survey. Not all data elements were available for all projects.

Findings

The top-level results are shown in Table 5. For existing buildings, we found median commissioning costs of $0.27/ft^2 ($2003) [with an inter-quartile range of $0.13 to $0.45] whole-building energy savings of 15% [7% to 29%], and payback times of 0.7 years [0.2 years to 1.7 years]. For new construction, median commissioning costs were $1.00/ft^2 [$0.49/ft^2 to $1.64/ft^2] (0.6% of total construction costs [0.3% to 0.9%]), yielding a median payback time of 4.8 years [1.2 years to 16.6 years].[1] All of these values exclude non-energy impacts, discussed in greater depth below. Extensive detail on the findings and primary sources is provided in Mills *et al* (2004). These values are based on corrections for inflation and standardized assumptions for energy prices, described in the preceding section on methodology. While, on average, these normalizations did not have a large absolute effect, adjusted values varied by up to a factor of four in individual cases. Pre-commissioning energy intensities, savings, and payback times varied among building types, as shown in Figure 3.

Our findings are conservative insofar as the scope of commissioning rarely spans all fuels and building systems in which savings may be found, not all recommendations are implemented, and significant first-cost and ongoing non-energy benefits are rarely quantified, but are important drivers for undertaking commissioning and important among the perceived benefits (Figure 4). Examples include reduced change-orders thanks to early detection of problems during design and construction, rather than after the fact, or correcting causes of premature equipment breakdown.

Where quantified, non-energy impacts in our case studies have a material positive impact on cost effectiveness. Observed non-energy benefits include reduced change-orders thanks to early detection of problems during design and construction, rather than after the fact, or correcting causes of premature equipment breakdown. We found four cases in which non-energy impacts represented a cost increase rather than savings.

For the 36 existing buildings projects providing information, information on 81 non-energy benefits was reported. Median one-time non-energy benefits were -$0.18/ft^2-year for existing buildings (10 cases) and -$1.24/ft^2-year for new construction (22 cases)–comparable to the entire cost of commissioning.

For 44 new-construction projects in this compilation, information on 95 non-energy benefits was reported. For this cohort, median net cost ratio declined to 0.2% of total construction costs (average value 0.0%), and 7 cases out of 22 reporting had negative net costs (Figure 5). In one case, first-cost savings achieved through commissioning resulted in a five-percent overall reduction in construction cost. Improved equipment lifetime was the most commonly reported: 19% of the cases.[2]

Deeper analysis of the results shows cost-effective outcomes for existing buildings and new construction alike, across a range of building types, sizes (Figures 6 and 7), and pre-

[1] Percentage savings are generally not available for new construction, as there is no opportunity to measure energy use in the hypothetical (not built) non-commissioned building.
[2] This is often accomplished by reductions in hunting or cycling.

commissioning energy intensities (Figure 8). The most cost-effective results—both in terms of depth of savings and payback times—occurred among energy-intensive facilities such as hospitals and laboratories. Less cost-effective results are most frequent in smaller buildings. Energy savings tend to rise with increasing comprehensiveness of commissioning (Figure 9).

The projects identify 3,500 deficiencies (11 per building, 85 projects reporting) among existing buildings and 3,305 (28 per building, 34 projects reporting) among new construction. HVAC systems present the most problems, particularly within air-distribution systems. The most common correctional measures focus on operations and control. For the subset of cases where deficiencies are paired with the measures to remedy them, information is summarized in Tables 6 and 7.

We found considerable differences between our results for existing buildings and new construction. Commissioning costs were higher in new construction, especially for larger buildings (Figure 10). In new construction commissioning, benefits are often not calculated or measured since the purpose is typically is to ensure design intent, and estimating benefits requires simulation of the building as though it had not been commissioned. This is reflected in the "bottom-line" results per unit floor area—six-fold greater energy savings and four-fold lower commissioning costs for existing buildings. It should be noted, however, that median payback times are attractive in both cases, especially when non-energy impacts are accounted for. Larger median building floor areas in our existing-buildings sample (151,000 square feet) tended to result in lower floor area-normalized costs compared to the new-construction cases (69,500 square feet). New-construction commissioning is more strongly driven by non-energy objectives such as overall building performance, thermal comfort, and indoor air quality, whereas existing-building commissioning is more strongly driven by energy savings objectives. The need for commissioning in new construction is indicated by our observation that the number of deficiencies identified in new-construction exceed that for existing buildings by a factor of three.

Conclusions

Some view commissioning as a luxury and "added" cost, yet it is only a barometer of the cost of errors promulgated by other parties previously involved in the design, construction, or operation of buildings. Commissioning agents are just the "messengers"; they are only revealing and identifying the means to address pre-existing problems.

We find that commissioning is one of the most cost-effective means of improving energy efficiency in commercial buildings. While not a panacea, it can play a major and strategically important role in achieving national energy savings goals. If the results observed across our sample are representative of the practice and potential of commissioning more broadly, significant energy savings could be achieved nationally. Specifically, if our median project performance were to be achieved over the entire commercial buildings stock (essentially an economic-potential, not adjusted for partial penetration rates) the full cost-effective potential would amount to 15-percent of the $120-billion annual energy bill for the sector (as of 2002). This translates into savings of $18 billion annually among existing commercial buildings. In practice, the fraction of the full stock ultimately reached will depend on the effectiveness of public and private efforts to build the market for this emerging service.

As noted above, our median savings numbers are certainly less than would be achieved if all buildings had been comprehensively commissioned and all recommended measures implemented. The upper-quartile existing-building commissioning savings of 29% is twice the median, which may be closer to a best-practice level of savings. Lastly, consideration of potential benefits must consider trends in the baseline. As buildings become more complex and utilize more advanced technologies, the incidence of problems and need for commissioning will only increase, hence amplifying the need for and value of commissioning.

Commissioning is underutilized in public-interest deployment programs as well as research and development activities. As technologies, controls, and their applications change and/or become more complex in an effort to capture greater energy savings, the risk of under-performance will rise and with it the value of commissioning. Indeed, innovation driven by the desire for increased energy efficiency may itself inadvertently create energy waste if those systems are not designed, implemented, and operated properly. The ultimate impact of energy efficiency research and development portfolios, as well as deployment programs, lies in no small part in the extent to which they are coupled with cost-effective quality assurance.

References

Mills, E., H. Friedman, T. Powell, N. Bourassa, D. Claridge, T. Haasl, and M.A. Piette. 2004. "The Cost-Effectiveness of Commercial-Buildings Commissioning: A Meta-Analysis of Energy and Non-Energy Impacts in Existing Buildings and New Construction in the United States." Lawrence Berkeley National Laboratory Report No. 56637 http://eetd.lbl.gov/emills/PUBS/Cx-Costs-Benefits.html

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Box 1:

Commissioning Metrics

Building Characteristics and Demographics
- Building type (using DOE/CBECS definitions), vintage, location
- Year building commissioned
- Reasons for commissioning, deficiencies identified, measures recommended

Energy utilization intensity (use or savings)
- Electricity: kWh/building-year,[3] kWh/ft^2-year
- Peak electrical power: kW/building; W/ft^2
- Fuel: MMBTU/building; kBtu/ft^2-year
- Purchased thermal energy: MMBTU/building-year; kBtu/ft^2-year
- Total energy: MMBTU/building-year; kBtu/ft^2-year[4]
- Energy cost: $/building-year; $/ft^2-year (based on local or standardized energy prices; nominal [not corrected for inflation] and inflation-corrected to a uniform year's currency)
- Percent energy use savings (total and by fuel)
- Percent total energy cost savings
- Persistence index: Post-commissioning energy use in a given year/pre-commissioning energy use (unitless ratio)

Commissioning cost
- $/building; $/ft^2 (based on nominal costs or, preferably, inflation-corrected to a uniform year's currency levels. Can be gross value or net, adjusting for the quantified value of non-energy impacts)
- Commissioning cost ratio, for new construction (commissioning cost / total building or renovation construction cost, %).[5]
- Costs are tabulated separately for the commissioning agent and other parties
- Allocation of costs by source of funds (building owner, utility, research grant, other)
- Total building construction cost (denominator for commissioning cost ratio)

Cost effectiveness
- Undiscounted payback time (commissioning cost/annualized energy bill savings). This indicator is preferably normalized to standard energy prices; costs and benefits are inflation corrected to a uniform year's currency levels

Deficiencies and measures
- Deficiencies/building; Deficiencies/100kft^2
- Measures/building; Measures/100kft^2
- Unique codes to identify combinations of deficiencies and measures (described in more depth below) [see Measures Matrix]

Commissioning scope
- Presence of pre-defined "steps" (yes/no), with different criteria for existing buildings and new construction

Non-energy impacts
- Type
- Quantified (when possible), $/building-year; $/ft^2-year [can be positive or negative] – one-time or recurring
- Yes/No (when not quantified)

[3] In some cases, multiple buildings will be aggregated, in which case data must be analyzed at the "project" level.
[4] Throughout this report, electricity is counted in "site" energy units, excluding losses in generation, transmission, and distribution, i.e., 3412 BTU/kWh.
[5] Commissioning cost as a percentage of total electrical or mechanical costs is often used as well.

Table 1:

Rules for inclusion of costs in scope of commissioning.

Cost Factor	Include Cost?	Relevance (**N**ew Construction, **E**xisting buildings)	Examples
Cx provider's fixed costs	Yes	N; E	Costs of developing commissioning spec, reviewing design documents, conducting inspections, construction observation
Other contractors' costs			
Contract compliance	No	N; E	Construct building; install systems
Testing and balancing (TAB)	No	N; E	Preceeds commissioning; separate service with separate fees
Coordination with commissioning provider	Yes	N; E	Assist in performing functional tests
Correcting design flaws	No	N	Included in design contract and warranty
Improving design or operations	Yes	N	Recommendations to reduce pressure-drop, improved control sequences (some opt to allocate this to "project" costs but not commissioning costs)
"Non-billable" in-house operations staff fixed costs	As desired by owner	N; E	Staff time to work with commissioning provider
Functional tests	Yes	N; E	Validating intended damper positions or variable-speed drive operating cycle
Resolution costs related to optimizing systems	Yes (existing), No (new)	N; E	Corrections during start-up; tune-up
Costs related to ensuring other trades' adherence to contract documents	Yes	N; E	Verifying as-built condition meets design intent
Resolution costs related to installing a system beyond project scope	No	N	Installing energy management and control systems; major capital retrofits
Resolution costs related to operations and maintenance	Yes	E	Cleaning fouled filters
Minor capital improvements to resolve deficiencies	Yes (existing), No (new)	N; E	Operations and maintenance
Major capital improvements to resolve deficiencies: new construction	No	N	Replacing incorrectly sized chiller. Capital improvements generally capped at those regarded as implementable within operating budgets (as opposed to capital budgets)
Major capital improvements to resolve deficiencies: existing buildings	Yes	E	Replacing faulty control system elements
Training or on-site staff	Yes, if in scope	N; E	
Utility rebates, grants, or other external financial assistance	Yes	N; E	Represents part of true project cost and should thus be included (although owner's may opt to exclude for the purposes of their own internal cost-benefit analysis)
Research-related costs	No	N; E	Development of research reports; not essential to efficacy of commissioning project
Travel	Yes	N; E	To and from project site
Non-energy impacts	Yes	N; E	Subtract from total cost if benefit; add to total cost if non-energy factor imposes an incrementaql cost

Table 2: Example of Measures Matrix used to characterize commissioning projects.

Project A. Hospital Facility

	Components (locus of fault)										Measures																				
											Design, Installation, Retrofit, Replacement				Operations & Control									Maintenance							
	HVAC (combined heating and cooling)	Cooling plant	Heating plant	Air handling & distribution	Terminal units	Lighting	Envelope	Plug loads	Facility-wide (e.g. EMCS or utility related)	Other	Design change	Installation modifications	Retrofit/equipment replacement	Other	Implement advanced reset	Start/Stop (environmentally determined)	Scheduling (occupancy determined)	Modify setpoint	Equipment staging	Modify sequence of operations	Loop tuning	Behavior modification/manual changes to operations	Other	Calibration	Mechanical fix	Heat transfer maintenance	Filtration maintenance	Other			
	V	C	H	A	T	L	E	P	F	O	D1	D2	D3	D4	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	M1	M2	M3	M4	M5	Measure Code	Implemented [Y;N;?]	Detail problems and remediation measures
			x																					x					H-M1	Y	Setpoint controller on boiler 1 was out of calibration by 20F
				x																x									A-OC6	Y	Night low limit should only control perimeter boxes with reheat, not core boxe
						x											x												L-OC3	Y	All exterior lighting ON all night per programming. Changed outside lighting 2:45 am.
				x											x														A-OC1	Y	Discharge air temperature reset schedule was not programmed. Added rese
				x														x											A-OC4	Y	Cooling-only VAV box min setting supposed to be 0, but set at 56%. Simulta heating and cooling with an adjacent zone.
				x														x											A-OC4	Y	Differential omitted from night high limit sequence and night low limit sequen cycling of AHU.
				x																x									A-OC6	Y	Outside air dampers don't close during optimal start and night low limit
	x																											x	V-M5	Y	Poor system documentation. Unclear and incomplete control sequences. Di flow rates for control valves or location of duct smoke detectors and backflov Improved documentation for O&M manuals
			x															x											H-OC4	Y	Firing rate controller setting on both boilers were wrong. High limit supposec 20F>low limit. It was reversed.
				x																x									A-OC6	Y	Confusion as to what the BAS will control and what the Trane RTU will contr straight and programmed.
									x														x						F-OC9	Y	Current trending capability is limited to 1 parameter per trend and can only b one parameter at a time. Inconvenient for troubleshooting and fine tuning.G interface with full graphing capabilities.
			x									x																	H-D2	Y	Isolation valves to boilers missing. HW supply temp cannot be controlled or by mixing valve when only 1 boiler is on. Valves and controls added.
					x																			x					T-M1	Y	Nine out of the nine thermostats were out of calibration. JCI didn't use a cali thermometer and used +/- 2F as acceptable. JCI sensors used are rated to specs call for +/- 0.5F calibration.
			x																				x						H-OC9	Y	Alarms on boilers had been disabled. Enabled alarms.
				x								x																	A-D2	Y	ASU-1 & 2 didn't have duct static pressure sensors hooked up.
	x																							x					V-M1	Y	OAT sensor calibration 2.5 degrees off. Recalibrated.
	x											x																	V-D2	Y	Installation problems: : ductwork high SP loss fittings, duct sealing, sheetroc coils, exhaust fan not wired, valve not hooked up, timeswitch doesn't start fa won't start by adjusting thermostat, TU zero calibration not enabled, exhaust connected, disconnects on boilers missing
									x											x									F-OC6	Y	Power outage sequences: not programmed correctly
					x							x																	T-D2	Y	Duct crushed 12" from TU inlet to make room for sprinkler pipe. Erratic TU f Sensor relocated.
Other:																														Y	93 Other findings not tabulated
Rejected																															
Count or total:	3	0	4	7	2	1	0	0	2	0	0	4	0	0	1	0	1	3	0	4	0	0	2	3	0	0	0	1			
Grand Totals:	19										19																				

Note: "Measure Code" is a unique code assigned based on each measure's corresponding deficiency and type. The full Measures Matrix also contains fields for persistence, savings measurement method, and energy impacts.

Table 3:

Energy and non-energy impacts (positive or negative) of commissioning.

	Cost	Benefit	Comment
Direct			
Cost of (retro)commissioning service	x	x	Cost can be partially or completely offset by the indirect effects listed below
Energy consumption	x	x	In rare circumstances, energy use can increase if equipment is found in "off" or under-utilized state
Indirect			
Accelerated repair of a problem (assuming it would have been identified and corrected, eventually, without commissioning)		x	
Avoided premature equipment failure		x	
Changes in ioperations and maintenance costs	x	x	
Changes in project schedule	x	x	Can shorten or lengthen schedule
Clarified delineation of responsibilities among team members		x	
Contractor call-backs		x	
Occupant comfort/productivity		x	
Equipment right-sizing	x	x	
Impacts on indoor environment		x	
Documentation	x	x	
In-house staff knowledge	x	x	
Disruption to occupancy and operations	x	x	Early detection of problems
More vigilant contractor behavior (knowing that Cx will follow their work)		x	
Operational efficacy		x	
Potential for reduced liability/litigation		x	
Change orders	x	x	Timely introduction of commissioning (early in process); otherwise potential for increase
Disagreement among contractors		x	
Testing and balancing (TAB) costs		x	Can be reduced by solving problems that the TAB contractor would otherwise have encountered
Safety impacts		x	
Warranty claims		x	
Water utilization		x	
Worker productivity		x	

Table 4:

Commissioning providers, by floor area.

	Existing Buildings (square feet)	%	New Construction (square feet)	%
Affiliated Engineers, Inc. (Walnut Creek, CA)	-	-	774,000	9.5%
CH2M Hill (Portland OR)	-	-	340,000	4.2%
Environmental and Engineering Services, Inc.	-	-	160,000	2.0%
Facility Dynamics (Baltimore, MD)	1,014,133	4.6%	-	-
Facility Improvement Corporation (Great Falls, MT)	64,000	0.3%	-	-
Farnsworth Group	-		1,083,758	13.3%
HEC (ESCO)	376,500	1.7%	165,000	2.0%
Herzog/Wheeler	44,000	0.2%	-	-
Keithly/Welsch Associates Inc (Burien WA)	65,000	0.3%	144,000	1.8%
Nexant (San Francisco, CA)	210,406	0.9%	-	0.0%
Northwest Engineering Service, Inc.	213,000	1.0%	-	0.0%
PECI (Portland, OR)_	4,345,810	19.5%	371,000	4.5%
Quantum Energy Services and Technologies, Inc. - QuEST (Oakland, CA)	2,132,411	9.6%	-	-
Sieben Energy	623,000	2.8%	-	-
Systems West Engineers (Eugene, OR)	172,400	0.8%	-	-
TAMU/ESL College Station TX)	9,439,042	42.5%	-	-
Test Comm LLC (Spokanne, WA)	-	-	60,000	0.7%
Western Montana Engineering	-	-	23,300	0.3%
Other	3,531,592	15.9%	5,046,400	61.8%
Total	**22,231,294**	**100%**	**8,167,457**	**100%**

Table 5:

Summary of results.

	All		Existing Buildings			New Construction		
	Total	sample size (Number of	Total	Median per project	Study sample size	Total	Median per project	Study sample size
Number of projects	175	175	106		106	69		69
Number of buildings [1]	224	175	150	**1.4**	106	74	**1.1**	69
Number of states	21	175	15		106	15		69
Total project floor area (million ft^2)	30.4	175	22.2	**0.151**	106	8.2	**0.07**	69
Building age				**1978**	78		**1996**	59
Total new building construction costs ($million) [2]						1,514	**10.2**	58
Number of deficiencies identified	6,805	120	3,500	**11**	85	3,305	**26**	35
Commissioning cost as a fraction of total building construction cost (excluding non-energy benefits) [%]							**0.6%**	65
Total commissioning costs ($2003), excluding non-energy impacts [3]								
$1,000	16,984	171	5,223	**34**	102	11,760	**74**	69
$/ft2				**0.27**	102		**1.00**	69
Total Savings ($2003) [3]								
$1000/year[4]	8,840	133	8,022	**45**	100	818	**3**	33
$/ft2-year [4]				**0.27**	100		**0.05**	33
Whole-building energy cost savings (%) [5]				**15%**	74			
Simple payback time, local energy prices [years]				**1.0**	99		**5.6**	38
Simple payback time: standardized US energy prices, including some cases with non-energy impacts [years] [6]				**0.7**	59		**4.8**	35

[1] Actual values likely higher. For the many data sources that did not specify number of buildings, we stipulated one.
[2] All costs in this table are in inflation-corrected 2003 dollars.
[3] Payback time should not be inferred from these two rows, as sample sizes are different.
[4] Total based on inflation-corrected local energy prices; median based on inflation-corrected standardized energy prices ($2003).
[5] Percentage savings are generally not available for new construction, as there is no opportunity to measure energy use in the hypothetical (un-built) un-commissioned building.
[6] A number of cases show commissioning costs partly or fully offset by resultant first-cost savings.

Table 6:

Results from Measures Matrices: Existing buildings (69 projects) [yellow highlights indicate most common measures, deficiencies, and combinations].

N (paired) = 702		Design, Installation, Retrofit, Replacement				Operations & Control									Maintenance					Deficiency unmatched to specific measure	Total
		Design change	Installation modifications	Retrofit/equipment replacement	Other	Implement advanced reset	Start/Stop (environmentally determined)	Scheduling (occupancy determined)	Modify setpoint	Equipment staging	Modify sequence of operations	Loop tuning	Behavior modification/manual changes to operations	Other	Calibration	Mechanical fix	Heat transfer maintenance	Filtration maintenance	Other		
Deficiencies		D1	D2	D3	D4	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	M1	M2	M3	M4	M5		
HVAC (combined heating and cooling)	V	0	2	8	1	1	1	5	3	1	5	0	0	2	5	7	1	5	2	12	61
Cooling plant	C	4	11	19	0	26	5	4	10	4	27	3	12	2	4	10	1	0	0	13	155
Heating plant	H	4	0	5	0	15	7	1	4	0	7	1	5	1	4	7	1	0	0	18	80
Air handling & distribution	A	15	9	19	3	80	9	21	25	4	24	12	14	6	40	27	3	4	2	40	357
Terminal units	T	1	3	2	1	4	0	3	14	0	4	1	2	1	7	10	0	0	0	8	61
Lighting	L	3	1	17	1	1	2	4	0	0	0	0	5	0	2	1	0	0	0	1	38
Envelope	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plug loads	P	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Facility-wide (e.g. EMCS or utility related)	F	2	3	2	0	1	0	7	0	0	1	1	7	2	2	2	1	0	0	3	34
Other	O	0	0	2	0	0	0	0	2	0	1	0	1	0	0	3	0	0	1	12	22
Deficiency unmatched to specific measure		10	9	7	0	2	2	1	29	2	7	2	4	1	12	10	0	0	0		809
Total		39	38	81	6	130	26	46	87	11	76	20	51	15	76	77	7	9	5	800	

Table 7:

Results from Measures Matrices: New construction (20 projects) [yellow highlights indicate most common measures, deficiencies, and combinations]

N (paired) = 157		Measures																			
		Design, Installation, Retrofit, Replacement				Operations & Control									Maintenance					Deficiency unmatched to specific measure	Total
		Design change	Installation modifications	Retrofit/equipment replacement	Other	Implement advanced reset	Start/Stop (environmentally determined)	Scheduling (occupancy determined)	Modify setpoint	Equipment staging	Modify sequence of operations	Loop tuning	Behavior modification/manual changes to operations	Other	Calibration	Mechanical fix	Heat transfer maintenance	Filtration maintenance	Other		
Deficiencies		D1	D2	D3	D4	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	M1	M2	M3	M4	M5		
HVAC (combined heating and cooling)	V	0	8	0	0	2	0	0	3	1	0	1	0	3	6	9	1	2	2	108	146
Cooling plant	C	0	3	0	0	0	1	0	1	0	1	1	0	1	1	2	0	0	0	84	95
Heating plant	H	1	1	0	0	0	0	0	1	1	1	1	0	1	2	0	0	0	0	49	58
Air handling & distribution	A	0	7	2	0	1	0	0	3	0	7	2	0	4	2	14	1	0	3	222	268
Terminal units	T	1	5	0	0	0	0	2	5	0	2	1	0	0	3	1	0	1	0	98	119
Lighting	L	0	0	0	0	0	0	1	0	0	0	0	0	0	8	1	0	0	0	161	171
Envelope	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plug loads	P	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	81	85
Facility-wide (e.g. EMCS or utility related)	F	0	1	0	0	0	0	0	0	1	2	0	0	8	0	3	0	0	0	69	84
Other	O	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	108	111
Deficiency unmatched to specific measure		12	82	4	22	0	0	0	90	37	52	133	0	14	78	140	14	3	263		1137
Total		14	108	6	22	3	1	3	103	41	66	139	0	31	103	171	16	6	268	1101	

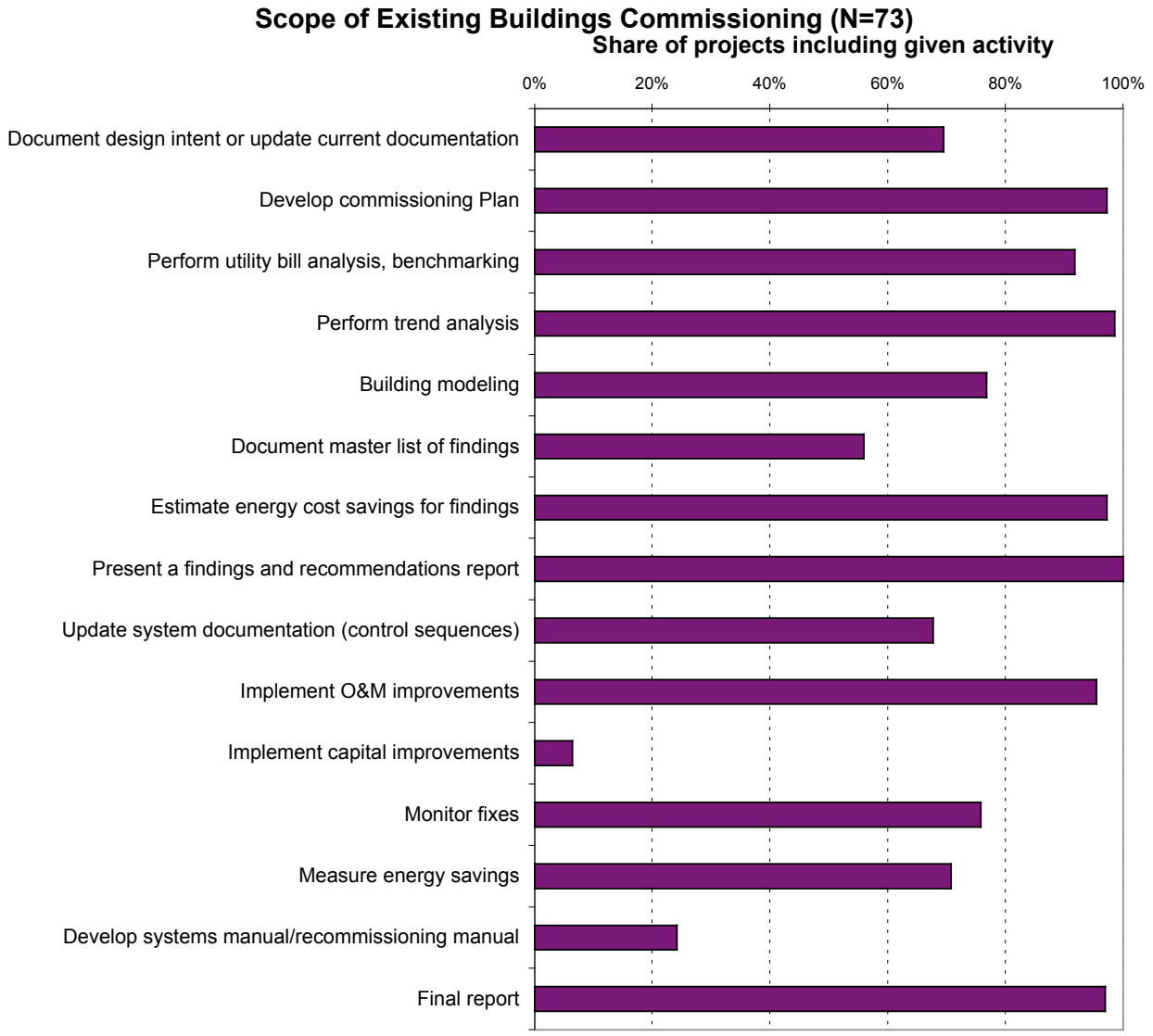

Scope of Existing Buildings Commissioning (N=73)
Share of projects including given activity
0%
20%
40%
60%
80%
100%
Document design intent or update current documentation
Develop commissioning Plan
Perform utility bill analysis, benchmarking
Perform trend analysis
Building modeling
Document master list of findings
Estimate energy cost savings for findings
Present a findings and recommendations report
Update system documentation (control sequences)
Implement O&M improvements
Implement capital improvements
Monitor fixes
Measure energy savings
Develop systems manual/recommissioning manual
Final report

Figure 1:

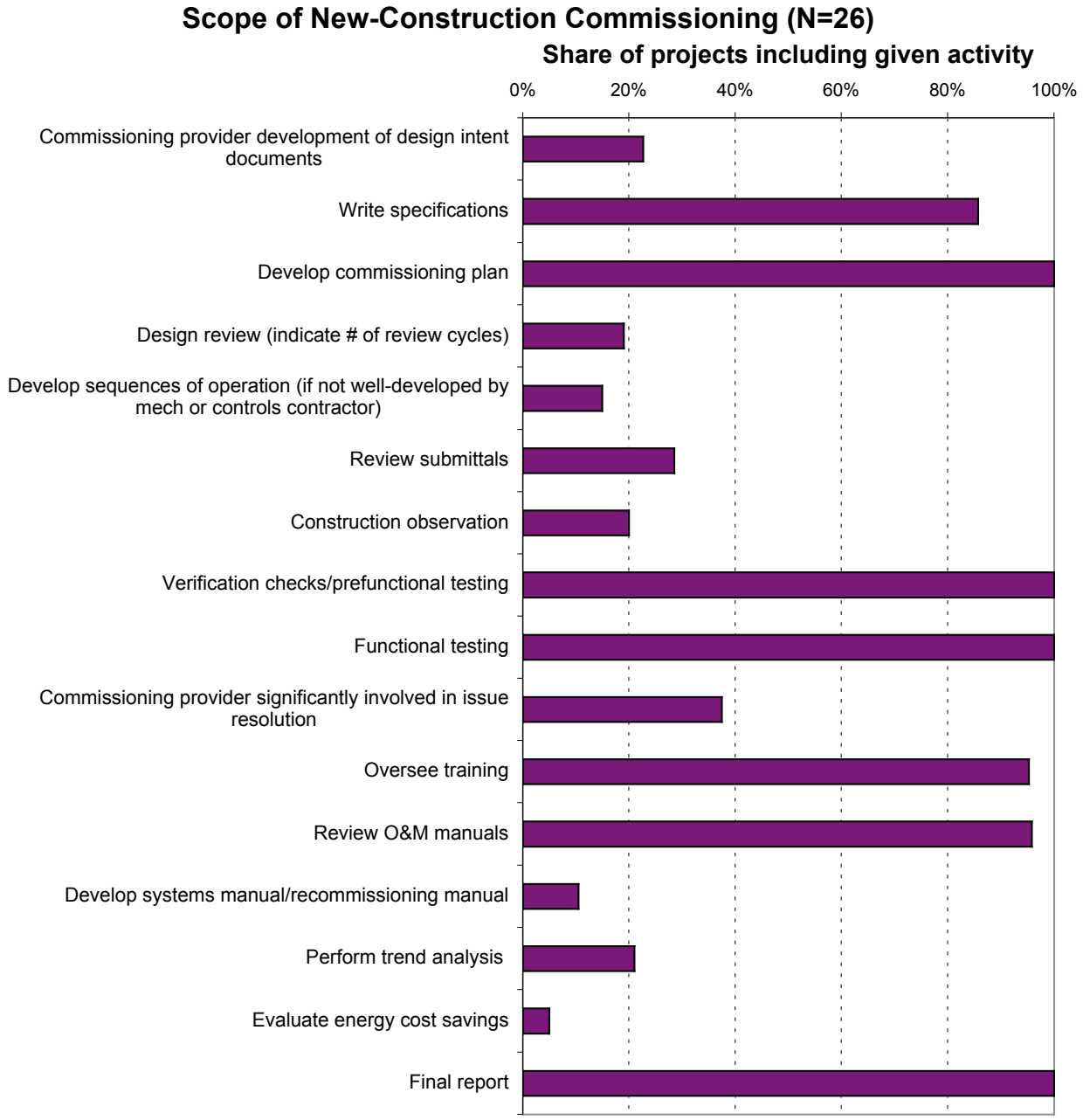
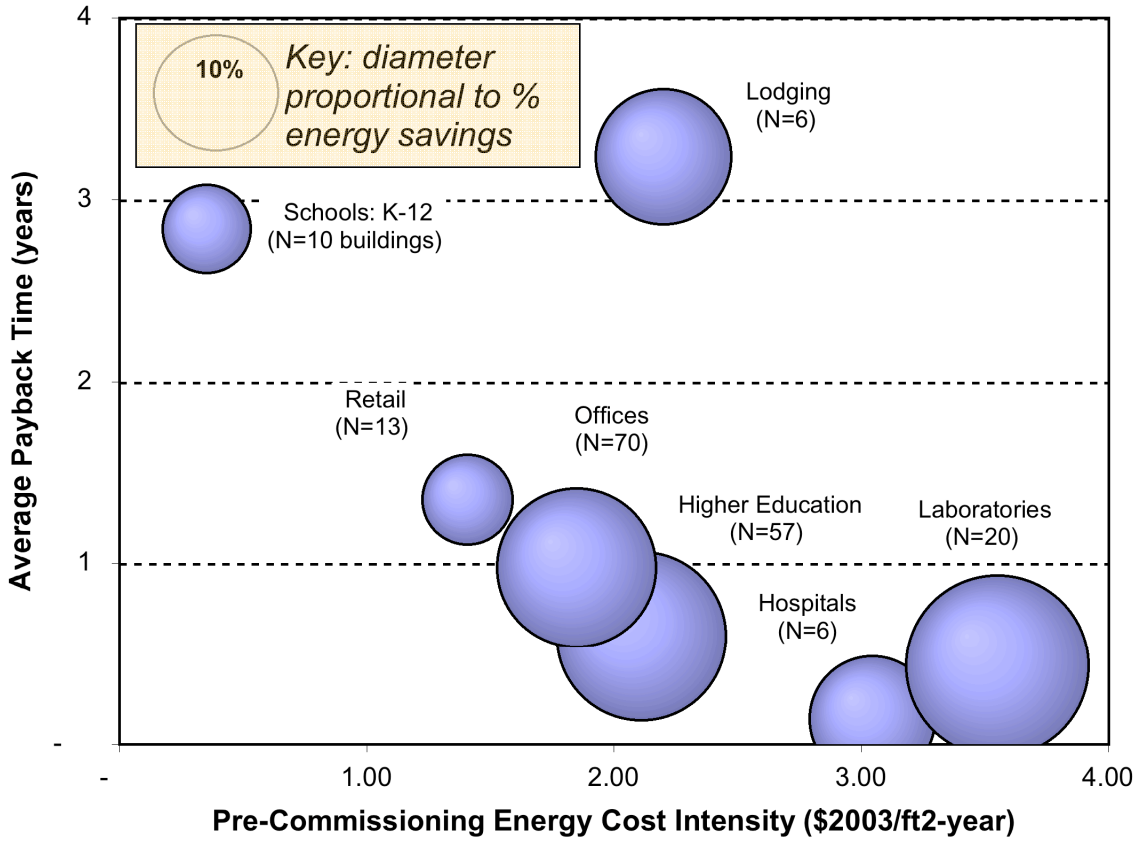
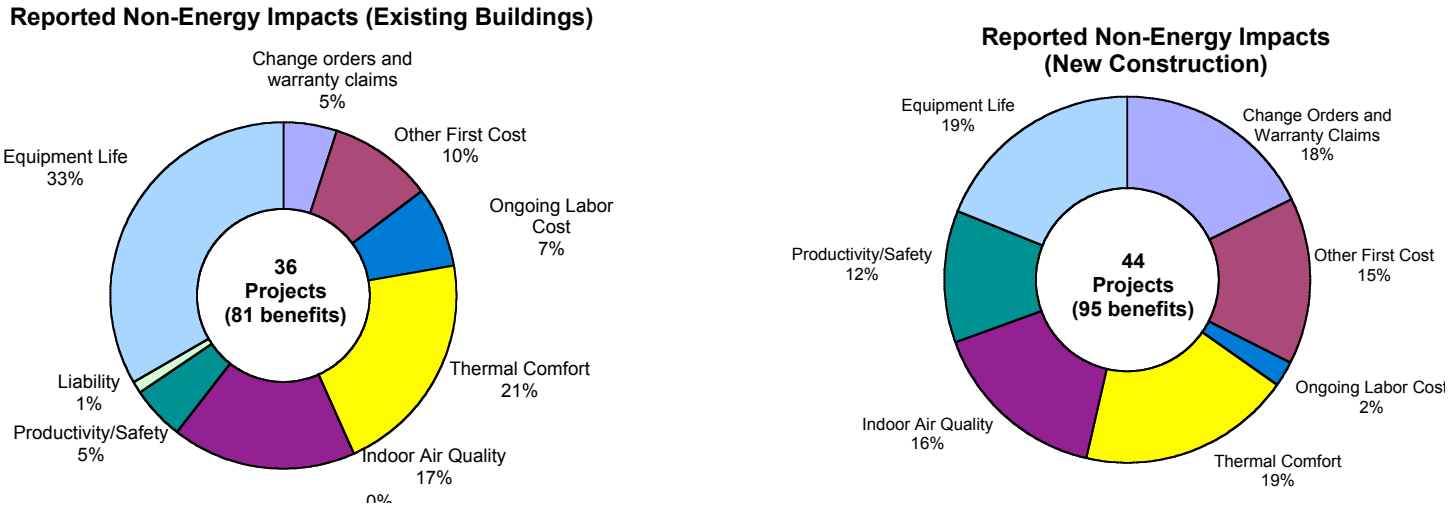

Scope of New-Construction Commissioning (N=26)
Share of projects including given activity
0%
20%
40%
60%
80%
100%
Commissioning provider development of design intent documents
Write specifications
Develop commissioning plan
Design review (indicate # of review cycles)
Develop sequences of operation (if not well-developed by mech or controls contractor)
Review submittals
Construction observation
Verification checks/prefunctional testing
Functional testing
Commissioning provider significantly involved in issue resolution
Oversee training
Review O&M manuals
Develop systems manual/recommissioning manual
Perform trend analysis
Evaluate energy cost savings
Final report

Figure 2:



Existing buildings. (Excluding non-energy impacts).

Figure 3:



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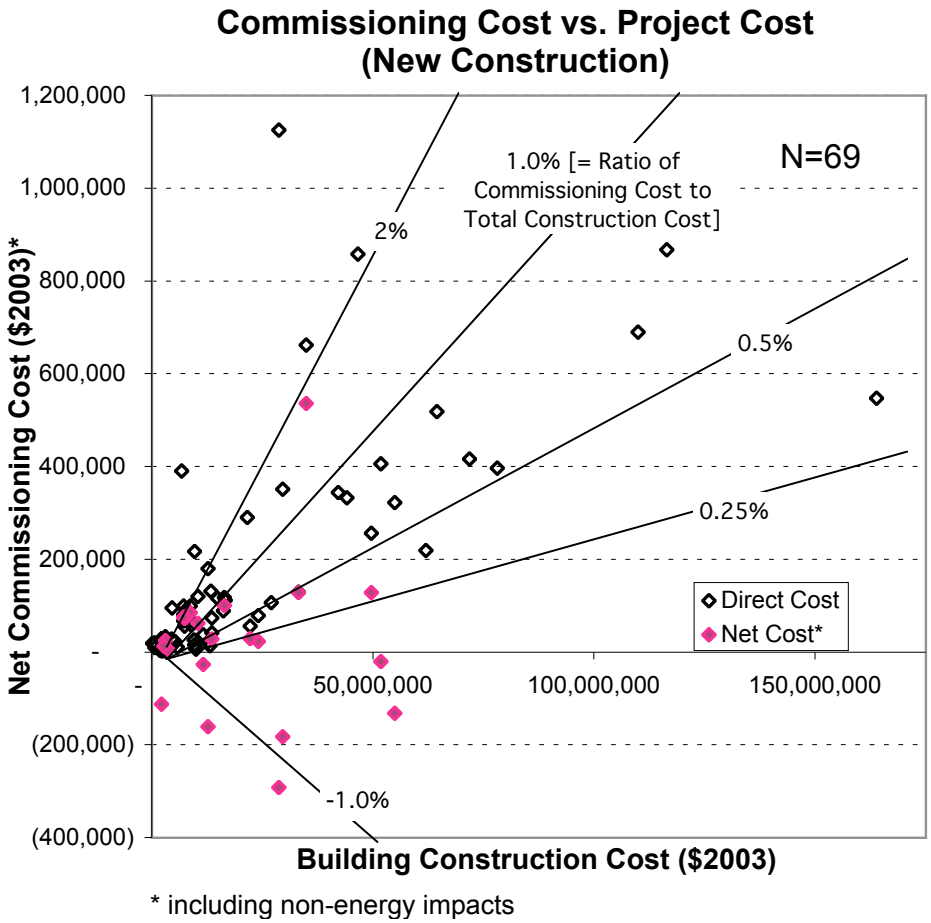

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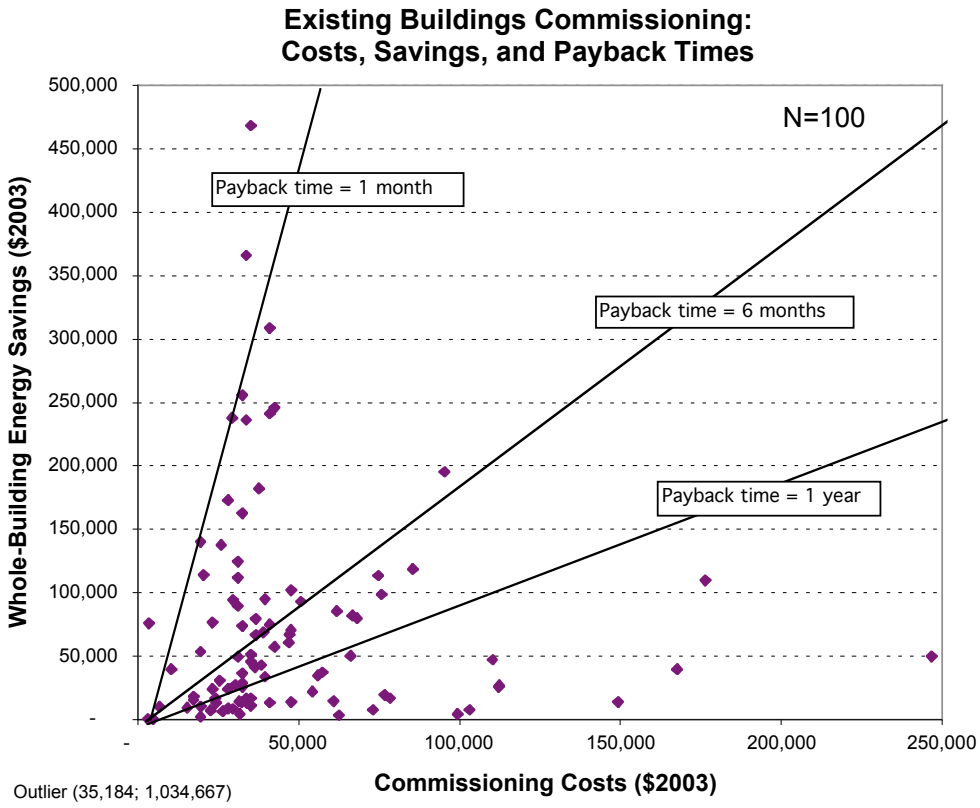

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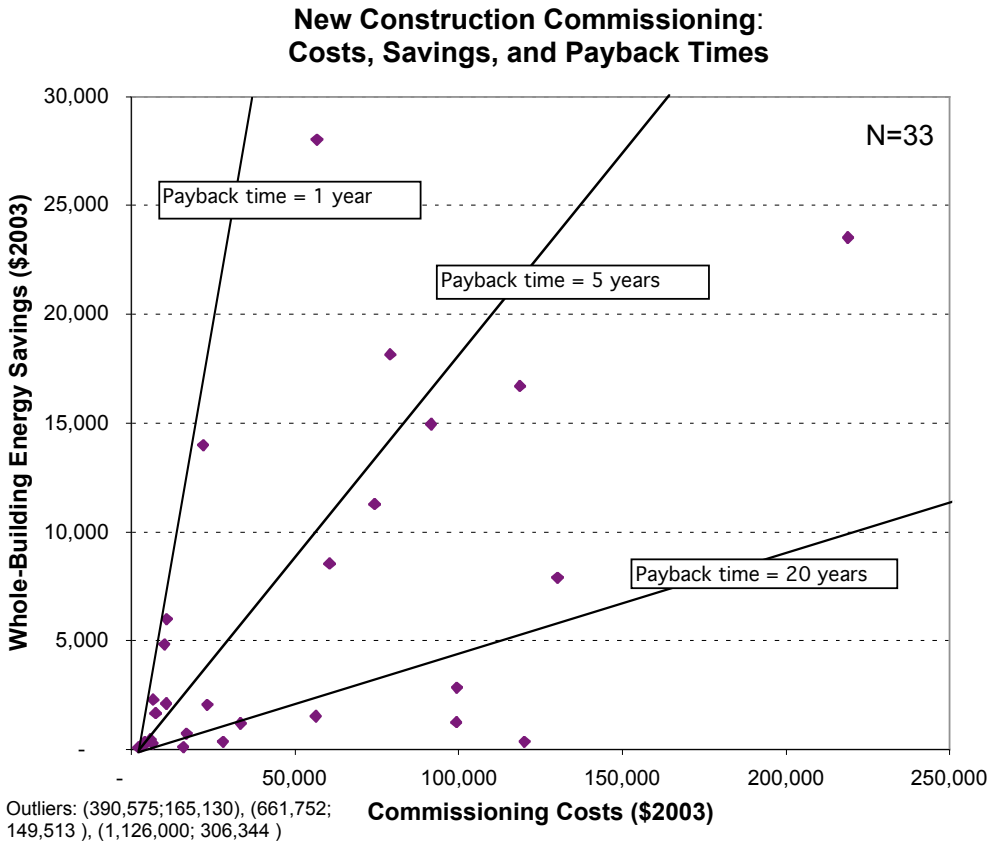

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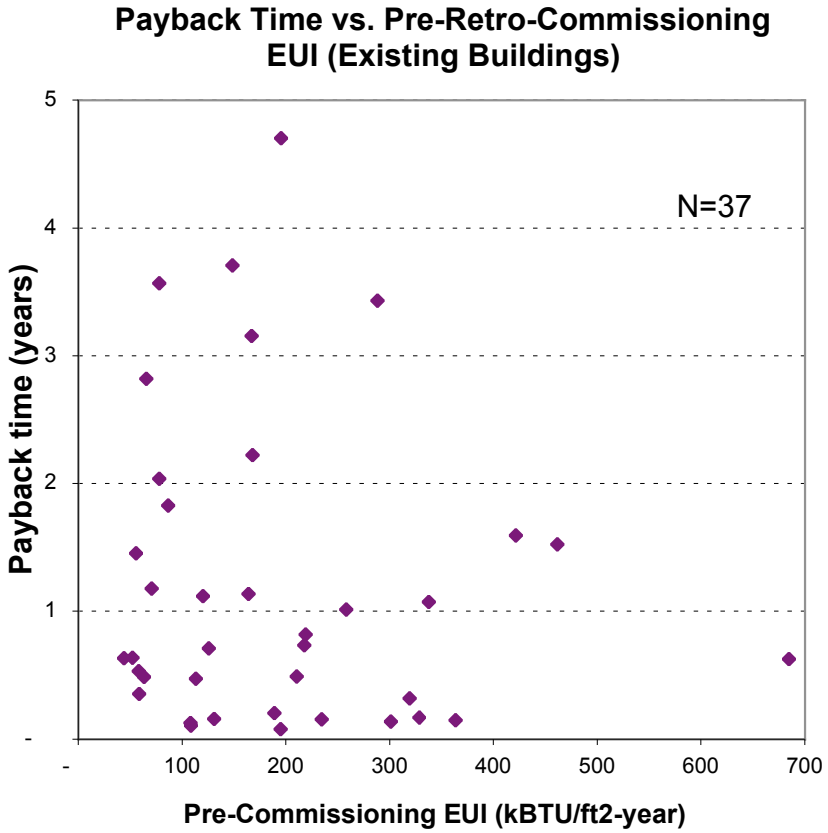

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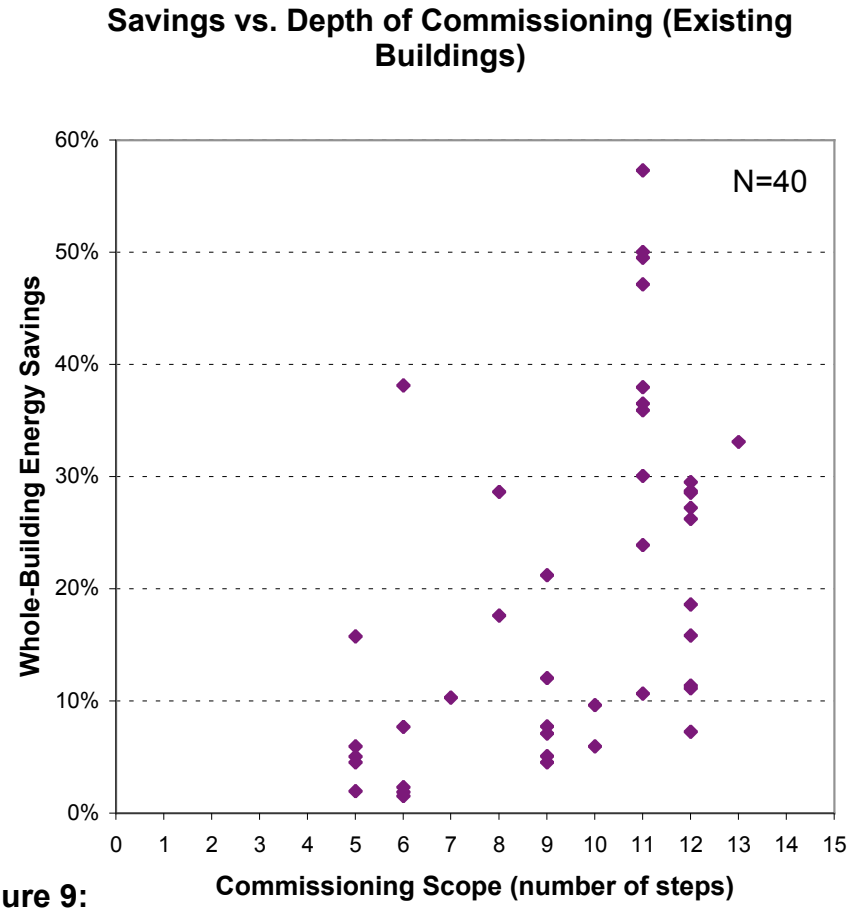

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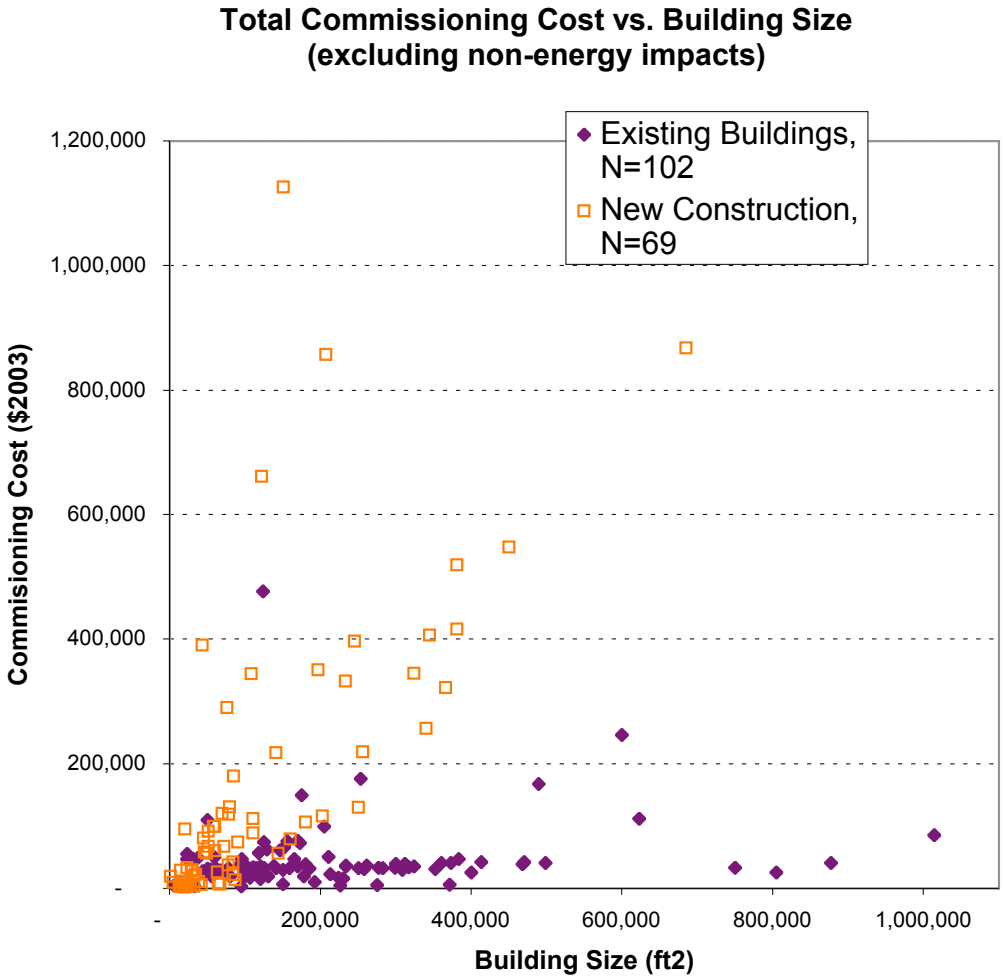
Total Commissioning Cost vs. Building Size
(excluding non-energy impacts)
Existing Buildings, N=102
New Construction, N=69
Commisioning Cost ($2003)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
200,000
400,000
600,000
800,000
1,000,000
Building Size (ft2)

Figure 10:

Building Commissioning:

A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions

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Report Prepared for:
California Energy Commission
Public Interest Energy Research (PIER)

July 21, 2009

For a downloadable version of the report and supplementary information, visit:
http://cx.lbl.gov/2009-assessment.html

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Disclaimer

Legal Notice

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Paul Mathew collaborated on a parallel research effort to evaluate monitoring-based commissioning (MBCx) projects throughout the University of California and California State University systems, and those projects are included in the database presented here. Karl Brown (California Institute for Energy and Environment) made that research possible by facilitating communication with the UC/CSU/IOU Monitoring-Based Commissioning (MBCx) program.

A number of individuals exerted considerable effort on gathering and tabulating data used in this study or augmenting previously published information. They include John Bynum (TAMU), Michael Anderson and Anna Levitt (Newcomb Anderson McCormick), Narendra Amarnani (County of Los Angeles), Eliot Crowe and Emilia Sibley (PECI), Geoffrey Bell and Steve "Futzmeister" Greenberg (LBNL), Jim Bradford (Nexant), Len Beyea (RetroCom Energy Strategies), Kimberlie Lenihan and Natasha Malik (NYSERDA), David McIntosh (Connecticut Power & Light), Margot Rode (Architectural Energy Corporation), and David Sellers (Facility Dynamics).

The following individuals provided data for the 2004 study (which remains part of our analysis): Edward Allen and David Jump (Quantum Consulting), Adam Benzuly (Affiliated Engineers, Inc.), Daren Goody (PECI), Martha Hewett (Minnesota Center for Energy and Environment), John Jennings (Northwest Energy Efficiency Alliance), Bing Tso (SBW Consulting), Jeffrey Warner (LBNL), and Phoebe Caner Warren (Seattle City Light).

Mark Wilson provided excellent copy-editing assistance.

Contents

Executive Summary

The aim of commissioning new buildings is to ensure that they deliver, if not exceed, the performance and energy savings promised by their design. When applied to existing buildings, commissioning identifies the almost inevitable "drift" from where things should be and puts the building back on course. In both contexts, commissioning is a systematic, forensic approach to quality assurance, rather than a technology per se. Although commissioning has earned increased recognition in recent years—even a toehold in Wikipedia—it remains an enigmatic practice whose visibility severely lags its potential.

Over the past decade, Lawrence Berkeley National Laboratory has built the world's largest compilation and meta-analysis of commissioning experience in commercial buildings. Since our last report (Mills et al. 2004) the database has grown from 224 to 643 buildings (all located in the United States, and spanning 26 states), from 30 to 100 million square feet of floorspace, and from $17 million to $43 million in commissioning expenditures. The recorded cases of new-construction commissioning took place in buildings representing $2.2 billion in total construction costs (up from 1.5 billion). The work of many more commissioning providers (18 versus 37) is represented in this study, as is more evidence of energy and peak-power savings as well as cost-effectiveness. We now translate these impacts into avoided greenhouse gases and provide new indicators of cost-effectiveness. We also draw attention to the specific challenges and opportunities for high-tech facilities such as labs, cleanrooms, data centers, and healthcare facilities.

The results are compelling. We developed an array of benchmarks for characterizing project performance and cost-effectiveness. The median normalized cost to deliver commissioning was $\$0.30/ft^2$ for existing buildings and $\$1.16/ft^2$ for new construction (or 0.4% of the overall construction cost). The commissioning projects for which data are available revealed over 10,000 energy-related problems, resulting in 16% median *whole-building* energy savings in existing buildings and 13% in new construction, with payback time of 1.1 years and 4.2 years, respectively. Median benefit-cost ratios of 4.5 and 1.1, and cash-on-cash returns of 91% and 23% were attained for existing and new buildings. High-tech buildings were particularly cost-effective, and saved higher amounts of energy due to their energy-intensiveness. Projects with a comprehensive approach to commissioning attained nearly twice the overall median level of savings and five-times the savings of the least-thorough projects

It is noteworthy that virtually all existing building projects were cost-effective by each metric (0.4 years for the upper quartile and 2.4 years for the lower quartile), as were the majority of new-construction projects (1.5 years and 10.8 years, respectively). We also found high cost-effectiveness for each specific measure for which we have data. Contrary to a common perception, cost-effectiveness is often achieved even in smaller buildings.

Thanks to energy savings valued more than the cost of the commissioning process, associated reductions in greenhouse gas emissions come at "negative" cost. In fact, the median cost of conserved carbon is *negative*— -$110 per tonne for existing buildings and -$25/tonne for new construction—as compared with market prices for carbon trading and offsets in the +$10 to +$30/tonne range.

Further enhancing the value of commissioning, its non-energy benefits surpass those of most other energy-management practices. Significant first-cost savings (e.g., through right-sizing of

heating and cooling equipment) routinely offset at least a portion of commissioning costs—fully in some cases. When accounting for these benefits, the net median commissioning project cost was reduced by 49% on average, while in many cases they exceeded the direct value of the energy savings. Commissioning also improves worker comfort, mitigates indoor air quality problems, increases the competence of in-house staff, plus a host of other non-energy benefits.

These findings demonstrate that commissioning is arguably the single-most cost-effective strategy for reducing energy, costs, and greenhouse gas emissions in buildings today. Energy savings tend to persist well over at least a 3- to 5-year timeframe, but data over longer time horizons are not available. It is thus important to "Trust but Verify," and indeed the field is moving towards a monitoring-based paradigm in which instrumentation is used not only to confirm savings, but to identify opportunities that would otherwise go undetected. On balance, we view the findings here as conservative, in the sense that they likely underestimate the actual performance of projects when all costs and benefits are considered. They certainly underestimate the technical potential for a scenario in which best practices are applied.

Applying our median whole-building energy-savings value (i.e. not best practices) to the stock of U.S. non-residential buildings corresponds to an annual energy-savings potential of $30 billion by the year 2030, which in turn corresponds to annual greenhouse gas emissions reductions of about 340 megatons of CO_2 each year. The commissioning field is evolving rapidly. The delivery of services must be scaled up radically if the benefits are to be captured.

The fledgling existing-buildings commissioning industry has reached a size of about $200 million per year in the United States. Based on a goal of commissioning each building every five years, the potential size is about $4 billion per year, or 20-times the current number. To achieve the goal of keeping the U.S. building stock commissioned would require an increase in the workforce from about 1,500 to 25,000 full-time-equivalent workers, a realistic number when viewed in the context of the existing workforce of related trades.

Commissioning is more than "just another energy-saving measure." It is a risk-management strategy that should be integral to any systematic approach to garnering energy savings or emissions reductions. Commissioning ensures that building owners get what they pay for when constructing or retrofitting buildings. It provides "insurance" for policymakers and program managers that their initiatives actually meet targets, and it detects and corrects problems that would eventually surface as far more costly maintenance or safety issues.

Commissioning is an underutilized strategy for saving energy and money and reducing greenhouse gas emissions while managing related risks. Reasons for this underutilization include a widespread lack of awareness of need and value on the part of prospective customers, insufficient professionalism within the trades, splintered activities and competition among a growing number of trade groups and certification programs, a misperception that it is not cost-effective in smaller buildings, the absence of commissioning-like requirements in most building codes, and omission or obfuscation of the strategy in most energy-efficiency potentials studies. It is important to strike a healthy balance between standardization and recognition that each building is unique and must be approached with an open mind.

"Commissioning America" in a decade is an ambitious goal, but "do-able" and very consistent with this country's aspirations to simultaneously address energy and environmental issues while creating jobs and stimulating economic activity.

Commissioning: The Stealth Energy-Saving Strategy

Walk into almost any home-improvement store today and be met by aisles brimming with compact fluorescent lamps. Climb atop a green building and behold a vegetated roof. Energy efficiency is all of a sudden commonplace with iconic imagery, or at least more so than it was just a few years ago. Yet, an equally important pathway to energy savings and greenhouse gas emissions reductions is virtually invisible to the typical building occupant, and too often even to the operators: the *commissioning* of new buildings and *retrocommissioning* of existing ones.[*]

For centuries, ship builders have "commissioned" vessels to ensure that they are ready for service; a risk-management process that includes installation and testing of equipment and ensuring that problems are corrected and the crew trained to maintain performance (Haasl and Heinemeier 2006a). After initial commissioning, ships are routinely inspected and serviced ("retrocommissioned") to maintain their performance. In this sense, people even routinely commission (inspect/service) their cars. Early forms of commissioning in buildings date to the 1950s in Europe, but arguably did not appear in the United States for several more decades (NEMI 2001). The commissioning of buildings for energy savings transitioned from being the subject of research projects in the 1980s, to a constellation of one-off pilot projects among a small vanguard of top-flight engineers in the 1990s, to ambitious scale-up efforts today.

The translation of this concept to buildings encompasses issues as diverse as access, safety, mechanical, landscaping, acoustics, water use, indoor air quality, and energy performance. This report focuses on commissioning as it pertains to energy performance in buildings, although other themes (particularly indoor environment) are often intertwined. While commissioning may seem like something that would be "standard practice" (and many building owners erroneously assume that it is), buildings are *rarely* commissioned, especially for energy savings. As a result, buildings are riddled with problems (Figure 1).

This situation is changing, albeit slowly. Commissioning is today used to save energy in ordinary buildings where no particular effort has previously been made to utilize energy-efficiency strategies, or to ensure and maximize performance of targeted energy-efficiency measures. The results are highly impressive. Case studies of large-scale commissioning efforts show attractive energy savings and payback times (Table 1).

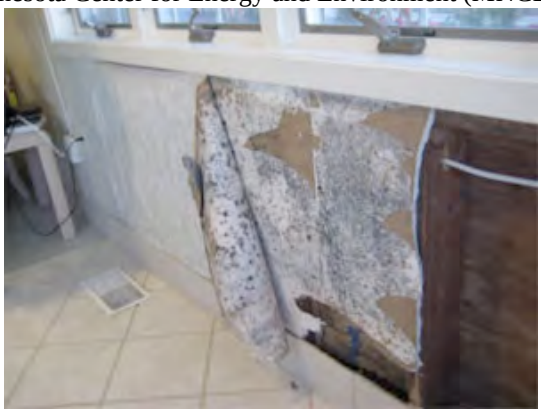
[*] Complicating an already difficult value proposition, the commissioning field is littered with competing terminology, naming systems, and proprietary marks. To avoid clutter, when discussing the topic we simply use the term "commissioning." If the reference is solely to new or existing buildings and that is not clear by the context, then we add clarifying language.

Figure 1. *Hall of shame – Visible evidence of problems addressed by commissioning*

Hot water valve motion impeded by piping layout [EMC no date (a)]

Damage to brick façade of pool building due to lack of proper sealing and air management [Martha Hewet, Minnesota Center for Energy and Environment (MNCEE)]

Inadequate fan cooling and excessive fan power due to poor fit between the light fixture and ducting, causing significant duct leakage [Martha Hewett, MNCEE]

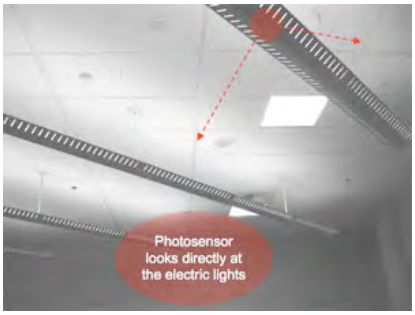


Building envelope moisture entry [Aldous 2008]

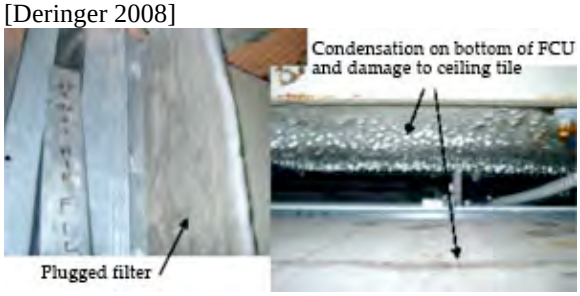
Rust indicates poor anti-condensation heating control setpoints in supermarket refrigeration cabinet [Sellers and Zazzara 2004]

Building envelope moisture entry [Aldous 2008]

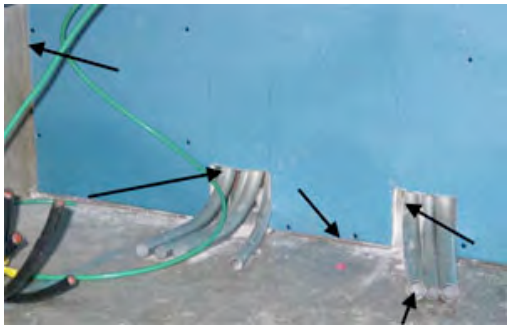
Photosensor (for daylight harvesting) shaded by duct [Deringer 2008]



Photosensor "sees" the electric lamps rather than task-plane illumination [Deringer 2008]



Plugged filter causing condensation on bottom of fan coil unit and damage to insulation coil resulting in poor air flow [Martha Hewett, MNCEE]



Air leakage in an underfloor air-distribution system [Stum 2008]

Zone damper actuator arm broken (no temperature control) [Martha Hewett, MNCEE]

Failed window film treatment.

Active humidification downstream of a condensing cooling coil at cleanroom facility [Sellers no date]

Exhaust fan hardwired in an "always on" position [Mittal and Hammond 2008]

Table 1. Examples of existing-building commissioning project costs and savings.

Target	Location	Sites	Energy Savings	Peak Demand savings	RCx Cost ($/sf)	Payback time (years)*	Source
Local government buildings	California	11 sites; 1.5 MSf	14.3% source energy (11% electric; 34% gas)		1.01	3.5	Amaranani et al (2005); Amarani and Roberts (2006); Pierce and Amarani (2006)
Offices and hotels	New York	6 sites; 6 MSft		10%	0.34	2.0	Lenihan (2007) - projected
Offices	Connecticut	5 buildings; 2 MSf	8.5% electricity (3% to 20%)			0.5	Building Operating Management (2006)
Class A Offices	Connecticut	3 bldgs; 1.2 MSF	7.3% electric		0.62	1.37	McIntosh (2008)
Mixed comercial	Colorado	27 buildings; 10 MSf	7% elect	4.2% (0-26%)	0.185	1.51	Franconi et al. (2005)
Three offices + hospital	Colorado	4 buildings; 1.8 MSf		6%	0.026	0.38	Mueller et al. (2004)
University buildings	California	26 buildings; 3.4 MSf	10% total source (2-25%)	4% (3-11%)	1.00	2.5	Mills & Matthew (2009)
Elementary schools	Michigan	4 schools			0.38	2.5	Freidman (2004)
Supermarkets	Central California	10 stores; 0.5 MSf	12.1% elect (4.3-18.3%)		0.14	0.25	Zazzara and Ward (2004); Emerson (2004)
Mixed commercial	Northwest	8 buildings			0.221	3.2	Tso et al (2003)
Mixed commercial	Oregon	76 projects	10-15% electric (5%-40%)		0.175	1.24	Peterson (2004)
Mixed commercial and educational	California	All California Programs (2007-2008)	1.7-8.1% electric		0.40	3.0	PECI and Summit Building Engineers (2007) - estimates
Total or simple average values		**186**	**~10-15%**	**~7%**	**0.41**	**1.8**	

Notes: All impacts shown using local energy prices and commissioning costs; averages are floor-area-weighted averages.

Commissioning is one of the most potent and yet least understood strategies for managing energy use, costs, and associated greenhouse gas emissions in the buildings sector. Emblematic of the problem, commissioning is rarely if ever explicitly included in energy-efficiency-potential studies. An encouraging sign of the gradual mainstreaming of commissioning is the appearance of an article on the topic in Wikipedia in 2008.[*]

An industry survey in 2005 estimated that well-below 5% of existing buildings and as much as 38% of "commissionable"[†] new construction had been commissioned (NEMI 2005). An earlier survey in California estimated that 0.03% of existing buildings and 5% of new construction had been commissioned (PECI 2000). The former survey probably addressed all types of commissioning, whereas the latter focused on energy issues.

There is no national census defining how many buildings are candidates for commissioning, but practitioners say they are hard-pressed to find buildings that would not benefit from the practice. The National Oceanic and Atmospheric Administration (NOAA) stated that 88 of its 122 weather-forecasting data centers are in need of commissioning, and had completed 47 of these by 2004 (Lundstrom 2004).

[*] See http://en.wikipedia.org/wiki/Building_commissioning

[†] The definition used here appears to be broader than just energy-driven commissioning, e.g., including safety systems. The share of buildings retrocommissioned for energy savings as thoroughly as many of those documented in this report could be lower by a factor of ten. The study assumes that one-third of all new construction (21% in the "commercial" sector, 25% multifamily, 34% industrial, and 54% institutional) is commissionable. The basis for this assumption is not clear, and, in this author's opinion the share could be far higher.

The commissioning practitioner community recognizes that market uptake has been slow. This is attributed to lack of understanding about what commissioning is and why it is needed, combined with a lack of a financial business case (*Cx Journal* 2005). Commissioning is most widely practiced in public buildings.

In addition to lack of awareness, commissioning is also a "stealth" energy-saving strategy in the sense that the deficiencies it corrects are almost always invisible to the casual observer, and unfortunately also to building designers, operators, and owners. Contributing to this state of affairs, these problems often do not present noticible symptoms such as occupant discomfort or noise (although in some cases these are indeed important clues and corresponding "non-energy" benefits of the fixes).

Momentum for commissioning is increasing. The impetus is coming from energy and environmental policymakers and the private sector, and is increasingly resonating with building owners' interest in greening their properties. Commissioning is required for buildings seeking the increasingly popular LEED (Leadership in Energy and Environment Design) rating, and building code officials (Kunkle 2005; Gowri 2009) are gradually studying and adopting mandatory commissioning or "commissioning-like" requirements. State-level initiatives such as California's Green Building Action plan are also promoting the practice. Meanwhile, in the private sector, energy utilities are rolling out increasingly ambitious incentive programs for commissioning, with at least 12 such programs currently in place (Criscione 2008). In one example, as of March 2008 the Southern California Edison commissioning program had secured 83 projects representing 25.5 million square feet of floorspace (Long and Crowe 2008a). Xcel Energy had a similar target in Colorado as of 2005 (Franconi et al. 2005). Other industries are also getting involved, notably insurance companies who are viewing commissioning as a risk-management strategy, and tailoring their insurance products and terms to encourage and reward it (Mills 2009a).

Commissioning is still far from mainstream. The untapped potential is huge. In 2004, Lawrence Berkeley National Laboratory estimated $18 billion per year of potential savings from commissioning throughout the United States (Mills et al. 2004). Analysis of a study published a year later suggests a potential savings for the top 13 (of 100) typical commercial buildings faults alone at $3.3–$17 billion per year (Table 2). As will be shown in the following pages, the potential is considerably higher today.

Table 2. Top faults causing energy inefficiencies in commercial buildings (top 13 of 100+).

	National Energy Waste (Quads, primary/year)	Electricity equivalent (BkWh/year)	Cost ($billion/year)
Duct leakage	0.3	28.6	2.9
HVAC left on when space unoccupied	0.2	19.0	1.9
Lights left on when space unoccupied	0.18	17.1	1.7
Airflow not balanced	0.07	6.7	0.7
Improper refrigerant charge	0.07	6.7	0.7
Dampers not working properly	0.055	5.2	0.5
Insufficient evaporator airflow	0.035	3.3	0.3
Improper controls setup / commissioning	0.023	2.2	0.2
Control component failure or degradation	0.023	2.2	0.2
Software programming errors	0.012	1.1	0.1
Improper controls hardware installation	0.01	1.0	0.1
Air-cooled condenser fouling	0.008	0.8	0.1
Valve leakage	0.007	0.7	0.1
Total (central estimate)	1.0	94.6	9.6
Total (range)	0.34-1.8	32.4-171.4	3.3-17.3

Adapted from Roth et al. (2005) assuming 10,500 BTU/kWh, and $0.10/kWh

What Commissioning Is (and Is Not)

Despite its 30-year history in the United States,[*] and hundreds of millions of square feet of floor area commissioned, most mainstream industry professionals would be hard-pressed to define building commissioning. A vanishingly small fraction of building owners/managers know what it is. Even efforts to explain it can leave many a listener mystified.

At the highest level, building commissioning brings a holistic perspective to design, construction, and operation that integrates and enhances traditionally separate functions. It does so through a meticulous "forensic" review of a building's disposition to identify suboptimal situations or malfunctions and the associated opportunities for energy savings.

The California Commissioning Collaborative has laid out plain-English definitions of the various forms of commissioning, which we quote verbatim in Box A (Haasl and Heinemeier 2006a-b). As can be surmised from these definitions, commissioning is necessarily a team effort, and usually led by a specialist but including the traditional trades such as designers, engineers, contractors, onsite operations and maintenance staff, and, hopefully, building owners.

[*] A detailed historical timeline is provided here: http://www.peci.org/ncbc/cx_history.html

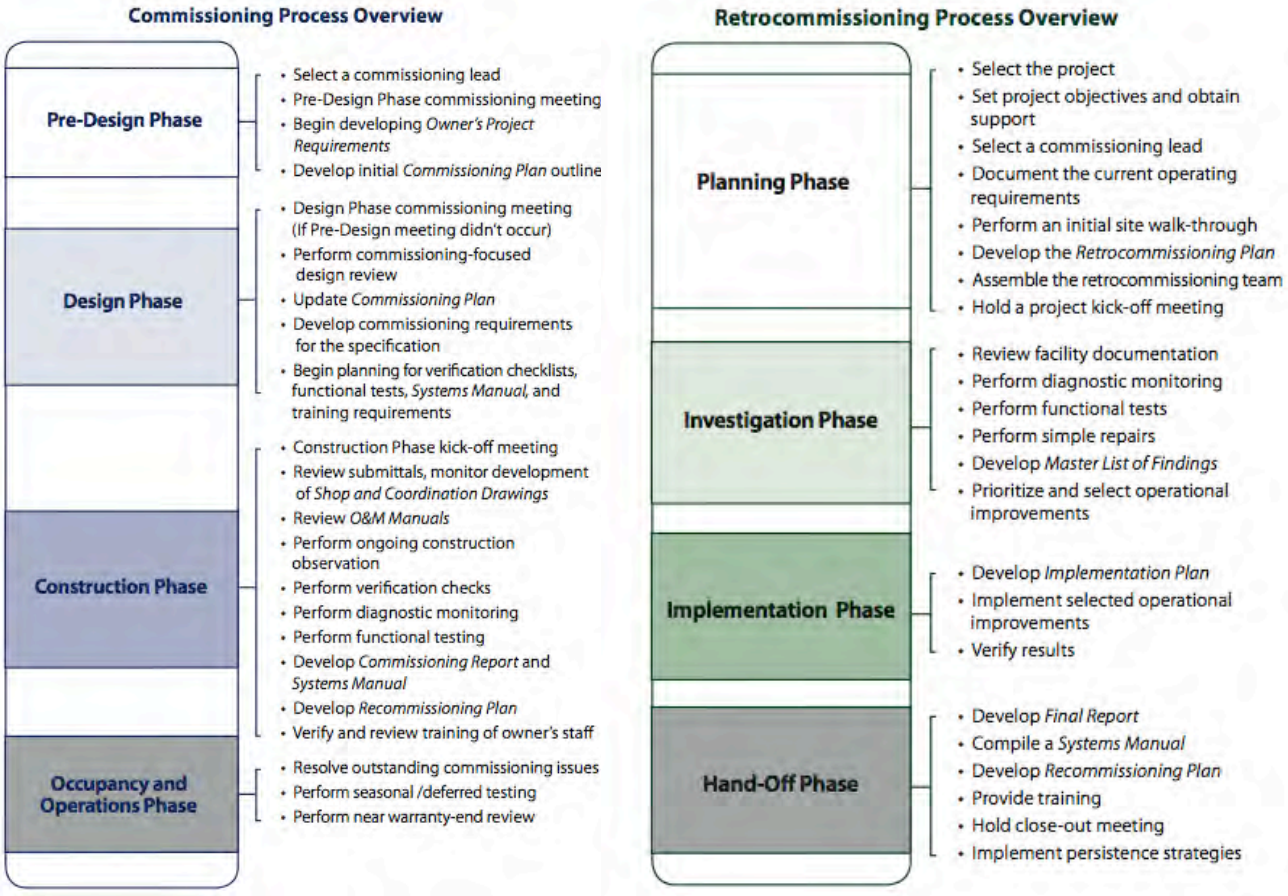
Box A. Commissioning Defined

The term commissioning comes from shipbuilding. A commissioned ship is one deemed ready for service. Before being awarded this title, however, a ship must pass several milestones. Equipment is installed and tested, problems are identified and corrected, and the prospective crew is extensively trained. A commissioned ship is one whose materials, systems, and staff have successfully completed a thorough quality assurance process.

Building commissioning takes the same approach to new buildings. When a building is initially commissioned it undergoes an intensive quality assurance process that begins during design and continues through construction, occupancy, and operations. Commissioning ensures that the new building operates initially as the owner intended and that building staff are prepared to operate and maintain its systems and equipment.

Retrocommissioning is the application of the commissioning process to existing buildings. Retrocommissioning is a process that seeks to improve how building equipment and systems function together. Depending on the age of the building, retrocommissioning can often resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life. In all, retrocommissioning improves a building's operations and maintenance (O&M) procedures to enhance overall building performance.

Recommissioning is another type of commissioning that occurs when a building that has already been commissioned undergoes another commissioning process. The decision to recommission may be triggered by a change in building use or ownership, the onset of operational problems, or some other need. Ideally, a plan for recommissioning is established as part of a new building's original commissioning process or an existing building's retrocommissioning process.

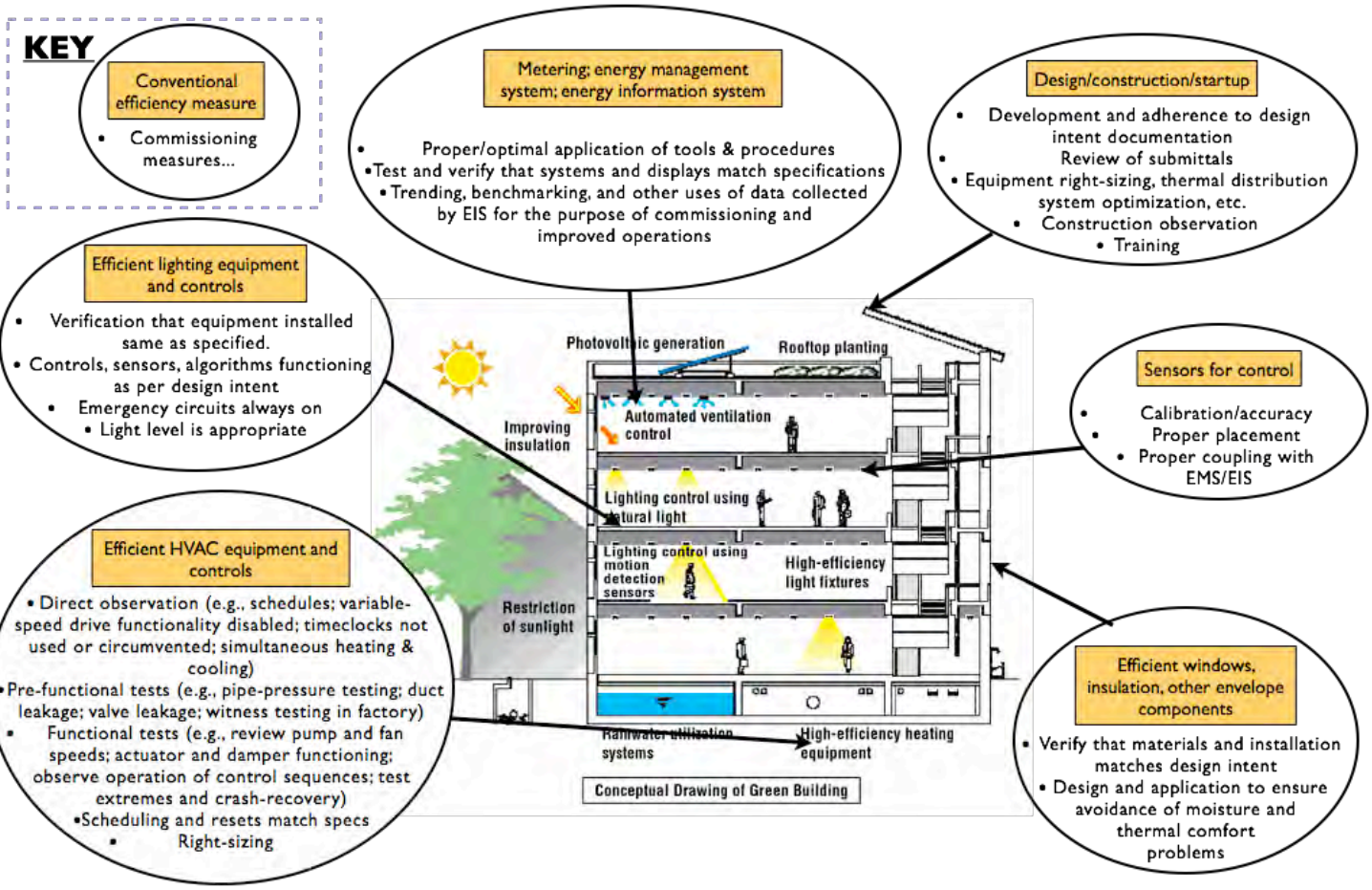


CSI for Energy Efficiency – Commissioning as Forensics

Unlike an efficient light bulb, commissioning is not a "commodity" product (or process). Each building is unique and presents unique problems for unique owners. Aspiration and budget can also vary; commissioning is performed at widely varying levels of effort and applied buildings as a whole (preferred) or to a specific sub-system or energy end-use.

Commissioning thus differs fundamentally from constructing or retrofitting facilities with better energy-using equipment (Figure 2). Commissioning complements these relatively familiar practices by ensuring and maintaining building energy performance (and other benfits, such as indoor environmental qulaity). On the same token, it can simply focus on saving energy by improving conventional building systems, irrespective of whether or not the building is equipped to be particularly energy efficient.

Figure 2. *Illustrative relationships between commissioning and energy-efficiency measures*



Commissioning improves on design and execution in new construction, or "tunes" the existing system (the metaphor to diagnosing and tuning a car is a loose but useful analogy). The costs of commissioning are thus largely time and labor, as opposed to materials or capital equipment. Persistence of the corrections (and associated energy savings) tends to be a concern, as many commissioning measures are operational and thus easily reversed if not monitored.

While the focus includes individual pieces of energy-using equipment, it is also a decidedly wholistic approach emphasizing the connections between components into systems.[*] Thus, "softer" elements are addressed, such as control logic or even the effectiveness of computer user interfaces or other communication systems used to visualize the building's disposition and energy use trends and make design and design intent unambiguous (Pollard 2009). Commissioning also differs from other energy-savings strategies in that it does not accept what is in a building (or design) as optimal (or even necessary), but, rather, asks fundamental questions such as "is that pump needed?" as opposed to "can we make that pump more efficient?"

While commissioning is not a panacea for the world's energy and climate problems, it is an element of a best-practices approach to achieving quality and high performance, while managing information and energy use throughout a building's lifecycle.

Commissioning as Risk Management

The world has become a riskier place, and buildings are no exception. With the enthusiasm and naivete about energy efficiency in the 1970s and 1980s, it was easy to assume that energy savings could be estimated with simple slide-rule methods and that promised energy savings would always materialize. Many studies and estimates of savings potential still assume that everthing works perfectly, an implicit inference that commissioning is universally applied (when in fact it rarely is).

The case of a data center provides a good illustration of these risks (Nodal 2008). Engineering calculations led the team to believe that electricity savings of 14.3% were being attained by a retrofit project. On closer inspection the savings were found to be exactly zero. Subsequent commissioning of the facility unearthed the causes of the lost savings, and not only restored them but boosted them to 19.2% (and 26% for peak demand).

Buildings are increasingly more complex than meets the eye, and many factors must fall into place (and stay there) in order for energy savings to manifest. And the consequences of underattainment are increasing as projects are structured such that energy-savings streams service the debt incurred to finance the efficient technologies, greenhouse gas reductions credited to energy efficiency are taken to markets with the desire that they be converted to "offsets" and then money, and regulators strengthen their oversight. Meanwhile, new technologies for saving energy have an intrinsic degree of risk simply

[*] There is an enormous literature on commissioning practices and case studies. Beyea (2009) provides very thorough review of the kinds of issues discovered and remedied during commissioning.

due to the lack of field experience and because some are more complex than the traditional technologies they replace.

As green buildings become a more significant part of the building stock, the insurance industry has been reasonably supportive of (Mills 2009a), but it is also very focused on changing "risk profiles." Reports from the world's largest brokers Marsh (2008) and Aon (Taylor 2008) encourage the practice, but also site concerns about issues ranging from unfulfilled energy warranties, to business interruptions, to liabilities posed by exotic materials and equipment that do not have the same track record as (less efficient) standard practices.

Jump (2007) notes that commissioning itself is vulnerable to similar risks if performance disappoints or if measurement and verification is inadequate:

- Risks to Owner:
    - Savings not delivered, no return on investment
    - No ability to track actual savings
    - Savings do not last, especially for "soft" measures that can be and often are defeated
- Risks to Energy-Efficiency Programs:
    - Claimed savings do not stand up to third-party review
    - Savings lifetimes are short
    - Negative impact on program realization rates
- Risk to Regulatory Agencies
    - Unreliable basis for program planning and accurate forecasting

As discussed later in this report, commissioning approaches that incorporate in-depth monitoring and verification can offer significantly enhanced risk-management benefits. The commissioning provider for one such project noted that:

> [Typical] savings are based on estimates, and rarely verified. In the long run, this can lead to problems with the perception of RCx [retrocommissioning] projects and programs. Monitoring-based commissioning programs provide the opportunity to develop tools to monitor and track savings, and notify operators when savings diminish. …[P]rojects … with the added metering and analysis, remain cost-effective, and provide added benefits of rigorous savings verification, energy tracking, diagnostic capabilities, and long-term persistence tracking. This provides added security for owners, energy efficiency program implementers, and their regulatory agencies, that the savings are real and last over time. (Jump et al. 2007).

Irrespective of the degree of monitoring and verification, to not commission at all is to invite a multitude of risks and underattainment of goals. It can be argued that commissioning is an essential risk-management component of any policy or program that aspires to attain a specific level of energy savings. Some have attempted to quantitatively

define the relevant risks to formalize the process of targeting commissioning activities (Berner et al. 2006).

As will be demonstrated below, commissioning is also a tool for managing non-energy risks. Indeed, prevention of indoor-air-quality problems, premature equipment failure, and litigation are among the reasons commonly given for commissioning.

Quantifying Commissioning: A Meta-Analysis

There is a growing literature on commissioning, including large numbers of disparate case studies. Many of these case studies present some form of information on the costs of commissioning and resulting energy savings in actual buildings. However, the underlying methods, assumptions, data completeness, and level of data quality vary widely and are not always revealed. The goal of this study is to prepare a "meta-analysis" of this body of experience in order to benchmark and chart the overall trends across a variety of geographies, building types, and other variables. This requires applying decision rules in determining which projects qualify for inclusion together with methods for normalizing and standardizing the data to facilitate benchmarking and inter-comparisions.[*]

As with any evaluation activity, data quality control and quality assurance are essential. Our experience with doing this firsthand with many of the projects in this compilation did reveal (and correct) dozens of issues with math errors, incorrect units, conversions, or underlying assumptions.[†]

Data Sources and Analysis Methods

We build on our original compilation published in 2004 (Mills et al. 2004), which contained information and analysis for 224 buildings. We subsequently released a call for more data to hundreds of stakeholders in the commissioning community, including practitioners. The response was meager. Real-world projects rarely have budget or a client able to pay for data collection, let alone preparation of publications. Proprietary considerations also keep certain data out of the public domain.

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[*] Engineering assumptions: Basic assumptions: Electricity heat rate 10,400 British thermal units per kilowatt-hour (BTU/kWh). Greenhouse gas emissions factors (in carbon dioxide emissions equivalent, i.e., including other major greenhouse gases): electricity (2.0331 pounds/kWh), natural gas (112.49 pounds per million BTUs). Economic assumptions: Costs normalized to 2009 price levels ("US$2009"). Energy prices per U.S. Department of Energy, Energy Information Administration (USDOE/EIA- averages 5/2008-4/2009): electricity ($0.1043/kWh, and $120/kW-month demand charge), natural gas ($12.32/MBTU), central hot water ($15.26/MBTU), central chilled water ($16.21/MBTU), central steam ($17.12/MBTU). Where savings by fuel are not available, we use nominal reported total cost savings, inflation-adjusted per the energy price deflator and weighted electricity/fuel price by the relative national consumption per DOE/EIA's 2003 Commercial Buildings Energy Consumption Survey, CBECS. Measure lifetime for cost-benefit analysis: five years. General inflation correction using gross domestic product deflators from the U.S. Department of Commerce. Building construction costs inflation-corrected using Engineering News Record (McGraw-Hill), Engineering News Record, Building Cost Index. Commissioning costs inflation corrected using Engineering News Record (McGraw-Hill) Skilled Labor, and total Construction Cost indices. More detailed documentation is provided at http://cx.lbl.gov/2009-assessment.html.

[†] Recommended quality assurance procedures are noted here: http://cx.lbl.gov/qa.html

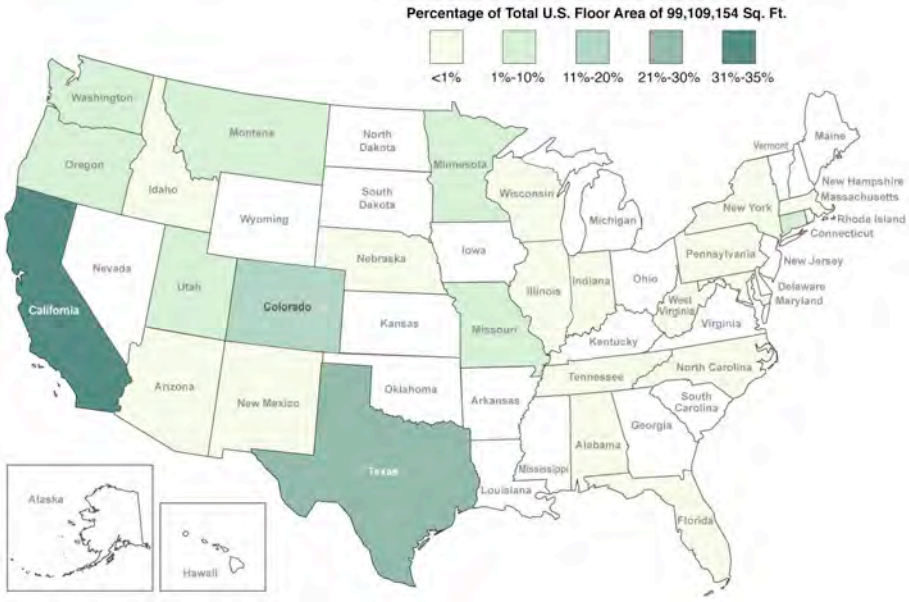
Several substantial cohorts of projects were ultimately recruited. We enlisted one large commissioning provider (Texas A&M University) to extract previously unpublished data from 63 prior projects around the country. Results from an evaluation of "monitoring-based commissioning" at 21 University of California and California State University sites were also migrated into the database (Mills and Mathew 2009). PECI provided data on 64 projects conducted under utility programs in California. Some projects from the original 2004 compilation were revisited, and missing information obtained, thereby upgrading that cohort of buildings.

We also combed the commissioning literature for individual or sets of candidate projects and obtained supplemental information by contacting authors, utility partners, or building owners. Many case studies we encountered did not qualify for inclusion. Many lacked critical information, such as the costs of commissioning or energy savings. Others included hypothetical savings from planned projects that had not yet been realized. Many included incomplete information, a common example of which is the fee paid to the commissioning provider but not the other costs incurred in-house or by other parties to deliver the complete commissioning service. In some cases retrofit costs and savings are mixed in with commissioning case studies, and we exclude these cases as well. For such projects, other useful data may still be available and included in the analysis (e.g., types of problems found or measures implemented).

To facilitate comparisions, the raw data are normalized to a standard U.S.-average commercial sector energy prices, and costs are inflation-corrected to 2009 levels. This is an important correction, as prevailing local energy prices for the projects in the database range from $0.02/kWh to $0.30/kWh for electricity and $0.62/MBTU to $10.22/MBTU for fuel. For energy use and savings data to be included, the data must be weather-normalized or based on engineering calculations indexed to standard weather conditions for the given location.

The resulting sample includes 332 commissioning projects in existing buildings and 77 in new-construction, spanning 26 states, representing a total of 643 buildings, 99 million square feet, and $43 million invested in the commissioning work (Figures 3 and 4).

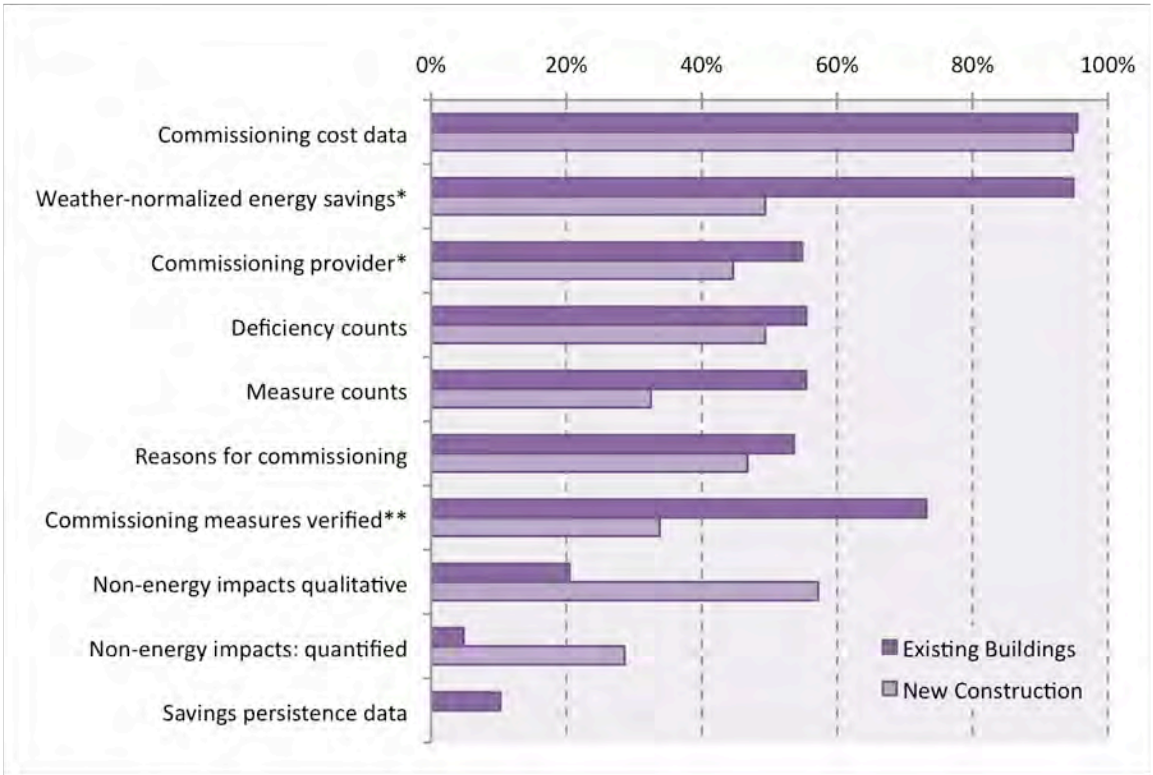
Figure 3. *Sample by location, type, and size (square feet)*



	Total	Existing	New Construction
Education			
K-12	3,123,754	2,467,661	656,093
Higher education	12,029,520	11,401,833	627,687
Food Sales	983,402	848,039	135,363
Food Service	187,724	187,724	-
Health Care			
Outpatient healthcare	4,525,424	4,319,124	206,300
High-tech Facilities	-	-	-
Cleanrooms	301,000	-	301,000
Data Center	12,888	12,888	-
Laboratory	6,526,658	4,561,593	1,965,065
Inpatient	7,478,988	6,791,029	687,959
Lodging	10,037,291	9,880,307	156,984
Mercantile			
Retail	2,926,038	2,926,038	-
Service	227,000	227,000	-
Office	40,867,062	39,972,765	894,296
Public Assembly	3,166,611	2,476,985	689,626
Public Order and Safety	4,756,949	2,485,277	2,271,672
Religious Worship	12,500	12,500	-
Warehouse and Storage	175,379	13,500	161,879
Industrial	475,000	475,000	-
Other	1,411,622	1,351,622	60,000
Vacant	-	-	-
Total	**99,224,809**	**90,410,884**	**8,813,925**

* Note in some cases floor area is apportioned among more than one building type.

Figure 4. *Sample depth.*



* weighted by floor area

** some or all

Our sample includes data representing 37 commissioning providers covering about half of the floor area in the database, with only 1% known to be done in-house. The provider is unknown for the balance of the projects (Table 3). It is unknown how many providers exist in the market. The California Commissioning Collaborative presently recognizes 53 providers across the country.*

* As of June 20, 2009. See http://www.cacx.org/resources/provider_list.html. Some providers in our study are not on this list.

Table 3. Commissioning providers in this study, by floor area.

	Existing Buildings (square feet)	%	New Construction (square feet)	%	Total	%
Abacus Engineered Systems, Inc.	95,405	0.1%	-	0.0%	95,405	0.1%
Affiliated Engineers, Inc.	-	0.0%	774,000	8.8%	774,000	0.8%
Architectural Energy Corporation	1,278,620	1.4%	230,000	2.6%	1,508,620	1.5%
Arup	176,000	0.2%	-	0.0%	176,000	0.2%
Casault Engineering	-	0.0%	170,566	1.9%	170,566	0.2%
CH2M Hill	-	0.0%	340,000	3.9%	340,000	0.3%
Cogent	1,900,200	2.1%	-	0.0%	1,900,200	1.9%
CTG Energetics	327,717	0.4%	-	0.0%	327,717	0.3%
Ecube	220,000	0.2%	-	0.0%	220,000	0.2%
EMC Engineers	1,506,188	1.7%	8,467	0.1%	1,514,655	1.5%
Energy Engineering & Design	490,000	0.5%	-	0.0%	490,000	0.5%
Environmental and Engineering Services, Inc.	-	0.0%	160,000	1.8%	160,000	0.2%
Facility Dynamics	1,014,133	1.1%	-	0.0%	1,014,133	1.0%
Facility Improvement Corporation	230,380	0.3%	-	0.0%	230,380	0.2%
Farnsworth Group	-	0.0%	767,176	8.7%	767,176	0.8%
HEC	376,500	0.4%	165,000	1.9%	541,500	0.5%
Henrikson	107,184	0.1%	-	0.0%	107,184	0.1%
Herzog/Wheeler	44,000	0.0%	-	0.0%	44,000	0.0%
Keithly/Welsch Associates Inc.	713,610	0.8%	173,000	2.0%	886,610	0.9%
MN Center for Energy and Environment	525,000	0.6%	-	0.0%	525,000	0.5%
Nexant	480,406	0.5%	-	0.0%	480,406	0.5%
Northwest Engineering Service, Inc.	213,000	0.2%	-	0.0%	213,000	0.2%
Notkin Engineering	-	0.0%	65,000	0.7%	65,000	0.1%
PECI	4,345,810	4.8%	371,000	4.2%	4,716,810	4.8%
Quantum Energy Services and Technologies, Inc. - QuEST	2,354,111	2.6%	-	0.0%	2,354,111	2.4%
RetroCom Energy Strategies	2,655,800	2.9%	-	0.0%	2,655,800	2.7%
Salas O'Brian	222,070	0.2%	-	0.0%	222,070	0.2%
Sebesta Blomberg	287,117	0.3%	-	0.0%	287,117	0.3%
Sieben Energy	623,000	0.7%	-	0.0%	623,000	0.6%
Solarc Architecture & Engineering	-	0.0%	96,500	1.1%	96,500	0.1%
Strategic Building Solutions	480,248	0.5%	-	0.0%	480,248	0.5%
Summit Building Engineering	90,712	0.1%	90,712	1.0%	181,424	0.2%
Systems West Engineers	172,400	0.2%	-	0.0%	172,400	0.2%
TAMU/ESL	26,429,206	29.2%	-	0.0%	26,429,206	26.6%
TESTCOMM, LLC	-	0.0%	195,390	2.2%	195,390	0.2%
UNL/ESL	675,885	0.7%	-	0.0%	675,885	0.7%
Van Zelm	765,064	0.8%	-	0.0%	765,064	0.8%
Western Montana Engineering	-	0.0%	23,300	0.3%	23,300	0.0%
Sub-total	48,799,766	54.0%	3,630,111	41.2%	52,429,877	52.8%
In-house	773,988	0.9%	301,000	3.4%	1,074,988	1.1%
Unknown	40,837,130	45.2%	4,882,814	55.4%	45,719,944	46.1%
Total	90,410,884	100%	8,813,925	100%	99,224,809	100%

Caveats and Conservatisms

The persistence of commissioning energy savings is perhaps the most significant caveat in analyses such as that presented in this report, although some concerns about the issue are ill-founded. Indeed, commissioning itself is needed largely *because* system performance does not persist. Commissioning can arguably increase the persistance of other energy measures (Pollard 2009). We acquired data on energy savings over multi-year periods following some of the projects, and this is summarized below. Negligible post-commissioning energy use/savings data have been collected for timeframes more than five years. However, the payback times we observe are within the likely period of savings persistence.

Some commissioning recommendations are implemented in "real time" by the commissioning provider. It cannot necessarily be assumed that all remaining commissioning recommendations are ultimately implemented by the building owner. Analytical and evaluation efforts can thus be complicated by the fact that measures may be implemented gradually, and the commissioning reports may be completed before the client has finished implementation. We endeavor to report savings from measures that are verified to have been installed, if the information is clear in the source materials. The distinction can be important, as shown in one study where the savings from measures that were identified, implemented, and then "verified" to have been implemented were about 30% lower than the savings "identified" for subsets of 63 buildings in Colorado (Franconi et al. 2005). In another more dramatic example, peak-demand savings of 112 kW were identified but only 3.5 kW captured (Mueller et al. 2004). In another example, the Southern California Edison (SCE) program is reported to have captured 83% of the potential savings identified (Long and Crowe 2008). Conversely, ultimate outcomes can be better than anticipated, as was seen in the University of California/California State University (UC/CSU) Monitoring-Based Commissioning program, where achieved savings routinely exceeded projected savings (Mills and Mathew 2009). In our compilation, 230 of the existing-buildings projects and 22 of the new-construction projects had the implementation of some or all measures verified. In most of the remaining cases, information was not available on the status of implementation. Of those submissions providing detailed data on measures recommended during the commissioning process, only 2% were reported to have been rejected.

Perhaps the largest single undercounting of benefits is in the area of non-energy impacts. In many cases, the benefits are real, yet difficult (if not impossible) to quantify, e.g., in the case of improved indoor air quality. In most cases, no effort is made to quantify these benefits, and thus the overall benefits are understated.

Net commissioning costs can easily be overestimated because non-energy objectives (e.g., commissioning fire and safety systems) are frequently combined with the costs reported for commissioning projects. The level of documentation provided often provides no way to back these costs out of the calculation.

Also of importance, commissioning projects vary widely in their scope and ambition. Some projects are relatively comprehensive, while others may target only a single system

(e.g., electrical heating, ventilating, and air conditioning (HVAC), but not lighting or other loads or fuels). Thus, energy savings attained are less than they might otherwise be with a more comprehensive approach. In some cases a commissioning program design can intrinsically limit the level of effort applied to achieving savings. In some of the California utility programs, budgets for investigation were fixed at $0.10 per square foot by the utility contracts, limiting the ability of commissioning providers to identify savings opportunities (Crowe 2009). In the UC/CSU program, sites could qualify for incentives with relatively low projected savings, and there was no requirement to exceed those savings, although many sites did so (Mills and Mathew 2009).

In determining the percentage savings, we divide the reported savings by whole-building energy use, even if every system in the building has not been addressed in the commissioning process. In come cases, data on all fuels are not reported, meaning that some savings may be uncounted. Commissioning can easily spur downstream energy savings that would not be captured in analyses that follow shortly upon completion of the initial commissioning. Such savings could arise from the training that commissioning projects often provide, as well as those from improved maintenance procedures and energy data monitoring, benchmarking, and feedback that should be instituted during commissioning.

Every effort is made to isolate the commissioning costs associated with energy savings and associated non-energy benefits, but it is likely that there are cases where unrelated objectives (e.g., ensuring functionality of security systems) have been included. Similarly, we seek to exclude costs associated with traditional retrofit or maintenance, but reporting is no doubt imperfect in practice. These effects would tend to inflate the cost and savings used in our analysis. We believe that the level of undocumented retrofit is very minimal.

On balance, we view the findings here as on the “conservative” side in the sense that they likely underestimate the actual performance of projects when all costs and benefits are considered. They certainly underestimate the technical potential for best practices.

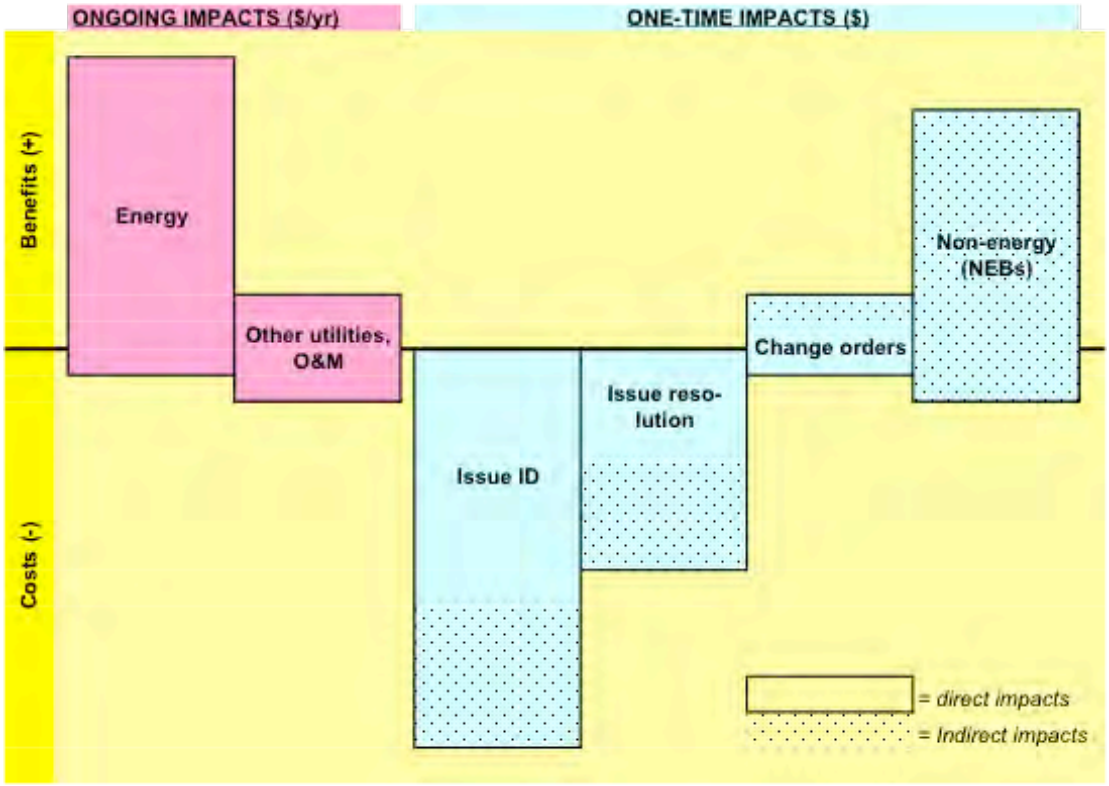
Commissioning Economics

The economic analysis of commissioning projects is arguably more complex than that applied to conventional energy-efficiency investments.

Commissioning can be said to have both costs and benefits (Figure 5). Benefits can include energy savings (although sometimes consumption increases when problems are fixed), reductions in other utilities or operations and maintenance costs. Costs include the identification and resolution of deficiencies (which can be paid through by a combination multiple parties, e.g., owners, utility incentives, or grants). Commissioning can influence the type and number of change orders or other non-energy benefits, resulting in either net delivery costs or net savings. Costs and benefits can occur at one point in time or be ongoing. Most studies do not quantify these “secondary” effects, but we include them where available (38 cases).

In rare cases (0.8% of our projects), energy use can actually increase after commissioning. This is generally a "good thing" insofar as it results from correcting an important operational deficiency (e.g., non-functioning equipment or insufficient ventilation).

Figure 5. *Conceptual map of commissioning costs and benefits*



In the real world, energy-related commissioning measures are often combined with non-energy ones, particularly those related to fire and safety systems. For energy cost-benefit analysis, it is important to isolate the relevant costs. In one example, about 95% of the new-construction commissioning cost of a Caltrans office in California was for correcting non-energy construction defects. Using the total value would have yielded an apparent energy payback time of 41 years, while the proper allocation of costs and benefits yields a payback time of only 2 years.

Not to commission is to "kick the ball ahead," and defer costs to the future. By this perhaps generous definition, commissioning is not a "real" cost. For two buildings analyzed in detail, one author found that 46% and 62% of the deficiencies identified during commissioning would in the future manifest as higher repair and maintenance costs (Della Barba 2005). Similarly, 4% and 10% of the deficiencies would have resulted in shortened equipment life, while 13% and 5% would have adversely impacted occupant productivity. For comparison, only 11% and 10% were directly associated with energy costs. Friedman (2004) found over 500 deficiencies at four Detroit elementary schools and that correcting the problems avoided $100,000 in repair costs. Foregone energy savings amounted to an additional $110,000. In commissioning 10 schools in California's Folsom Unified School District, 32% of the issues identified would have increased

operations and maintenance costs, 37% comfort and indoor air quality, 6% safety, and 26% energy (Mittal and Hammond 2008).

The Impact of Commissioning: A Golden Opportunity for Saving Energy, Money, and Greenhouse Gas Emissions

Our results are within the range of that observed in smaller studies (Table 1), but they provide a far more definitive and well-normalized assessment than the existing constellation of isolated studies. This is thanks to the large sample size and screening process used to determine which projects to include, the breadth of the sample, and normalization processes that remove "noise" from the costs and savings analyses.

Table 4 provides a high-level summary of the characteristics of our sample, the investment made in commissioning, as well as the energy and economic outcomes. Table 5 and Figure 6 give key results for building types for which we have more than five examples in the database. (In some cases, sample sizes were too small to allow analysis of the new-construction cohort.)

We found median* whole-building energy savings of 16% for existing buildings and 13% for new construction. Fuel savings for existing buildings were similar, while those for saving centrally generated thermal energy were significantly higher (31%). Savings in peak electrical demand were achieved in many cases—median value 5%—but were often not the main focus of the commissioning projects, and so the potential is probably considerably greater.

* The *median* value is often superior to the *average* (technically known as the "mean") for representing the central tendency of a data set. The median of a list of numbers can be found by simply arranging all the observations from lowest value to highest value and picking the middle one (or the average of the two middle values if the list contains an even number of entries). The average is the sum of all the values in the list divided by the number of values. Per Wikipedia: "Suppose 19 paupers and 1 billionaire are in a room. Everyone removes all money from their pockets and puts it on a table. Each pauper puts $5 on the table; the billionaire puts $1 billion there. The total is then $1,000,000,095. If that money is divided equally among the 20 people, each gets $50,000,004.75. This is the average amount of money that the 20 people brought into the room. But the median amount is $5, since that would be the middle value in a ranked list. In a sense, the median is the amount that the typical person brought in. By contrast, the average is not at all typical, since nobody in the room brought in an amount approximating $50,000,004.75. By using the median, extreme outlying values don't skew the result."

Table 4. Sample characteristics, investment, and outcomes.

	Total	Existing	New
Characteristics			
Number of projects	409	332	77
Number of buildings	643	561	82
Number of states	26	21	15
Identified commissioning providers [1]	37	28	15
Commissioned floor area			
total (square feet)	99,224,809	90,410,884	8,813,925
per building (median ksf)		190,907	67,987
Ownership (by % of floor area)			
Public	71%	69%	85%
Private	29%	31%	15%
Investment			
Commissioning Investment (US$2009) [2]			
total project cost (US$2009)	43,484,002	28,562,970	14,921,031
(US$2009/project)		49,075	86,546
(US$2009/ft^2)		0.30	1.16
cost as % of construction cost			0.4%
Outcomes			
Number of deficiencies identified [3]	10,180	6,652	3,528
Number of measures [3]	5,795	4,104	1,691
Energy Savings			
Total primary energy		16%	13%
Electricity		9%	*
Peak electrical demand		5%	*
Fuel		16%	*
Combined central thermal		31%	*
Central hot water		12%	*
Central chilled water		16%	*
Central steam		19%	*
Payback time (years) [4]		1.1	4.2
Cost-Benefit Ratio [4]		4.5	1.1
Cash-on-Cash Return [4]		91%	23%
Cost of Conserved Carbon ($/tonne) [4]		-110	-25

Notes: Statistics are median values. New values or ratios should not be computed by combining numbers in this table, as the sample sizes for which data are available vary by row.

[1] The provider is known for 55% of the floor area treated in existing-building projects and 43% in the new-construction projects.

[2] Gross costs (excluding non-energy impacts).

[3] Systematically undercounted because some projects reported "Yes/No" rather than absolute counts. These tabulated as 0.999 for tallying purposes.

[4] Including non-energy impacts for projects where the information is available.

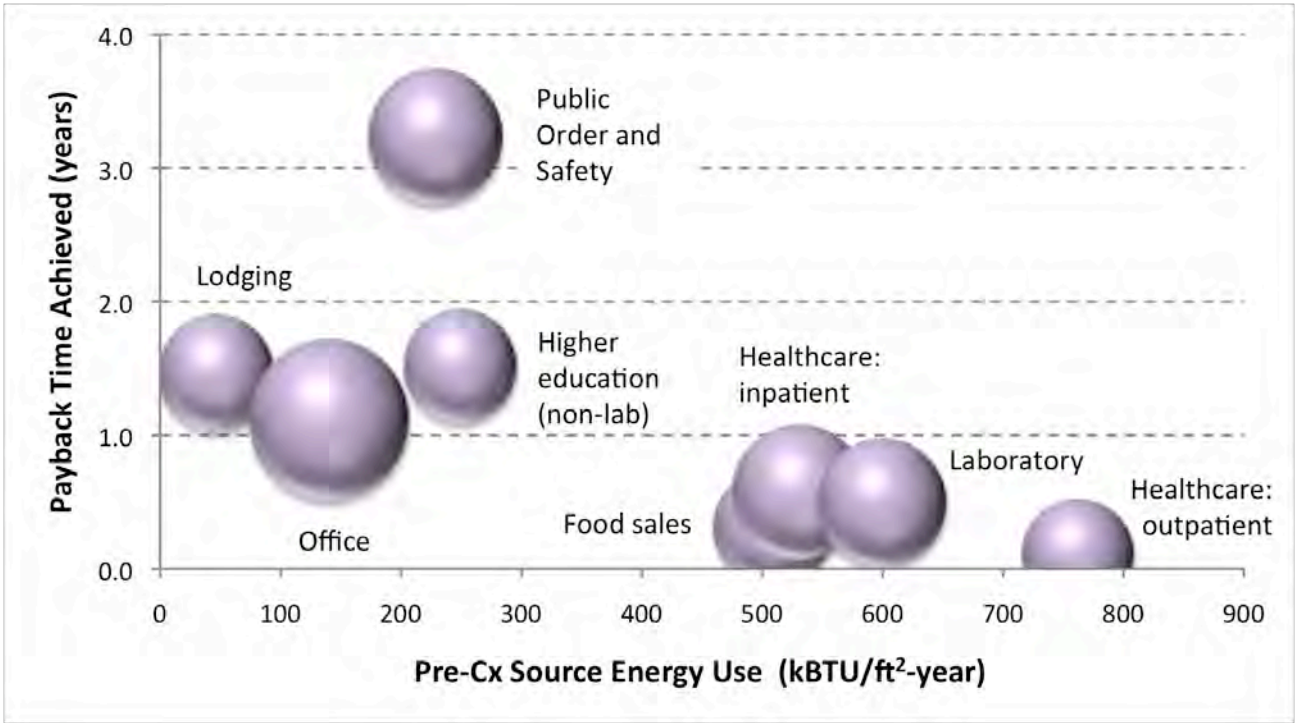
* no data

Table 5. Results by building type.

	Pre-Cx EUI (kBTU/ft^2-year)	Source Energy Savings (%)	Simple Payback Time (PBT - years)	Number of buildings (by PBT)
K-12			3.3	19
Higher education	250	11%	1.5	165
Food Sales	510	12%	0.3	10
Food Service				
Inpatient	532	15%	0.6	15
Outpatient	764	10%	0.1	13
Cleanrooms				
Data Center				
Laboratory	600	14%	0.5	50
Lodging	48	12%	1.5	38
Retail			1.4	9
Service				
Office	141	22%	1.1	145
Public Assembly			1.0	6
Public Order and Safety	229	16%	3.2	15

Values only shown when the sample size is five or more buildings.

Figure 6. *Results by building type. from Table 5. Circle diameter is proportional to percent energy cost savings. For reference, "Office" = 9%. Public order and Safety includes prisons.*



Deficiencies and Their Resolutions

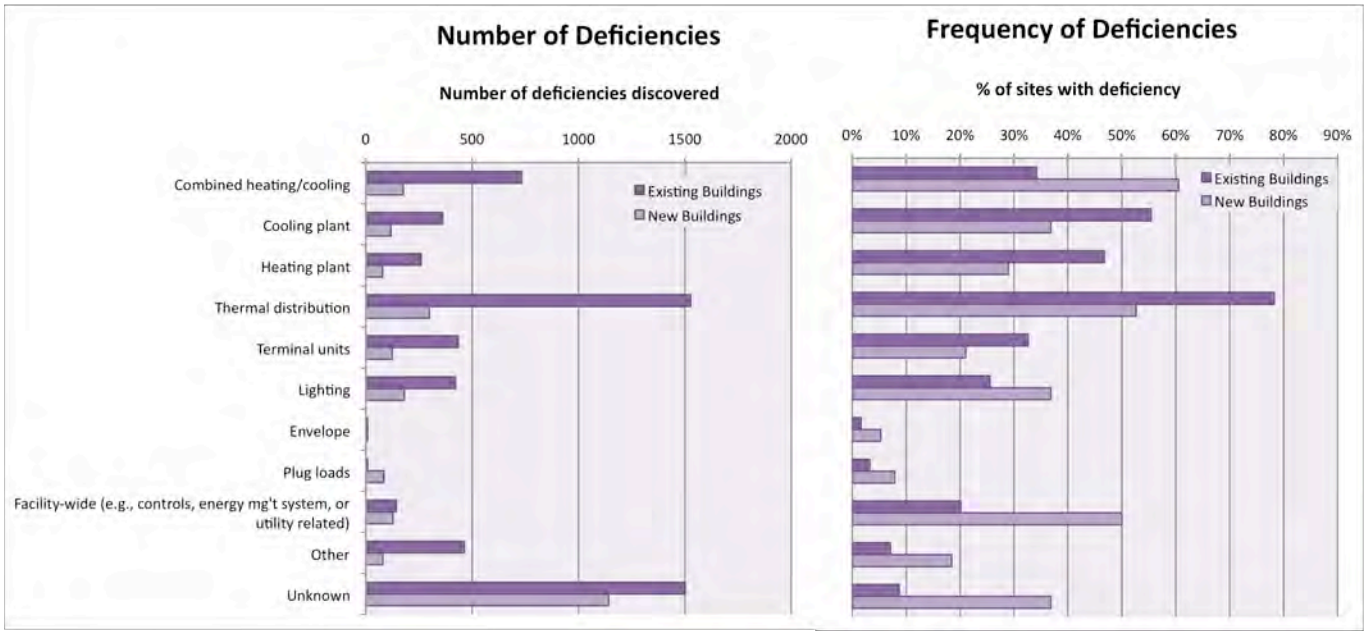
The initial payoff from the commissioning process is the unearthing of problems in the building that, remaining undetected, would burden the facility with higher operation and maintenance costs. In some cases the costs can expand to include hampered productivity or safety.

Many individual case studies delineate the deficiencies and how they were addressed. For example, Barr-Rague and Wilkinson (2005) provide a highly detailed case study of how almost 250 deficiencies were identified and remedied in a 150,000 square-foot middle-school building in New Jersey. Della Barba (2005) found almost 2500 deficiencies throughout 9 college buildings.

Information on the deficiencies and measures implemented to resolve them was available for 122 (about one-third) of the projects in the this study, and we have mapped them to a consistent framework (Figure 7). We identified 6652 deficiencies for existing buildings and 3528 for new-construction.[*] A wide diversity of problems was found. For existing buildings, problems were by far most common in air-handling and distribution systems. For new-construction, problems were most common in the mechanical systems. The low incidence of reported problems in plug loads and envelopes is probably a combined reflection of their relative simplicity (compared to HVAC systems) and that most commissioning providers are specialists in mechanical systems.

[*] For a subset of these (2145 cases in existing buildings, and 1186 cases in new construction), we have the exact correlation of deficiencies with the resolution. These are provided in the online supplementary information, at http://cx.lbl.gov/2009-assessment.html.[†] For more on the energy-efficiency potential in these facilities, see http://hightech.lbl.gov

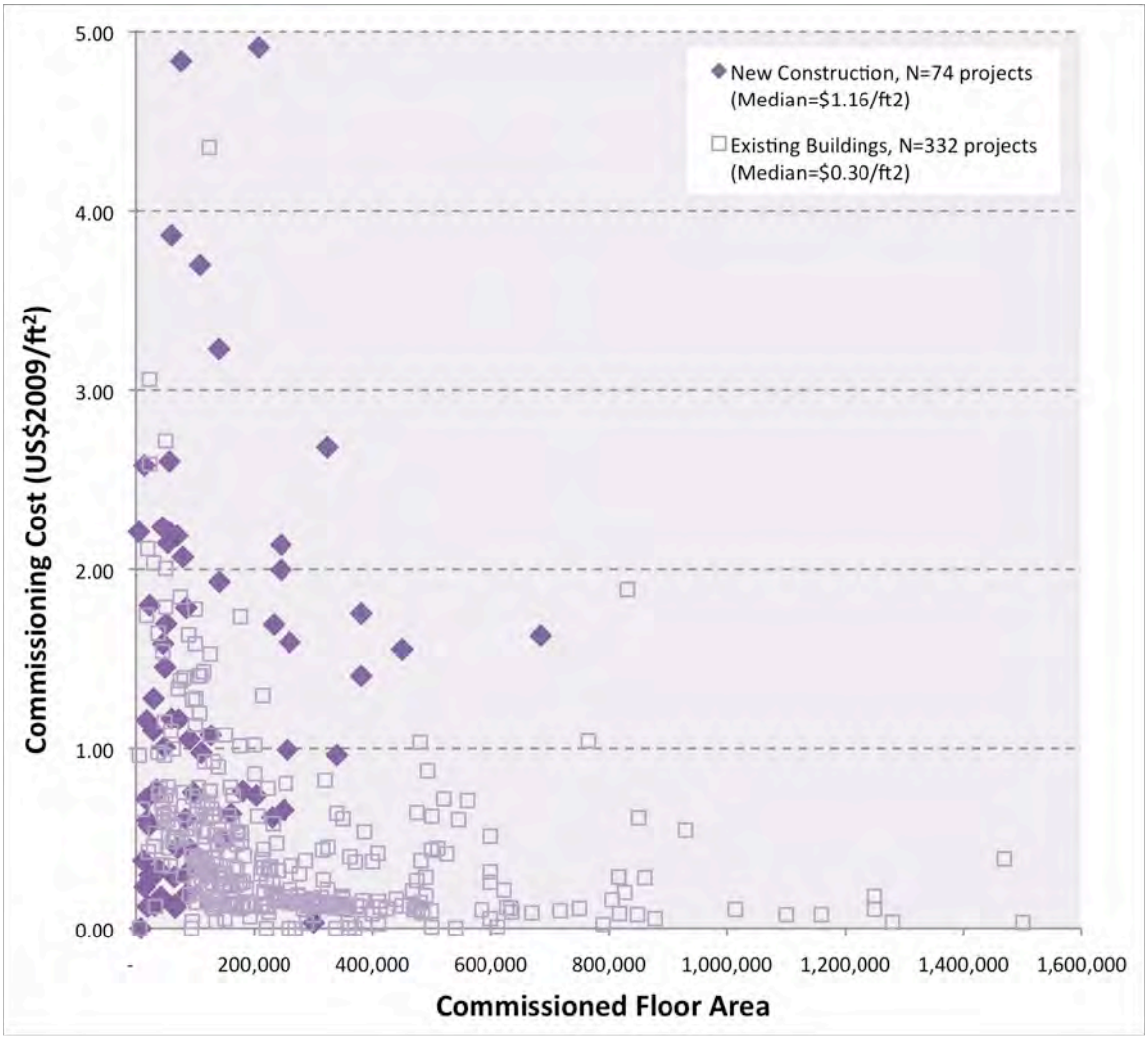
Figure 7. *Types of Problems (Deficiences) and their solutions (Measures)*



Energy, Economy, Environment

Approximately $43 million (inflation-adjusted 2009 USD) was spent on commissioning the projects in our database. The average investment per existing building was $49,000 and $87,000 for new construction. Across the 561 existing buildings for which commissioning-cost data are available, we find a median normalized cost of $0.30/square foot ($ft^2$) (inflation-adjusted to US$2009 currencies). The corresponding value for new-construction commissioning is $1.16/$ft^2$ (82 buildings). These values exclude non-energy benefits, which are in some cases quantifiable in economic terms. For existing buildings, normalized costs tend to decline with building size (Figure 8), but with large variances. In the case of new construction, pricing appears to be more proportional to total project cost. The nature of activities required for new-construction commissioning may be less dependent on project size.

Figure 8. *Commissioning cost as a function of building size*

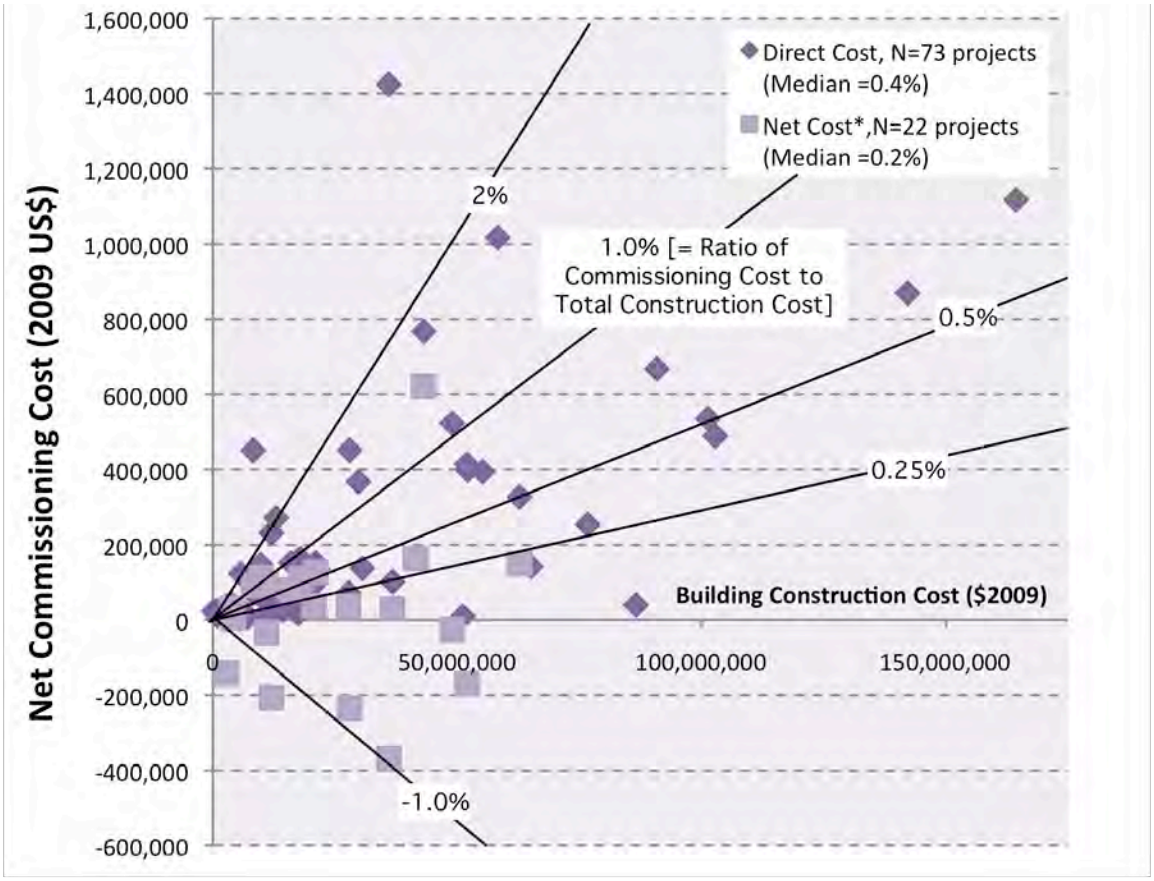


The higher normalized costs tend to correlate with projects having a substantial effort to measure and verify savings (Mills and Mathew 2009).

A more common cost metric in the case of new construction is the cost of commissioning as a percentage of total building construction cost, which has a median value of 0.4% for our sample. When non-energy impacts are included, the values decline significantly, becoming zero or even negative in many cases (Figure 9).

In evaluating commissioning cost-effectiveness, it is important not to mistake or use as a surrogate the commissioning provider's fees for total project costs. We have seen this done in other studies, and often not disclosed to the reader. For the 32 cases where we had the information on external commissioning provider fees for existing-building projects, the fees averaged 45% of total costs, with a minimum value of 9%. For the 44 cases where we had the information for new-construction projects, the fees averaged 85% of total costs, with a minimum value of 56%.

Figure 9. *New-construction commissioning cost as a fraction of total construction cost. "Net Cost" includes first-cost savings where applicable.*



The seven panels in Figure 10 summarize the core energy-savings and cost-benefit findings from our compilation. The charts show the median values for a series of metrics, together with the top and bottom twenty-fifth percentile for the set of projects as a whole. This provides an indication of the central tendencies of the results as well as the spread. The cost-benefit indicators combine all costs and benefits. Building owners enjoy even higher levels of cost-effectiveness where they receive rebates or other forms of incentives or subsidies. Across our sample, partial or full utility rebates were received in 84% of the cases in existing buildings projects, and 68% of the cases in new-construction projects. Where rebates were given, they represented about 80% of project costs for new and existing buildings alike.

The percentage weather-normalized *whole-building* energy savings was roughly similar between existing and new buildings, as was the variance, with median values of 16% and 13% (small sample size), respectively. More than a quarter of all buildings saved in excess of 30%.

While commissioning projects at one time focused exclusively on obtaining energy savings, they are increasingly also targeting peak-demand reductions (Franconi et al. 2005; Lenihan 2007; Mills and Mathew 2009). Within our database, 54 existing-buildings projects include savings in peak demand (median value 5.4%, with the upper quartile at 12%), and another 11 new-construction projects report savings but without pre-/post values (and thus the percentage savings cannot be determined).

Median commissioning costs were \$0.30/ft^2-year for existing buildings and \$1.16/ft^2 for new construction. Median cost savings were \$0.29/ft^2-year for existing buildings and \$0.18/ft^2-year for new construction. To address the needs of a diverse array of users, we employ four cost-benefit tests.

- **Simple Payback Time:** This is the project cost divided by the first-year cost savings. Where savings equal the cost, the payback time is one year. Where the payback time is the same or more rapid than that available through alternative investment options, the project can be deemed cost-effective. Median paybacks were 1.1 and 4.2 years, for existing buildings and new construction, respectively.

- **Benefit-Cost Ratio:** This is the sum of project benefits over the assumed measure lifetime divided by the project cost. If the ratio is greater than 1, the project can be deemed cost-effective. The median ratios were 4.5 for existing buildings and 1.1 for new construction.

- **Cash-on-Cash Return:** This is the ratio of first-year cost savings from the project divided by project cost, expressed as a percentage return (inverse of the payback time). If the return is equal to or greater than alternative investment returns (e.g., 10%) then the project can be deemed cost-effective. We offer this metric because it is widely used in the real estate industry. The median returns were were 91% for existing buildings and 23% for new construction.

- **Cost of Avoided Carbon:** This is the annualized project cost minus annual savings, divided by annual greenhouse gas emissions reductions (measured in carbon dioxide [CO_2] equivalents). The value can thus be negative—and in fact commonly is—when the cost of commissioning is exceeded by the energy savings. If the value is less than zero or less than the cost of purchasing emissions offsets in the marketplace, then the project can be deemed cost-effective. The median costs of avoided carbon were -$110/tonne for existing buildings and -$25/tonne for new construction.

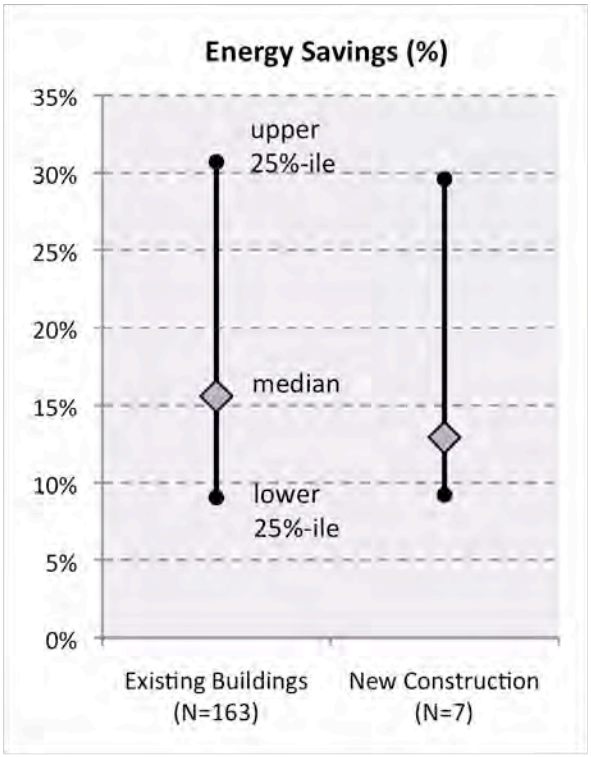
In each case, we adjust the project cost to include non-energy impacts (positive or negative) in the rare cases where the information is available. We assume that the project lifetime is 5 years, which means that savings accrue and project costs are amortized over a much shorter period of time than with long-lived energy retrofits. Measure life is not a factor for payback time or cash-on-cash return, which makes these particularly robust metrics. We assume that energy prices grow at the rate of general inflation, i.e., future energy savings are valued the same as savings today in inflation-adjusted terms.

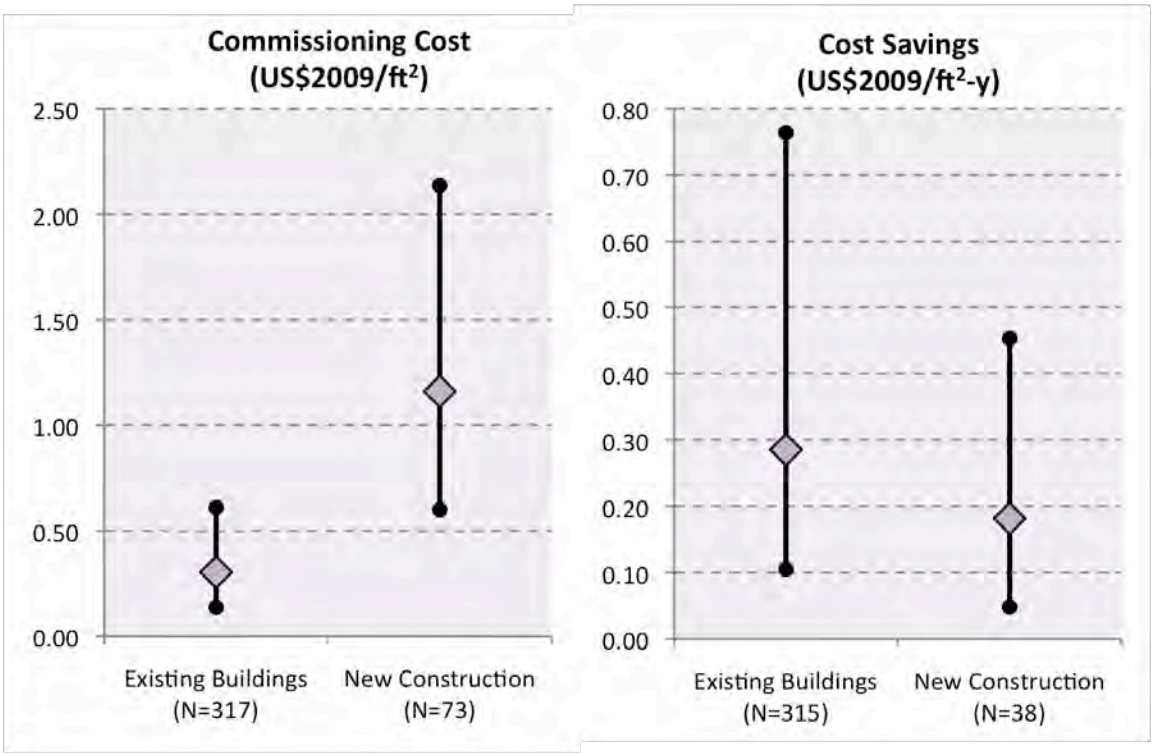
These results are on a par with those we found with a smaller sample in 2004 (Mills et al. 2004). The variations have no practical significance in terms of the attractiveness of commissioning compared to other energy-efficiency measures.

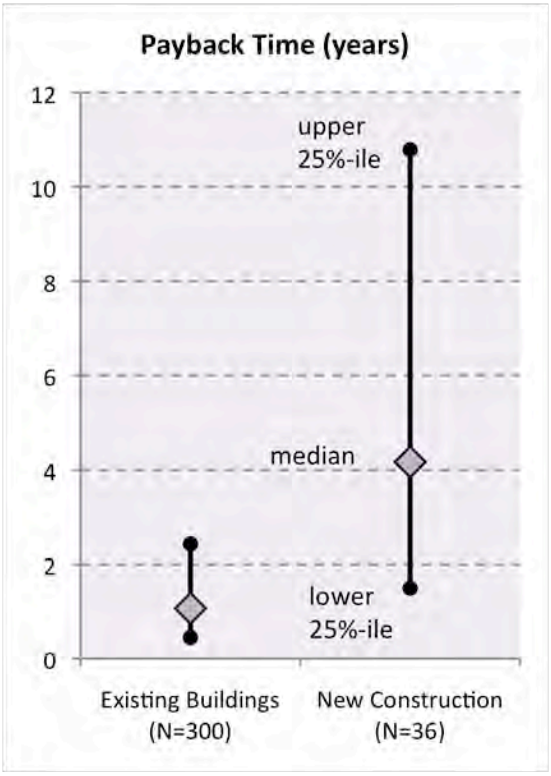
It is noteworthy that virtually all existing building commissioning projects were cost-effective by each metric. We also found that commissioning was cost-effective for each specific measure for which we have data (Figure 11). The median performance was cost-effective for new-construction, although a number of cases would not be viewed as cost-effective by most building owners.

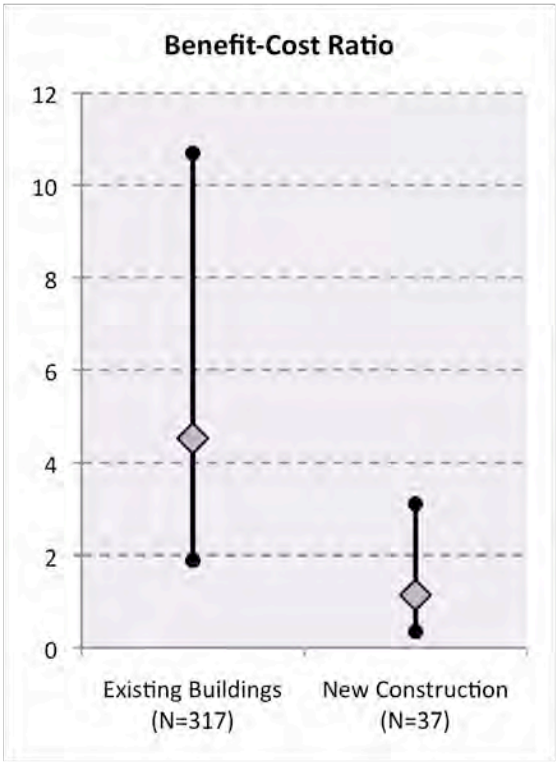
As shown in Figure 12, we observed a wide range of costs and savings. Payback times varied as well but were highly attractive in virtually all cases. It is notable that payback times showed little correlation with how much money was spent to conduct the commissioning, suggesting that skill plays a large role. Contrary to views that smaller buildings are not good candidates for commissioning, attractive payback times were achieved across our sample for buildings of all sizes (Figure 13). Unfortunately, many utility programs that promote and incentivize commissioning exclude smaller buildings. For example, the 2003 Xcel Energy program excluded buildings below 75,000 square feet (and preferred ones over 250,000 square feet) (Mueller et al. 2004).

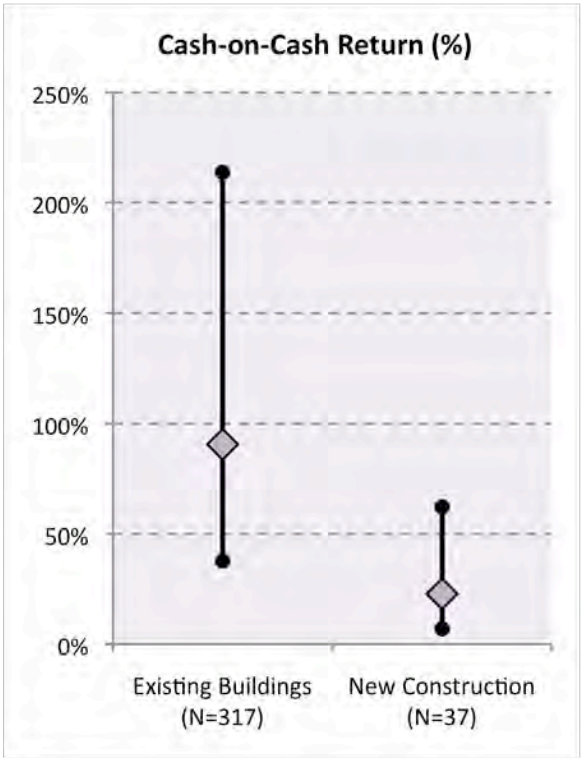
Figure 10. *Benchmarks for energy savings and cost-effectiveness*






Payback Time (years)
12
10
8
6
4
2
0
upper
25%-ile
median
lower
25%-ile
Existing Buildings
(N=300)
New Construction
(N=36)


Benefit-Cost Ratio
12
10
8
6
4
2
0
Existing Buildings
(N=317)
New Construction
(N=37)


Cash-on-Cash Return (%)
250%
200%
150%
100%
50%
0%
Existing Buildings
(N=317)
New Construction
(N=37)

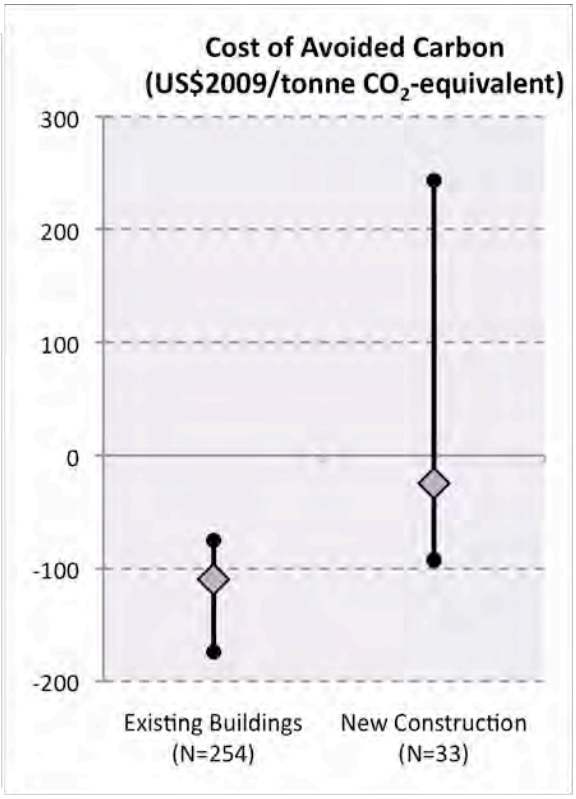

Cost of Avoided Carbon
(US$2009/tonne CO2-equivalent)
300
200
100
0
-100
-200
Existing Buildings
(N=254)
New Construction
(N=33)

Figure 11. *Payback times by type of problem ("Deficiencies") and by resolution ("Measures")*

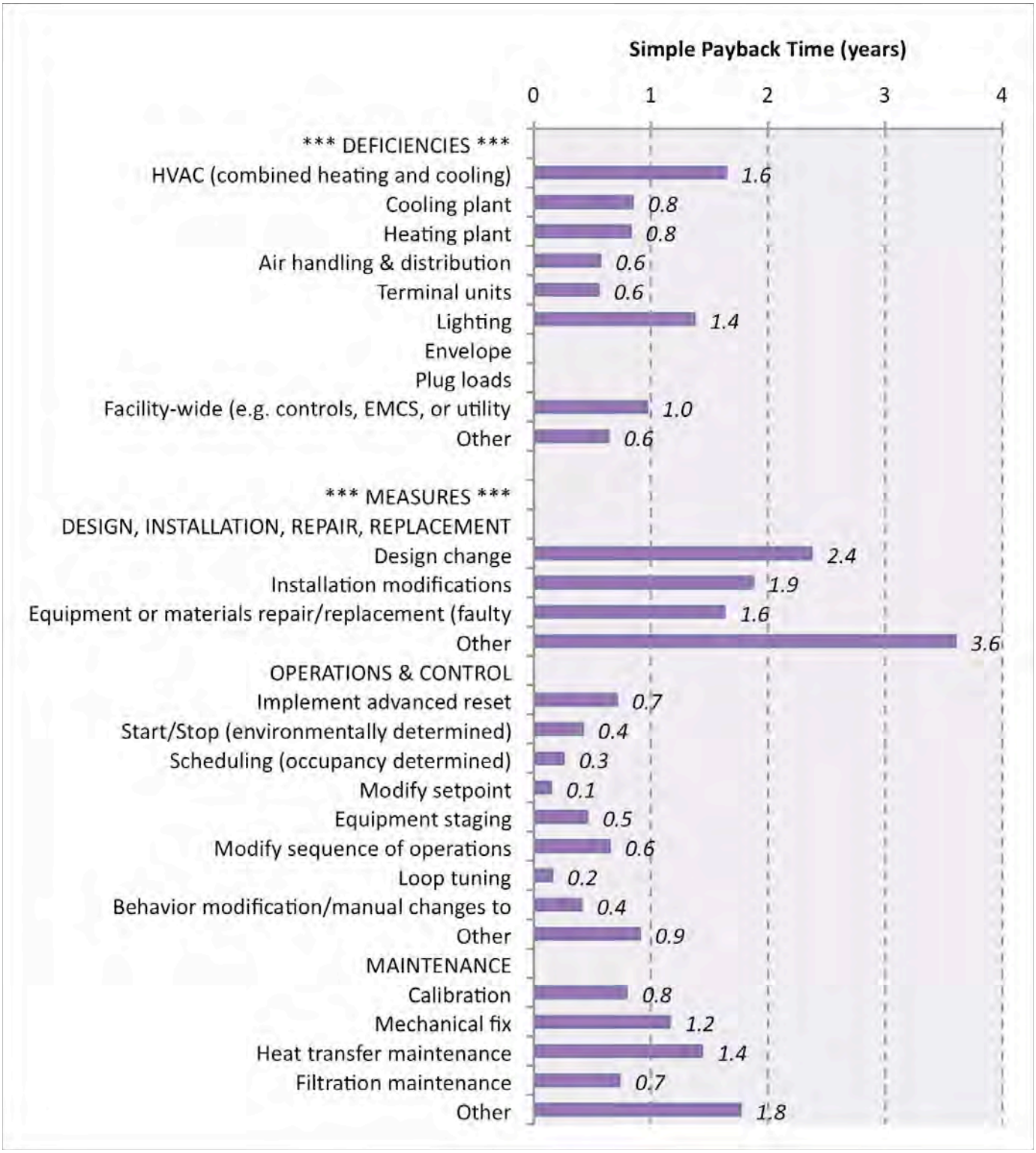
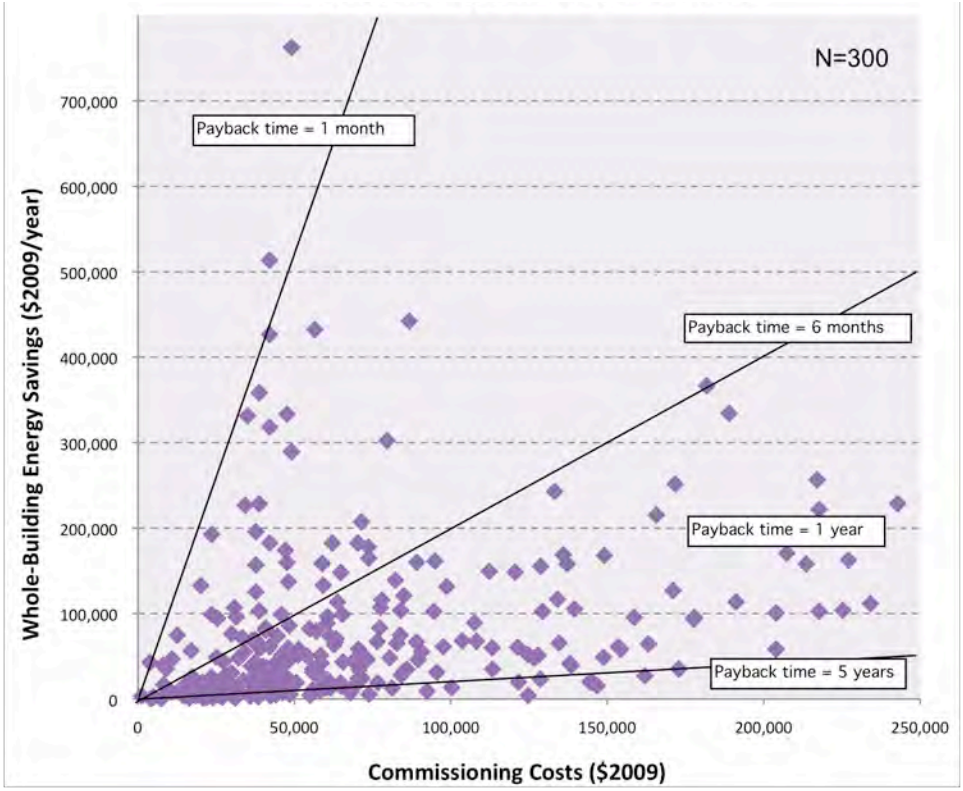


Figure 12. *Commissioning costs, savings, and payback times: existing buildings (above) and new construction (below)*



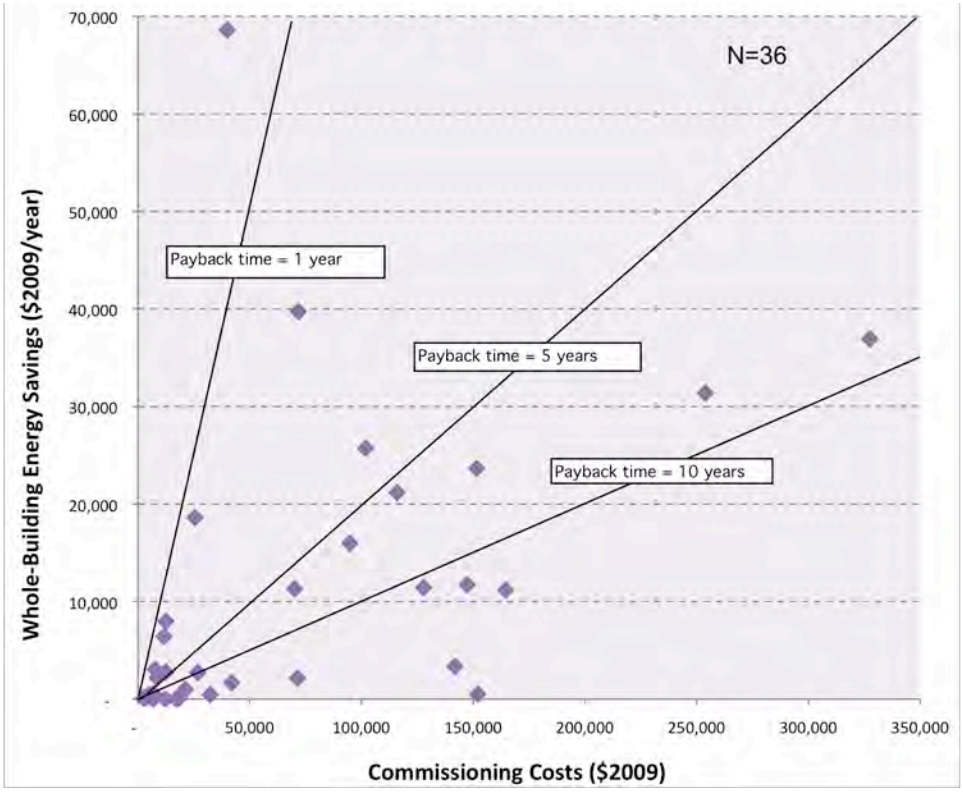
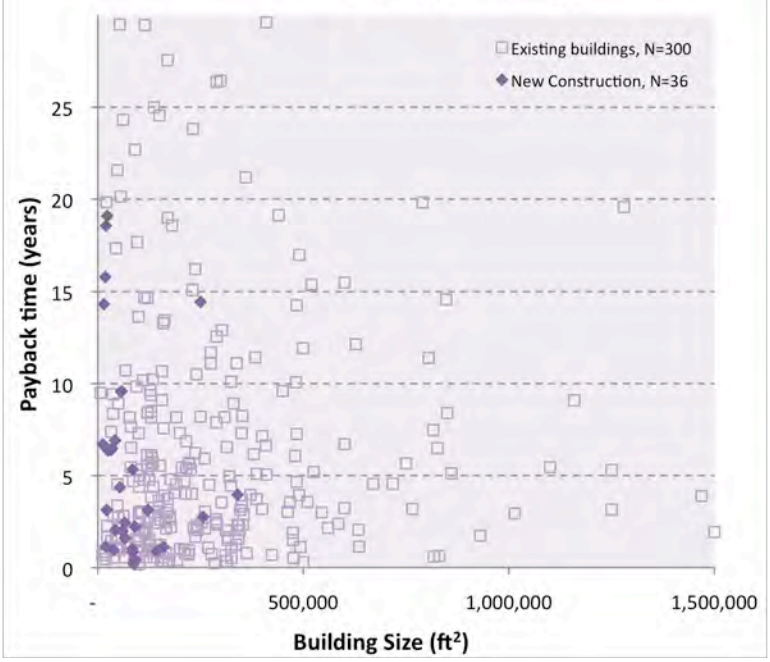
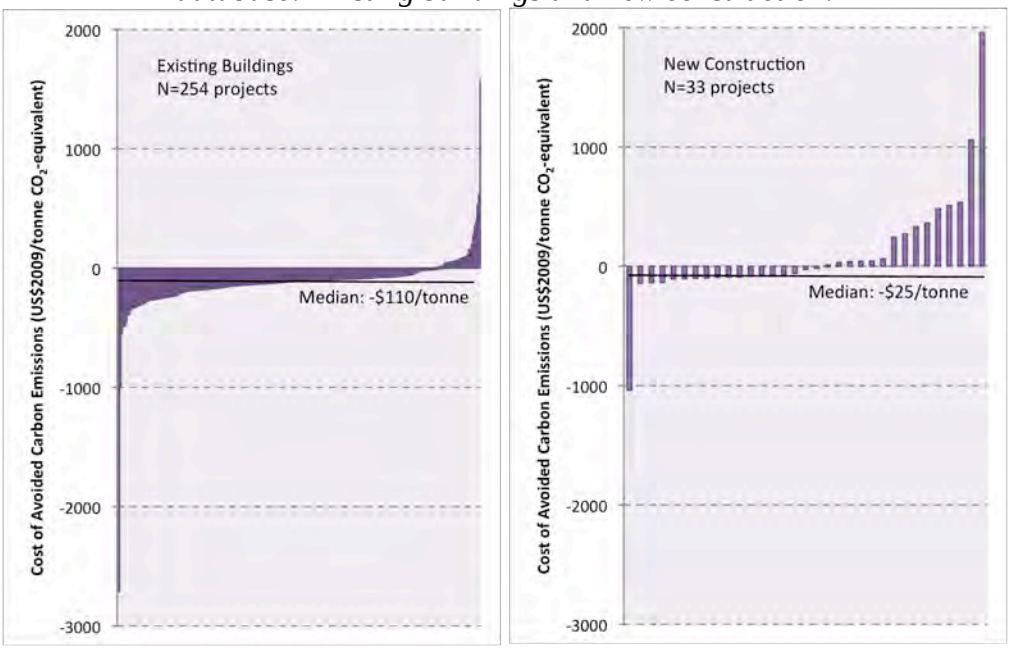


Figure 13. *Commissioning payback time versus building size*



Project costs and energy savings can be cross-referenced with the forms of energy saved (e.g., electricity versus fuel) to determine the amount of greenhouse gas reductions achieved. In almost 90% of the existing-building cases, the cost of avoided carbon was negative, as was the case for over half of the new-construction cases (Figure 14). This metric has been used to rank various emissions-reduction strategies in "carbon abatement curves," as will be discussed below.

Figure 14. *The ranked cost of conserved carbon for existing-building projects in the database: Existing buildings and new construction.*



Non-Energy Impacts

Non-energy benefits are a major driver of decisions to utilize commissioning, although adverse non-energy outcomes should also be studied (hence our use of the neutral term "impacts"). The importance of these impacts is evidenced in the titles from the following BetterBricks case studies:

- "Community Colleges of Spokane –Enhancing Teaching and Learning for Health Care Professionals"
- "Othello Community Hospital – Insuring Operation of Critical Systems"
- "Riverside School District – Correcting Mechanical and Indoor Air Quality Problems"

Indeed, non-energy benefits are in many cases the primary reason—or the *only* reason—for embarking on commissioning projects. Customers are often surprised to find, after the fact, that energy savings were achieved. The utility commissioning programs in Nebraska attribute part of their success on focusing first on improving building comfort (Criscione 2008).

We gathered qualitative data on the reasons for commissioning for 178 existing buildings projects and 36 new-construction projects. While energy savings are cited as a driver in 90% of the cases, this is followed by a desire to ensure or improve thermal comfort, productivity, and indoor air quality for occupants (Figure 15). Ensuring system performance per se is an driver in about half of the cases, and training and occupant operators or occupants is a driver in about a third of the cases. For new construction, ensuring equipment performance, indoor environmental quality, and occupant productivity are cited more often than is obtaining energy savings.

We obtained data on observed post-project non-energy impacts for 68 existing building commissioning projects and 44 new-construction commissioning projects, representing a total of 480 identified non-energy benefits. For existing buildings, improved thermal comfort and extended equipment life are among the most cited non-energy benefits experienced after the projects are completed (Figure 16), while equipment life is the most-cited benefit for new construction, followed by improved thermal comfort.

In 38 cases, the non-energy impacts were quantified. As seen in Figure 17, these can significantly offset the direct cost of the commissioning. Where the value shown in the diagram is less than zero, the non-energy benefits exceeded the first costs. In some cases, the benefits exceed the costs, rendering the projects instantaneously cost-effective. The actual net median commissioning project cost was reduced 49%.

Figure 15. *Reasons for commissioning*

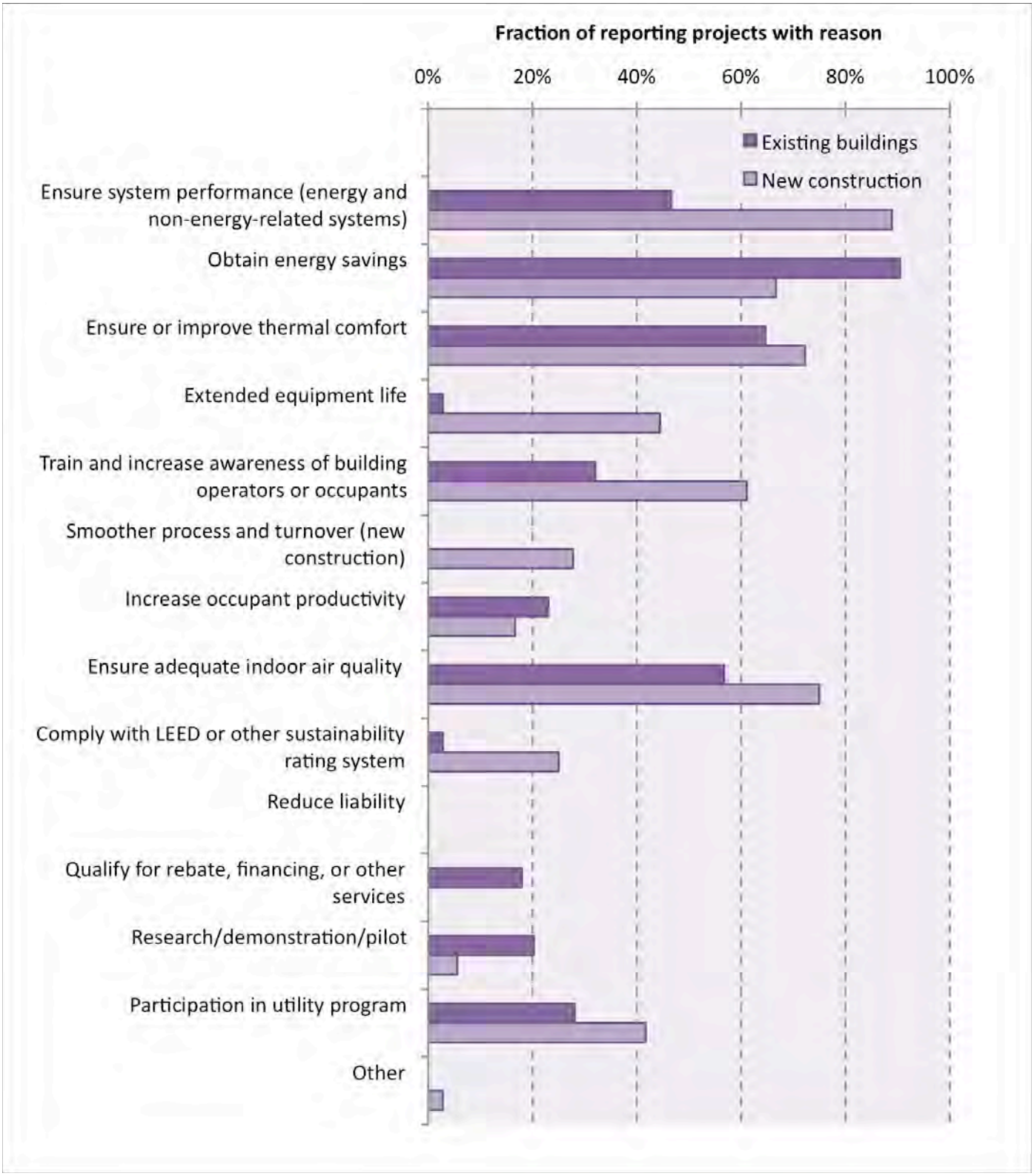


Figure 16. *Non-energy benefits observed following commissioning.*

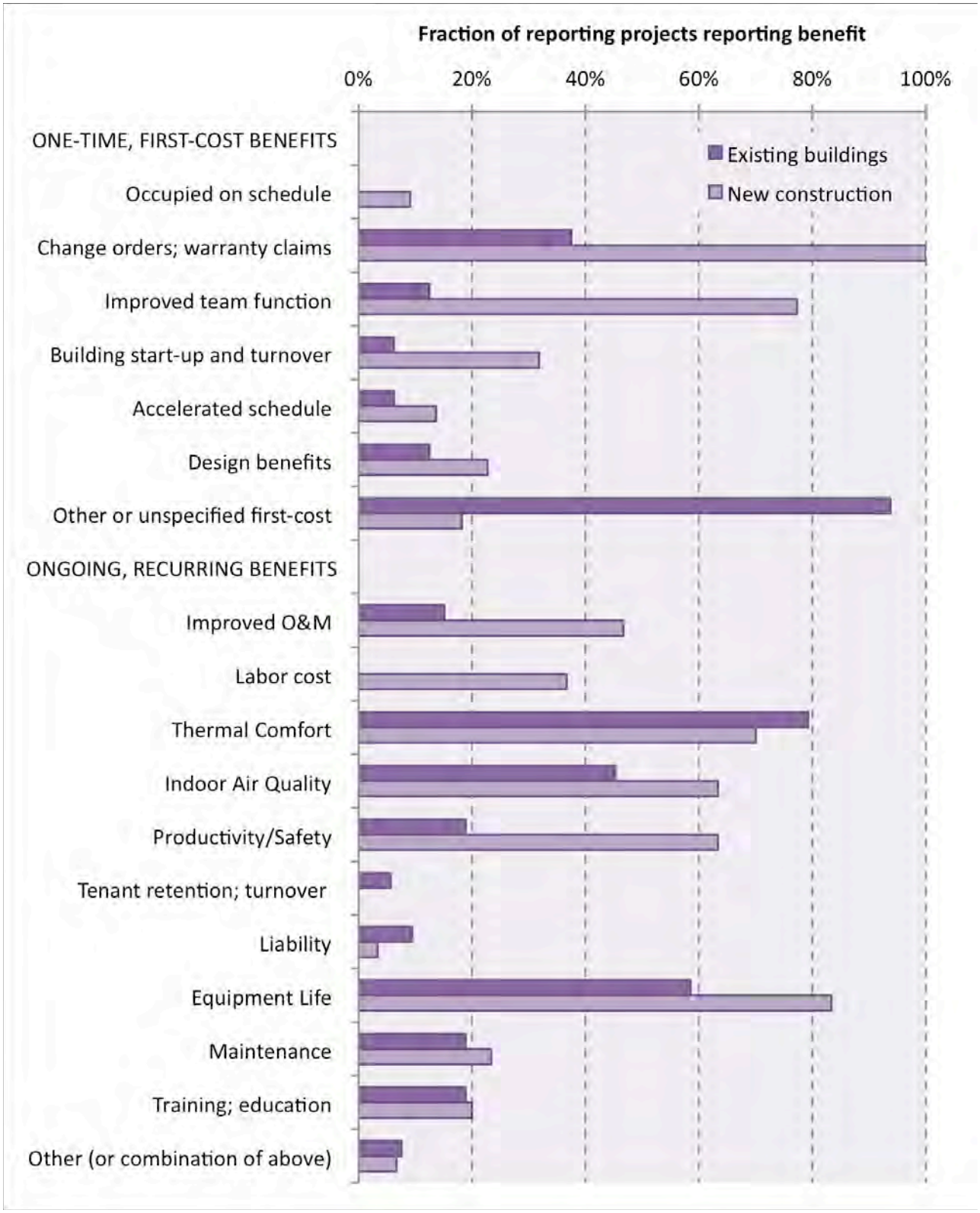
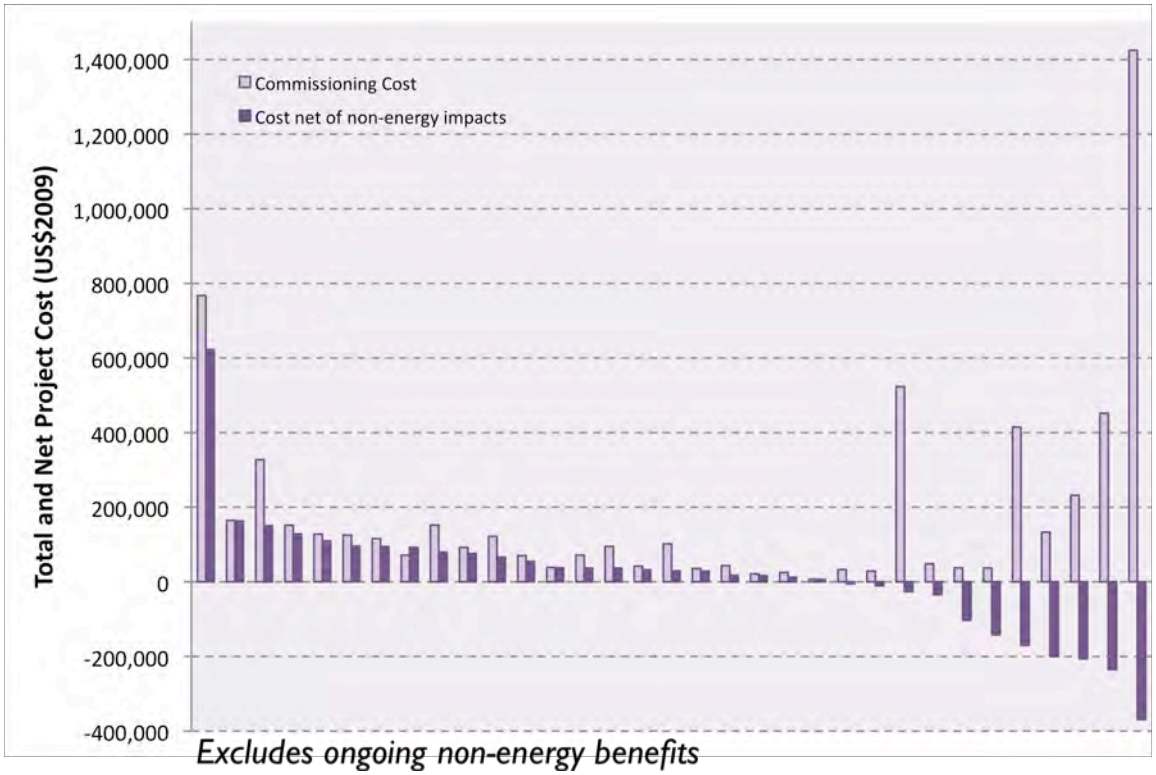


Figure 17. *First-cost savings often offset part or all nominal commissioning project costs*



High-Tech Facilities: The Commissioning Mother Lode

High-tech facilities have at times been passed over in the quest for energy savings, often under the pretense that they "must" already be optimized, and other times under the pretense that they are mission-critical and should not be disturbed. Observers sometimes incorrectly assume that these facilities are routinely commissioned for energy savings. While it is true that they receive a far higher level of quality assurance in construction and operation than traditional buildings, energy performance *per se* is usually not a central focus.

For the purposes of this report, "High-tech" facilities include labs, data centers, cleanrooms, healthcare, and specialized research facilities such as particle accelerators. While specialized on the one hand, these facility types are also pervasive, occurring in private industry (from semiconductor fabs to hospital operating rooms) to educational institutions (from high school to university labs), and in the public sector (from agricultural research labs to high-energy physics facilities). Across the United States,

high-tech facilities in the private and public sector have been estimated to spend upwards of $10 billion per year on energy (Mills 2009b).

They have a number of common characteristics, including: around-the-clock operation, high air-change rates and critical activities and safety requirements that rely on proper indoor environmental control building performance. In some cases all of the air is "once-through" and/or requires dehumidification, with far larger volumes of air needing to be treated than in conventional buildings. Taken together, these requirements tend to translate into particularly high energy-intensities, and correspondingly large opportunities for energy savings (Mills et al. 2007).[†] There are a number of articles and reports addressing commissioning in high-tech facilities, although many of them are not focused on energy issues and indeed many make no mention whatsoever of energy.

However, while we have found that commissioning can be cost-effective in virtually any building type or size, the results are particularly impressive in high-tech facilities. For example, one of the data centers analyzed for this report (Nodal 2008) had a pre-comissioning energy intensity of over 900 kWh/ft^2-year (or almost $100/ft^2-year), which is about 100 times the energy bill of a typical office building. Just the savings ultimately achieved by commissioning this one facility—173 kWh/ ft^2-year—is 10 times the median *pre*-commissioning energy use for the non-high-tech buildings in our database.

A small proportion of reports in the commissioning literature address the specific needs of these facilities. Many of those that do so focus on non-energy issues, rather than energy (Ross 2008; Hydeman et al. 2005). However, some energy-specific resources do exist, such as the Labs21 guide to commissioning existing laboratories for energy efficiency (Bell 2007), which, for example, cites the special importance of fume hoods and specialty pressure- or volume-controlled HVAC systems used for safety purposes.[*]

While problems identified in the commissioning of high-tech facilities can appear in ordinary buildings, the cost—in terms of excessive energy use—when they occur in high-tech facilities is far, far higher. Some technical issues and opportunities are unique to these facilities, as are some of the barriers. Because these facilities are also highly mission-critical, the non-energy benefits having to do with factors such as safety, equipment life, and reliability often associated with energy-related commissioning can be very substantial.

Laboratory facilities are the most widely documented type of commissioning case studies in high-tech facilities. As an example of the scores of deficiencies discovered in the construction of a laboratory facility, Pinnix et al. (2004) found that none of the 163 fume hoods had properly installed alarm monitors (a serious safety issue), while many had faulty control devices and/or miscalibrations.

The commissioning of data centers has been treated in exceedingly few publications and reports. Findings from a case study of commissioning the HVAC system of a data center

[*] A bibliography of readings on commissioning high-tech facilities is located here: http://cx.lbl.gov/hightech.html.

at the NOAA weather forecasting office in Jacksonville, Florida (Lundstrom 2004) are indicative of the kinds of problems that can otherwise go undetected in these types of facilities:

- No balancing dampers were installed to the branch ductwork for balancing, making it impossible to balance the system to improve hot/cold spots.
- Some of the electric duct heater serving zones were significantly oversized.
- Condenser coils were corroded and need to be replaced (coils were not coated for high salt content atmosphere).
- The condensing units had incorrect head pressure control and hot gas bypass connections.
- The exhaust fan was only producing 33% of design flows.
- The access door on the air ductwork was removed during an inspection and was not reinstalled.
- The fan status controls were not responding to the control system.
- The discharge temperature was controlled off the zone with the lowest setpoint, not the zone with the highest actual temperature, causing many zones to be hot.
- The temperature and humidity sensors were out of calibration.
- The lead-lag operation of the redundant air-handler units (AHUs) was not functioning in a fail-safe manner.
- The control sequence was not operating correctly.
- Many of the electric duct heaters were not staging correctly, due to incorrect wiring.
- Cooling load calculations revealed that the requirements were 10% less than the original system design (a reflection at least in part of overestimation of internal loads at the time of design).

And, after the preceding items were fixed by a separate contractor, the commissioning authority reinspected and found the following new issues:

- OA damper drive motors on two AHUs were not installed properly on the shaft linkage.
- SCRs for electric duct heaters (EDHs) on two AHUs were not correctly set up.
- Temperature sensors were not correctly mounted downstream of EDHs.
- The damper jackshaft arm on the outside-air damper on the two AHUs was stripped at the damper connection.
- Direct digital control (DDC) programs for some zones were not responding correctly.
- Specific items in the operator workstation graphics were missing or mislabeled.
- The return air damper for one AHU was broken.

Cleanrooms are another important class of “high-tech” (and highly energy-intensive) facility. They, perhaps more than any other facility type, suffer from a misconception that they are routinely commissioned for energy savings. In fact, they are routinely “qualified” or “certified” to ensure that the manufacturing process within will be error-free and yield a predictably acceptable product (e.g., semiconductor wafers). However,

the qualification process rarely includes energy performance. A cleanroom can be operating "perfectly" and yet use far more energy than necessary. Moreover, there are intense pressures to construct cleanrooms quickly, and there is well-founded apprehension about interventions that could compromise the process.

While attention on the commissioning of cleanrooms (and most other types of spaces) tends to focus on the mechanical systems, a recent report points out the importance of considering building envelopes. In this case (Sellers 2009), inspections of the envelope of a cleanroom in the final stages of construction found that 6% of the circulated air was leaking. Other end uses—such as plug loads or "tools"—get much less attention.

To our knowledge, quantification of energy-focused commissioning in cleanrooms has been offered only once in the open literature, in an important paper and associated presentations by Sellers and Irvine (2001). In that report, a cleanroom was traditionally "qualified" during construction and all was well. Symptoms began to emerge that the HVAC system was not functioning properly, which led to a series of discoveries and adjustments to the control system. To provide a frame of reference for the prodigious energy use by these types of facilities, electricity consumption of ~100,000 kWh per day and 1,800 therms of natural gas use per day translated to $5000 per day (at energy prices that are very low by today's standards – $0.039/kWh and $4.4/therm).

Following are some of the problems identified during commissioning this cleanroom:

- Key temperature sensors were out of calibration, by nearly 10^{o}F in one case.
- A critical valve was inadvertently not connected to control system, resulting in 24x7 heating and extensive simultaneous heating and cooling.
- A preheat coil controller had been set at 110^{o}F during a start-up test and associated control sequences were severely sub-optimized.
- The absence of alarms for pre-heat temperatures.
- Presence of frustrating controls and user interfaces that resulted in their being devalued and ignored.
- Air was over-dehumidified, and thus over-humidified in response.

The bottom line was $60,000 to $80,000 per year in energy savings (for a small fraction of the space that had been completed), at a one-time commissioning cost of $4,700 to $8,000. The corrections also yielded significant safety-enhancing benefits, which helped avoid costly future disruptions and potentially costly contamination of the process.

This project did not have the benefit of a measured baseline and post-commissioning measured savings. An estimate of savings was based on a calculated baseline rooted in an observed operating condition combined with calculated savings based on what engineering principles say will happen after correcting problems identified in the commissioning process. With this in mind, a very rough extrapolation of lessons learned to the rest of the facility (not yet completed at the time of the study), suggests annual savings of about $540,000, or about 30% of the facility's entire energy bill, and a payback time of 0.01 years (about 4 days). As with any case study, these specific results

will not necessarily apply to other similar facilities, but this story serves as a clear indication that commissioning in cleanrooms should be taken quite seriously and that further study is merited.

Our database contains data for 115 high-tech facilities, representing 19 million square feet of floor area (Table 6). Percentage energy savings tended to be somewhat higher than other building types, while absoulte savings were significantly higher because of initial energy intensities. Payback times were also among the lowest of any building type we evaluated.

Table 6. High-tech facilities in the compilation.

	Existing Buildings		New Buildings		TOTAL	TOTAL
	# bldgs	ft^2	# bldgs	ft2	# bldgs	ft^2
Cleanrooms	0	0	1	301,000	1	301,000
Data Center	2	12,888	0	0	2	12,888
Laboratory	50	4,561,593	18	1,965,065	68	6,526,658
Healthcare: inpatient	17	6,791,029	9	687,959	26	7,478,988
Healthcare: outpatient	14	4,319,124	4	206,300	18	4,525,424
Total	83	15,684,633	32	3,160,324	115	18,844,957

The Value of First-cost Savings Can Eclipse Those of Ongoing Energy Savings

An oft-cited non-energy benefit from commissioning—and one of the largest in terms of economic value—is helping to right-size mechanical systems, thereby saving on capital costs during original construction or future retrofit/replacement.

We documented a dramatic example of this in the Advanced Light Source facility at Lawrence Berkeley National Laboratory (Box B) in which a huge cost savings was garnered by scaling back a new chiller from over 450 tons to 350 tons (thanks to the energy savings from commissioning). The corresponding one-time savings were four times the entire commissioning project cost.

Leading commissioning practitioners have gone as far as to say that all the costs of new-construction commissioning *should* be recovered through cost savings in project delivery (with energy savings being icing on the cake). Dorgan et al. (no date) cite seven examples in which these non-energy benefits amount to 1.7 to 22 times the cost of commissioning, with a combined value of over $2.2 million in savings before energy savings are even counted.

Dorgan et al. cite four examples in high-tech buildings in which new-construction commissioning saved $319,000, $400,000, $425,000, and $500,000 in project delivery costs, for a science center, hospital, vivarium, and science building, respectively (before energy savings were even counted). These benefits resulted from:

- Eliminating change orders
- Eliminating requests for information (RFIs)

- Proper system/component selection
- Reducing contracgtor callbacks and accelerated date of proper operation

Commissioning Continuity

We identified a rare opportunity to follow a high-tech building through both its initial commissioning process (during design, construction, and startup) and then its subsequent commissioning as an existing building. The data tell an important story of the importance of embedding commissioning throughout a building's lifecycle (Box C). This took place at Lawrence Berkeley National Laboratory's Molecular Foundry facility, a complex high-tech building containing laboratory spaces as well as data processing and cleanroom environments.

Considerable energy savings were garnered during new-construction phase, with a payback time of 0.4 years. A comparable level of savings was subsequently obtained when new commissioning opportunities arose after occupancy, and with an even shorter payback time of 0.2 years (Box C).

Box B. High-Tech Case Study: The Advanced Light Source

Project Summary:

- Floor area: 118,573 square feet
- Project cost: $32,000
- System commissioned: Chillers
- Energy savings: 45.7% (weather-normalized)
- Payback time (commissioning cost/annual energy savings) less than one year
- Avoided capital cost thanks to chiller replacement downsizing from 450 to 350 Tons: $120,000 (based on $1,200/tonne), i.e., four times the cost of the commissioning project

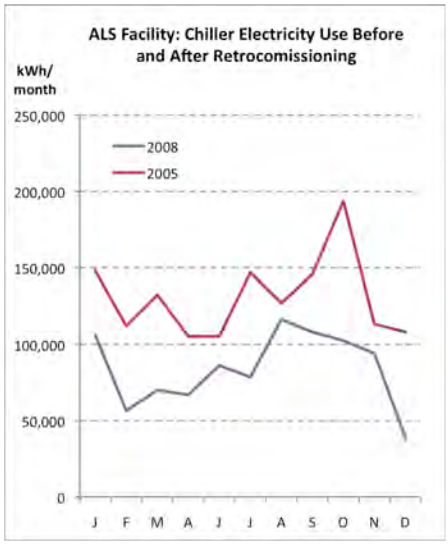
Drivers: Observed simultaneous heating and cooling

Deficiencies Identified through Commissioning:

- A false cooling load induced by the facility's temperature-stabilization reheat system.

- The main air handling units (AHUs), which provide outside air and cooling for the main experimental area, were not functioning properly. Cooling valves in all AHUs were frozen in full-cooling position, causing simultaneous heating and cooling throughout the facility. Outside air dampers not functioning.

- The central plant cooling and heating system's control programming did not optimize energy-efficiency performance or equipment longevity.



Measures Implemented through Commissioning:

- Fixed/replaced heating valve controllers and leaking valves; adjusted automated control parameters

- AHUs' cooling control valves and dampers repaired

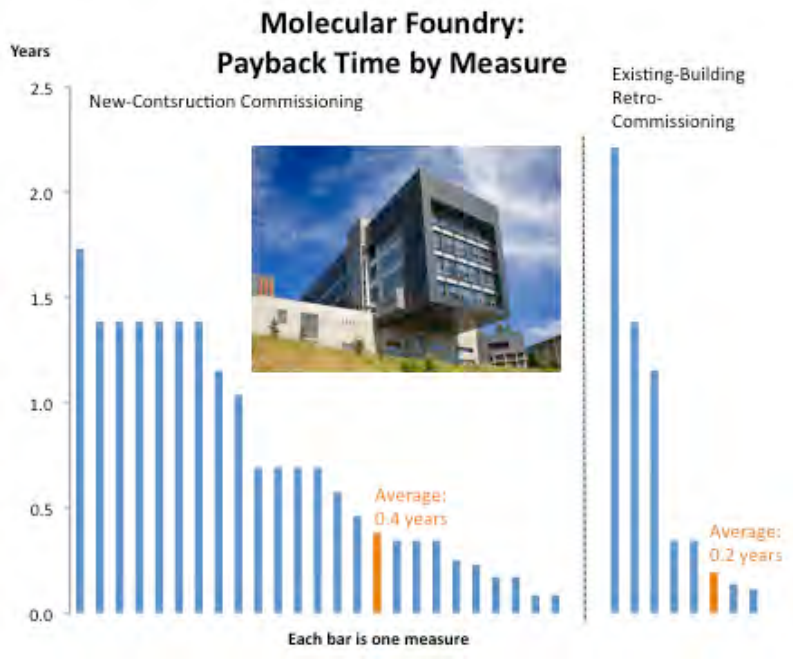
Outcomes

Energy Savings – Chiller plant cooling capacity requirements were reduced by 50 to 70 tons (10%–15%, weather corrected), which corresponded to a 45.7% (weather corrected) reduction in energy use.

O&M Improvements – The system was documented, and the staff was trained and became more able to operate the building.

Capital-cost Savings – The original chiller plant included a variable-speed 450-ton unit and an old, unreliable 350-ton unit. The commissioning project lowered chilled water needs so significantly that the 450-ton chiller went into a "surge" mode of operation that, and if allowed to continue, would damage the chiller. The operators/users believed that a new chiller with an even greater capacity than the 450-ton unit needed to be installed in place of the old 350-ton unit. However, due to the energy reductions achieved during the project, a chiller-replacement project was completed to install a new variable-speed 350-ton chiller to replace the old 350-ton unit. The new 350-ton unit provides the majority of annual chilled water needs, thus becoming the "baseload" chiller instead of the larger, less-efficient 450-ton unit.

Box C. Two Tales of One Building



The Molecular Foundry at Lawrence Berkeley National Laboratory is a 91,000-ft^2 high-tech research facility. As is often heard anecdotally, even though commissioned during construction, this building was immediately a candidate for commissioning upon completion and occupancy.

During the construction phase, problems where found in the HVAC system and plant, air-handling and distribution, terminal units, and lighting. Forty-eight specific deficiencies were discovered during the new-construction phase of the commissioning. When commissioning was performed, an additional fourteen deficiencies were discovered and corrected.

Both the phases were highly cost-effective, with the new-construction commissioning averaging a 0.4-year payback time and the existing-building building commissioning phase averaging 0.2 years.

	Commissioning (new Construction)	Retrocommissioning (post-construction)	Total
Year	2006	2006	
Measures Implemented to Resolve Problems	Modify controls' sequences of operations Modify setpoints; and start/stop operation Calibrate terminal unit damper position feedback Calibrate lghting occupancy sensors Bring air-compressor operation into spec	Replace inefficient, oversize cooling terminal units & perform other HVAC upgrades . Eliminate false loading of oversized chiller. Buffer tank modification to optimize return water temperature Modify air compressor system to reduce need for frequent blowdown.	
Electricity savings (kWh/year)	441,500	223,200	664,700
Fuel savings (MBTU/year)	3,840	4,370	8,210
Cost Savings ($/year)*	93,369	77,132	170,501
Commissioning Cost (US$2009)	39,932	16,992	56,924
Simple Payback Time (years)	0.4	0.2	0.3

* at standardized national prices

Persistence of Energy Savings

Concern is often voiced about the durability or "persistence" of energy savings from commissioning projects. The literature on the subject remains sparse, and the periods over which persistence has been tracked are mostly under five years. In a rare example of longer-term analysis, a large existing office building in Colorado originally commissioned in 1996 was reexamined in 2003, and it was found that most of the original measures were still in place and that 86% of peak-demand savings and 83% of electricity consumption savings had persisted (Selch and Bradford 2005). These eroded savings were recovered at the time by re-commissioning the original measures.

To our knowledge, we have assembled the largest available collection of persistence data for commissioned existing buildings. For a subset of 36 buildings, energy-savings data (total or for particular fuels) was available for two or more consecutive years following the project, allowing us to observe the persistence/durability of savings (Figure 18). Each project is represented in the figure by a grey line for the corresponding type(s) of energy for which persistence data were collected. The heavy red curves show the median trends for each type of energy.

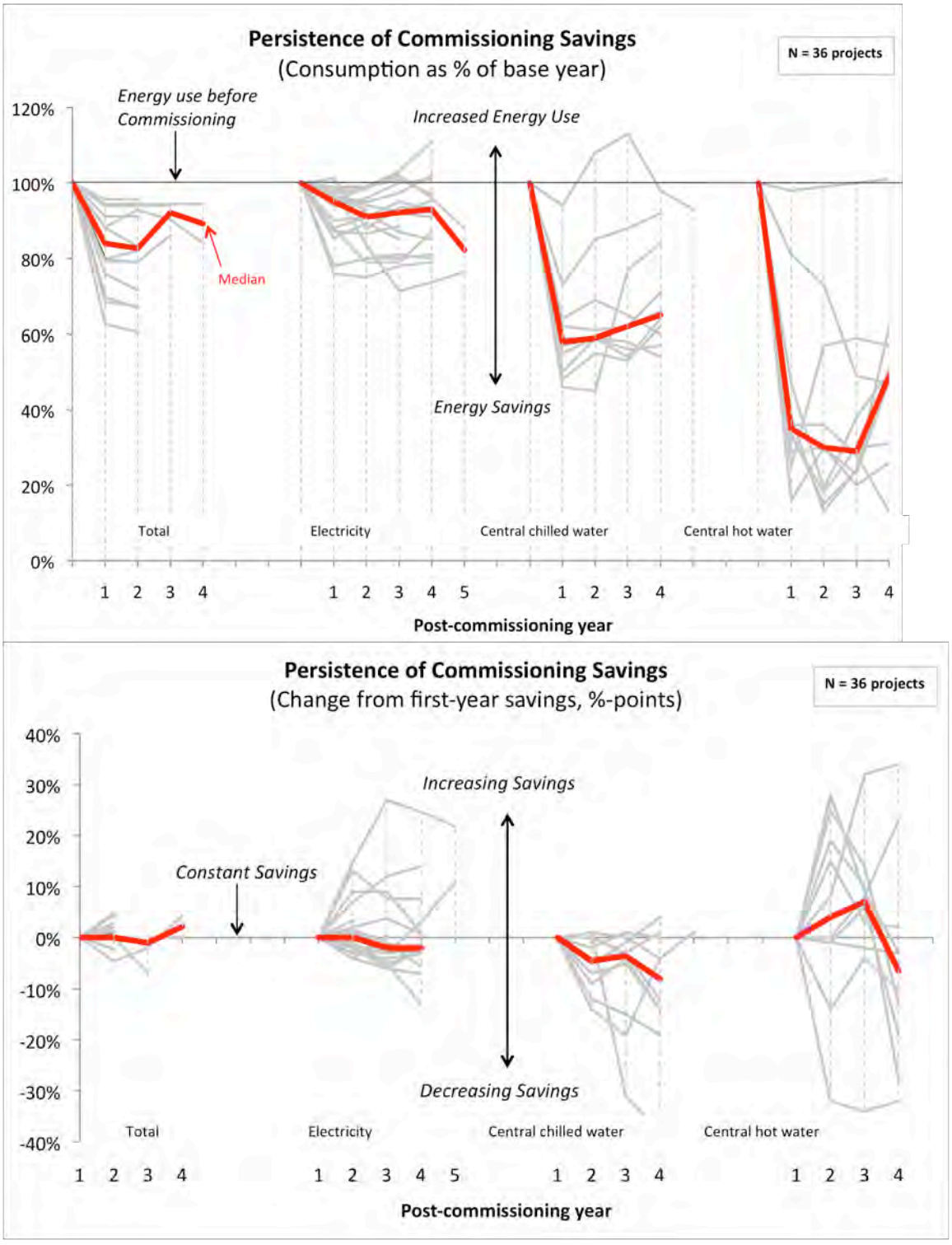
The first important observation is that savings in many cases increase in the second year, presumably a product of refinements in the commissioning or incomplete implementation in the first year. Savings from "static" commissioning measures can be expected to diminish over time. Indeed, the erosion of savings or other factors that tend to bring a building "out of tune" are the rationale for commissioning in the first place.

While some projects exhibit an erosion of savings over time, many do not. In fact, the tendency for the sample as a whole is for level or even slightly increasing savings over time. This perhaps counterintuitive outcome may be explained by the fact that comprehensive commissioning includes training, and, in some cases, installation of permanent metering and feedback systems. These improvements "live on" after the commissioning engineers leave the site, and, if properly utilized, can maintain and even help deepen savings. Many measures implemented in new-construction commissioning will tend to be very durable, e.g., properly sizing HVAC equipment.

To the extent that savings increase over time, our project cost-benefit estimates miss some of the true savings. This means that effective payback times could be even shorter than we have estimated.

The data underscore the importance of benchmarking performance over time and revisiting the need to commission with some frequency.

Figure 18. *Two views of the persistence commissioning energy savings: 36 projects.*



Note: The upper panel plots the energy use in each post-commissioning year, with the pre-commissioning value set at 100%. The lower panel plots the change in percentage savings for each year (starting with year 2 versus year 1). Note that the decline in "Total" savings in year three is attributed to the discontinuation of some of the "better" data series after two years.

Trust, But Verify

As with most other energy-efficiency measures, commissioning savings are often roughly estimated or out-and-out stipulated based on little more than best guesses.

The imperative for measurement has increased as energy prices soar, concerns intensify about securing reductions in greenhouse gas emissions, and demand-side programs come under closer scrutiny and expectations that savings be measured and verified. In addition, there are strong engineering arguments that better due-diligence during and after the commissioning project can identify deficiencies that would otherwise go undetected. Thus, a measurement-based paradigm certainly does not imply that savings will necessarily prove lower than estimates.

In a previously referenced example of the value of measurement, a data center was believed to be attaining 14% savings (Nodal 2008). Upon conducting a number of measurements within the commissioning process, it was discovered that there were actually no savings. Proper adjustments not only recovered the "lost" savings but actually *increased* them by a third, to a total savings of 19.2%.

In another example, the commissioning of an existing hospital was projected to garner annual savings of just over $56,000. A first-order calculation and inspection led to a revised savings estimate of under $53,000. The subsequent application of full "retrofit isolation" measurement technique, per the International Performance Measurement and Verification Protocols (IPMVP), identified additional savings opportunities, bringing the verified total to nearly $74,000—a 31% increase over the original estimate. The additional effort came at a price, but overall payback times remained well below one year (Chitwood et al. 2007).

The aforementioned issue of savings persistence has also contributed to the healthy interest in applying a higher level of measurement-based approach to commissioning than is typically the case. Program operators, however, have articulated various barriers, which include lack of staff, monitoring data that are useful and understandable, empowering those doing the monitoring to act on the results (to intervene if the data suggest that savings are being forfeit), and lack of information on the cost-effectiveness of monitoring (Long and Crowe 2008).

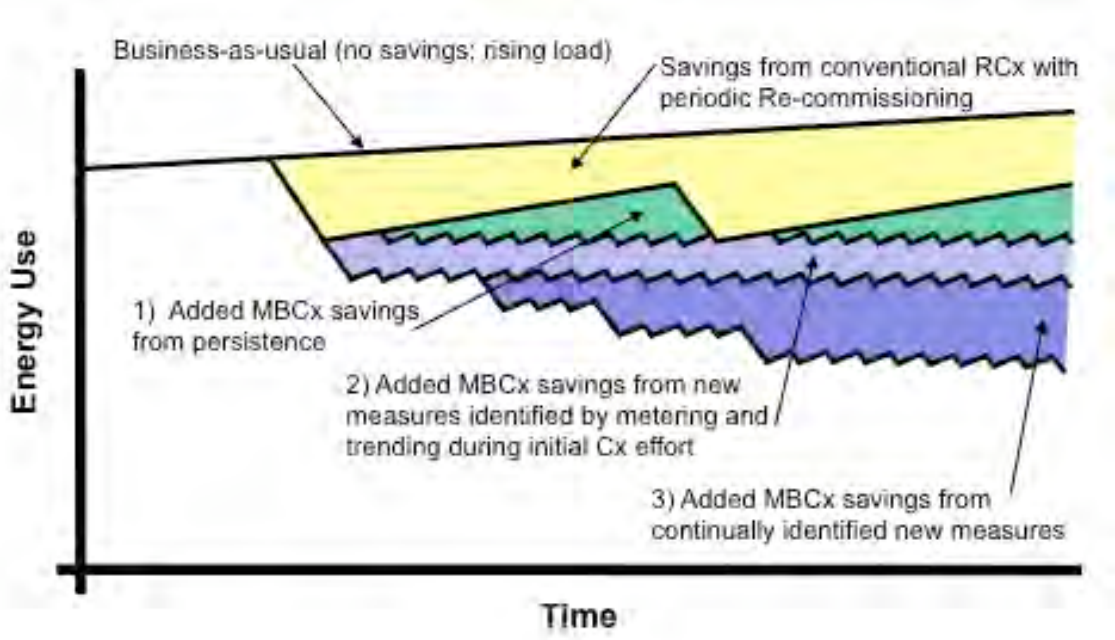
Monitoring is a tool for benchmarking and identifying savings opportunities that may otherwise go undetected. One of Xcel Energy's most successful commissioning projects attributes its high peak-demand savings (221 kW) to the presence of a sophisticated energy monitoring and control system that was used to implement "creative control strategies at little cost" (Mueller et al. 2004).

The field has responded to this opportunity through increased use of monitoring, e.g., as practiced early on within various research-based projects by Texas A&M University and increasingly in projects within the University of California and California State University systems.

The Monitoring-based Commissioning Paradigm

An emerging formalization of measurement in the commissioning process is known as monitoring-based commissioning (MBCx). As discussed by Mills and Mathew (2009), monitoring-based commissioning can also be thought of as monitoring-enhanced building operation that incorporates three components: (1) permanent energy information systems (EIS) and diagnostic tools at the whole-building and sub-system level; (2) commissioning based on the information from these tools and savings accounting emphasizing measurement as opposed to estimation or assumptions; and (3) ongoing commissioning to ensure efficient building operations. MBCx is thus a measurement-based paradigm that affords better risk management and also helps to identify problems and opportunities that are missed with periodic commissioning. The fundamental goal is to garner more and more persistent energy savings (Figure 19).

Figure 19. *MBCx provides three streams of additional energy savings relative to conventional commissioning of an existing facility.*



An initial outline of the theory and practice, coupled with an evaluation of 13 projects was performed by Brown et al. (2006), followed by an evaluation of 21 projects by Mills and Mathew (2009). These projects have been integrated into our meta-analysis database. The analysis was based on in-depth benchmarking of a portfolio of MBCx energy savings for buildings located throughout the University of California and California State University systems. A total of 1120 deficiency-intervention combinations were identified (Mills and Mathew 2009). From these interventions flowed significant and highly cost-effective energy savings. For the MBCx cohort, source energy savings of 10% were achieved, with a range of 2% to 25%. Peak electrical demand savings were 0.2 watts per square foot per year (W/ft^2-year) (4%), with a range of 3% to 11%. Costs ranged from

$0.37/ft^2 to 1.62/ft^2, with a median value of $1.00/ft^2 for buildings that implemented MBCx projects. Half of the projects were in buildings containing complex and energy-intensive laboratory space, with the higher costs associated with these projects. Median energy cost savings were $0.25/ft^2, for a median simple payback time of 2.5 years. The greatest absolute energy savings and shortest payback times were achieved in the subset of laboratory-type facilities.

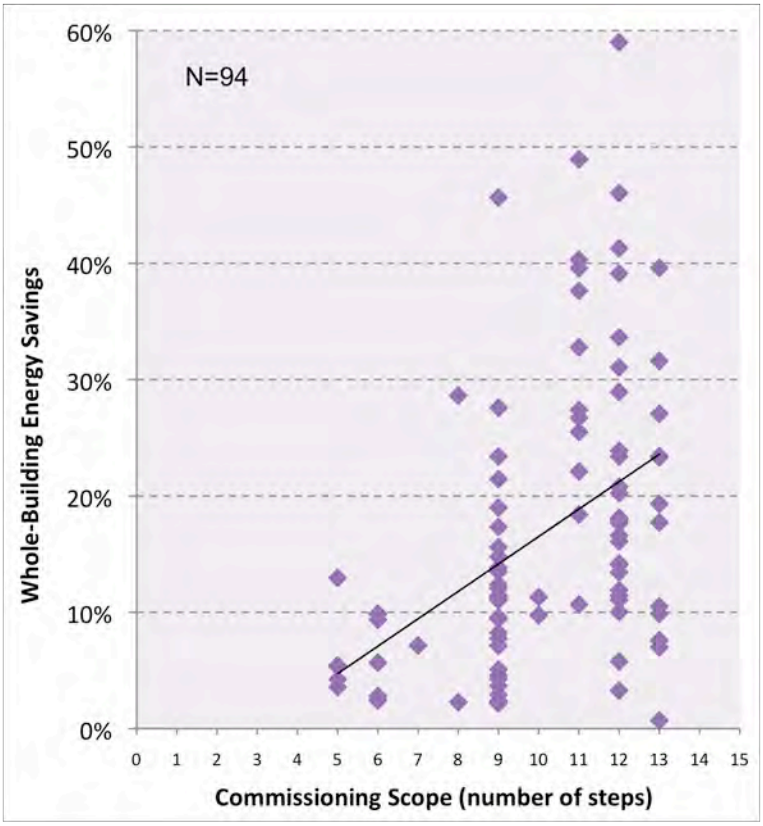
An evaluation of California utility-funded commissioning programs attributed higher savings to those that were monitoring-based (PECI and Summit Building Engineers 2007).

Best Practices

When viewed in terms of outcomes, the best practices we have observed result in zero- or negative net cost as non-energy benefits more than offset commissioning fees. The resulting payback times are in effect instantaneous, combined with energy savings surpassing 50% whole-building energy use.

Such large energy savings of course depend on thorough commissioning and the presence of serious problems at the outset, but it is clear that in more than half the cases in our database saved above our median value of 16%, and higher savings were correlated strongly with the breadth of the commissioning undertaking (Figure 20).

Figure 20. *Depth of commissioning versus savings achieved (existing buildings).*



Projects with a comprehensive approach to commissioning attained nearly twice the overall median level of savings and five-times the savings of the least-thorough projects. Comprehensiveness is measured in terms of the number of pre-defined steps/phases included in the commissioning process.[*]

In terms of application, it is critical that commissioning be well integrated with the rest of the building lifecycle and associated services. These include design and design-intent documentation at the early stages of the project cycle, through benchmarking performance to identify baseline performance and savings opportunities, and a monitoring-based paradigm for identifying and quantifying opportunities on an ongoing basis.

Within the commissioning process are a wide number of steps and documentation and training (Box A), which should be but are rarely all exercised in practice. For new and existing buildings alike, periodic recommissioning is often called for. For new construction this dictates introducing the commissioning agent at the very outset of the design and planning process and keeping them on board well through startup and into the warranty period. This is often not the case in practice, i.e., in only about one-quarter of our projects was commissioning begun during the design phase, and in only one-third of the cases did it include construction observation.

To have maximum impact, commissioning must address the whole building. Many of our case studies are selective in their focus, e.g., addressing space-conditioning systems to the exclusion of service water heating, lighting, plug loads, and envelopes.

Lastly, much better practices are needed in the documentation of commissioning projects and creation of case studies. The current literature is fraught with ambiguities and non-standard definitions. When quality control protocols are applied along with benchmarking analyses[†] that require very specific data—as is done in this report—much of the existing literature is not usable. Areas requiring clear definition include factors such as correlating floor area to commissioning cost, extent of end uses and fuels included in savings estimates, weather-normalization of pre-/post-commissioning data, specific costs included and excluded, and clarity as to whether measures and savings have been verified.

[*] Details available at http://cx.lbl.gov/documents/2009-study/supplemental-information.pdf
[†] A quality control/quality assurance checklist is provided in Mills and Mathew (2009).

The Ultimate Potential for Commissioning

Applying our median whole-building energy savings value (i.e. not best practices) to the stock of U.S. non-residential buildings corresponds to an annual energy-savings potential of $30 billion by the year 2030, which in turn corresponds to annual greenhouse gas emissions of about 340 megatons of CO_2 each year.[*] Commissioning is thus a formidable efficiency "measure" in its own right. In some cases it enables the achievement and maximizes the impact of other more traditional measures. In other cases, it provides savings independently of other measures. Like other energy-efficiency measures, it has a cost, associated savings, and a given "lifetime," or period of persistence.

Scores of studies have been conducted on the potential for energy savings. Few, if any, have rigorously included the costs and benefits of building commissioning. However, many such studies examine the "technical potential," other measures which, rather, implicitly assumes that all measures work perfectly and, typically, that they fully penetrate the targeted stock of buildings. This would require considerable commissioning effort and generate equally considerable rewards.

To put the potential for commissioning in context, Figure 21 shows the significant carbon reductions that commissioning of U.S. commercial buildings would represent in context with a prominent study of the potential for a wide range of other strategies. This exercise reveals that not only is commissioning among the very most cost-effective strategies for reducing greenhouse gas emissions, but it is also a large absolute source of savings, as indicated by the width of the step in the figure.

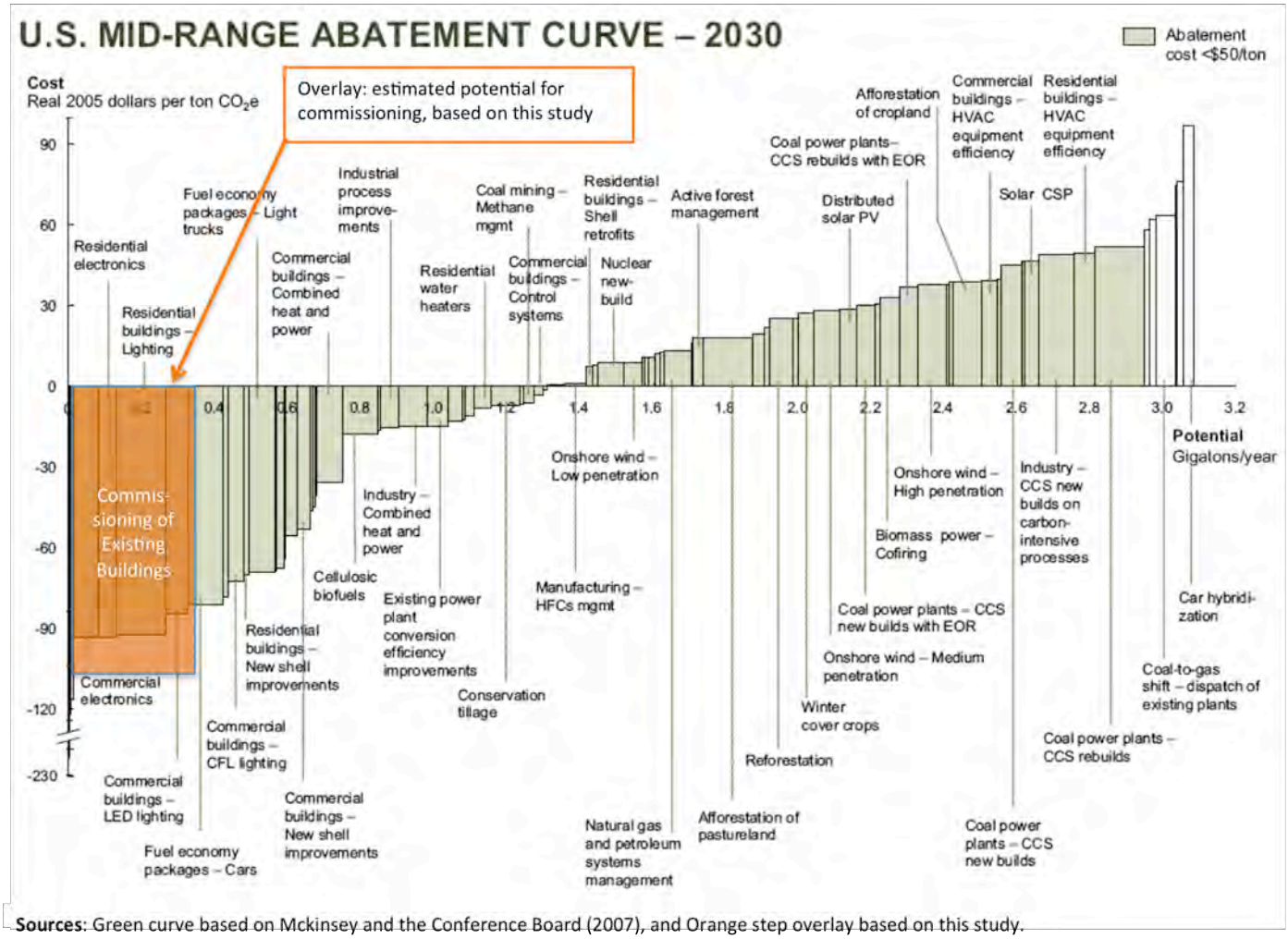
Thorough potential studies must also incorporate the role of commissioning in extending the persistence of other energy-efficiency measures, as well as the finite persistence of commissioning itself. Commissioning is also a delivery mechanism for operator training, which supports maintenance and extension of the savings potential of virtually all other carbon-abatement strategies in buildings.

Projections of commissioning cost-benefits should also consider trends in costs and impacts. Delivery costs will be driven in large part by trends in labor prices, although as this relatively young industry moves up the learning curve, delivery will become more time-efficient. New technologies such as advanced metering, wireless sensors, and "automated commissioning" electronics stand to considerably reduce the costs. The value of energy savings will be pegged to energy prices, which will rise in the long term.

Non-energy benefits should also be incorporated in potentials studies. As borne out by the data presented in this report, they are significant and today generally not monetized; this may change in the future. One certain example of this final point will be when a cost/value is assigned to greenhouse gas emissions.

[*] We assume energy consumption per DOE/EIA (2003), demand growth per the U.S. Energy Information Administration's *Annual Energy Outlook* (2007), median commissioning energy savings of 16% (per this study) and the energy price default values used in preparing this report.

Figure 21. *Potential U.S. carbon savings from commissioning in context with other options.*



Sources: Green curve based on Mckinsey and the Conference Board (2007), and Orange step overlay based on this study.

Notes. The overlaid orange bar is derived from the analysis in this report and superimposed for reference over the green carbon "abatement curve" published by McKinsey (McKinsey & Company and the Conference Board (2007). The full abatement curve indicates the potential emissions savings potential for a range of measures, ranked by the annualized net cost per ton of emissions reductions (y-axis), i.e., the cost of commissioning minus the value of the resulting energy savings over the measure life. The horizontal width of each step is the potential emissions reduction attributed to each measure for the particular scenario considered. The height of the orange step reflects the median cost of avoided carbon for commissioning derived in this report, and the width represents a potential 16% reduction (median value from this report) in commercial-building emissions projected for the year 2030. To estimate the baseline emissions in 2030, commercial buildings emissions from 2005 are scaled by the projected growth in commercial floor area (EIA 2006). The mid-range scenario is described as one that "involves concerted action across the economy."

Research Frontiers

Those who study and evaluate commissioning have a wealth of interesting technical and market-based issues to address. These include: garnering greater insight into the mechanics of savings persistence, optimal application of measurement and monitoring, decreasing the cost of delivering and reaching difficult market segments, and filling in gaps in the types of facilities for which good case-study data are available. Commissioning is becoming more specialized towards individual systems, although certain end uses (e.g., plug loads) are less well addressed than the heating, ventilating, and air-conditioning systems with which most commisisoning practitioners are most familiar. Few studies have examined the commissioning of central plants, and few have reached outside the commercial buildings sector to address industrial facilities or multifamily residential buildings.

Most of the rigorously documented commissioning projects appear to be limited to the United States. It is important to expand the practice of commissioning project data collection and evaluation to other parts of the world.

Numerous emerging technologies are entering the marketplace. Among these are solid-state lighting systems, integrated daylight-dimming and automated window shading systems, electric demand control methods and technologies, wireless controls, and a host of smart-grid strategies. Each will bring new risks along with opportunities for energy savings. In one example—a chilled-beam cooling project at a major research laboratory—about 30% of the 100 condensation sensors failed (Mantai 2009). It is critical that the practice of commissioning keep pace with the introduction of new technologies in order for their energy-savings potential to be realized.

With the new imperative of climate change, more effort must also be focused on tailoring commissioning services to the reduction of greenhouse gas emissions. As carbon savings achieve greater economic value, verifying and ensuring the persistence of reductions will become an increasingly important role for the commissioning provider. Little has yet been done on the related but broader theme of green-buildings (e.g. water use and green materials/practices) commissioning and quality assurance.

There is currently rising interest in the “softer” fields of energy research focusing on human decision-making and behavior by end users and intermediaries. These questions are central to both the uptake and practice of commissioning. While awareness of commissioning is low among building owners, it is equally low among energy policymakers (most of whom are not even familiar with the term).

Commissioning America in a Decade

Since our 2004 review of commissioning experience, the field has bourgeoned with large increases in the number of projects and the scale of coordinated deployment programs. The next tier of growth may prove more challenging, but will also be more rewarding. Given the need to reduced greenhouse-gas emissions, there is an unprecedented urgency

to capture and retain energy savings wherever they can be found. With the high cost-effectiveness of commissioning, the practice will continue to be looked to as part of the solution. Reaching a more meaningful scale will require resolution of various barriers.

Leading commissioning practitioners and other stakeholders were convened at a "Town Hall" meeting in conjunction with the 2008 National Conference on Building Commissioning. The group set out to identify key issues and needs faced by the industry (PECI 2008), and it identified four high-level issues and challenges:[*]

1. **Professionalism:** inadequately trained workforce, insufficient communication within commissioning teams, and uneven quality in the practice
2. **Value Proposition:** low awareness among owners (and concern about persistence of savings), combined with split incentives where owners do not benefit from commissioning services that reduce tenants' energy bills
3. **Standardization:** need for standardization in methods and definitions, while avoiding counterproductive commoditization (where price competes with value)
4. **Fragmentation:** splintered activities and competition among a growing number of trade groups and certification programs

Addressing these issues will be no small challenge, and it will require a well-engineered mix of discipline in the training of commissioning providers and practice of the art, together with awareness-building within the broader end-user/customer community, most of whom have still never heard of commissioning, or, when they do, are skeptical as to its need or value.

The National Energy Management Institute estimated that the current market for commissioning *new* buildings grew from $121 million per year in 2001 to $788 million in 2005, and projected it would reach $1.3 billion 2008 (NEMI 2005).[†]

The vast preponderence of near-term energy savings, hare to be had in existing buildings. The NEMI study estimated that the market for commissioning *existing* buildings grew relatively slowly from $175 million in 2002 to $200 million 2005. NEMI estimates that this level of effort corresponded to 2.3 million labor-hours were spent on commissioning existing buildings, or about 1,150 full-time equivalent workers.[‡] At a stipulated retrocommissioning cost of $0.30/ft^2 (based on this study) to deliver retrocommissioning, the $200 million spent corresponds to about 660 million square feet currently treated each year and even if this is being achieved today it represents less than 1% of the U.S. non-residential building stock.

If, as a thought experiment, a goal was to commission all existing U.S. commercial building floorspace (clearly an upper limit of the need), it would take the existing

[*] Similar findings emerged from a major survey of industry players sponsored by NEMI (2005).
[†] It is not clear whether the NEMI findings are limited to commissioning that includes an energy focus or more broadly at all forms of commissioning.
[‡] NEMI states that there are 1.5 million "field-labor" hours per year, which constitute 65% of the total labor. They utilize a billing rate for the work of $65/hour.

workforce about 100 years to do so (assuming current practices). Thus, to achieve the goal in a decade would require a 10-fold increase in the workforce (to about 12,000 workers). While this may sound like a large number, consider that as of 2006 there were 292,000 heating, air-conditioning, and refrigeration mechanics and installers; 80,000 electrical and electronics repairers for commercial and industrial equipment; 226,000 mechanical engineers; and 511,000 engineering technicians in the United States.[*]

The corresponding industry would have a sales volume of $2 billion per year for existing buildings commissioning. In addition, there should be some degree of recommissioning to ensure persistence of savings. If done every five years, then the preceding numbers would double to 24,000 workers and a $4 billion market size.

There is clearly more potential demand for commissioning than the existing workforce can meet. One study estimates that only 20% of the existing providers have capacity to take on new projects at any one point in time (PECI and Summit Building Engineering 2007). As commissioning is a highly specialized skill, requiring keen sensibilities, it is not an overnight project to train more providers. An assessment of the record and capacity of workforce development institutions to train providers of energy services identified commissioning as one of the areas in which current programs were deficient, and concluded more generally that:

> *"Workforce development needs of the energy efficiency industry are acute. Employers are not finding sufficiently skilled job applicants in today's market and the anticipated growth of the industry will only increase the severity of the problem in the short term. Educational institutions, at all levels, are not keeping pace with the growth and needs of the energy efficiency industry. … The job creation potential in the energy efficiency industry appears to be very significant and is likely the leading sector in the clean energy field for job growth potential. The industry has need and opportunity for talented and creative thinkers, both in technical and non- technical areas, which will drive the development of a new energy economy …"* (NEEC 2008)

"Commissioning America" in a decade is an ambitious goal, but "do-able" and very consistent with this country's apirations to simultaneously address energy and environmental issues while creating jobs and stimulating sustainable economic activity.

[*] U.S. Bureau of Labor Statistics, http://www.bls.gov/oco/

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CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Deployment Committee, Clean Energy Finance and Investment Authority

From: Dave Ljungquist

Date: May 2, 2012

Re: Multifamily Open Market ESCO Loan Loss Reserve

For Discussion

CEFIA proposes contributing $2.5 million to a loan loss reserve (LLR) fund to support an innovative energy efficiency performance contract program designed to serve multi-family low income housing developments. CEFIA, working through a US Department of Housing and Development (HUD) award, would work with Winn Development of Boston, Massachusetts, which has designed this program, organized all of the participants and will establish a LLC to administer the program.

In October of 2011, CEFIA agreed to participate, subject to the Board of Directors approval, with Winn Development of Boston, MA in a grant proposal to the HUD Energy Innovation Fund NOFA FR-5505-N-01, which was intended to encourage creative solutions and promote private sector investment for the implementation of energy efficiency and renewable energy (EE/RE) measures in multifamily housing. The Winn proposal won, and was awarded $5.25 million in December. The Winn program creates a loan fund which is intended to facilitate performance contracting in the multifamily (40 – 300 unit) housing market by making available debt capital to energy service companies (ESCos) to finance energy efficiency projects in this underserved market. The project would require CEFIA to provide $2.5 million from the Clean Energy Fund to an interest-earning LLR, as a second position after the HUD funding, covering 65% of losses in the event of loan repayment default for projects in Connecticut. This LLR would support $3,846,000 in EE/RE projects in the state, representing improvements to about 600 housing units at the expected average cost. Given that the multifamily housing market is underserved and that financial innovation in this sector has its risks, the LLR does not have a high leverage.

Summary of Multifamily Open Market ESCO Loan Loss Reserve

Use of private capital to improve the energy efficiency of low-income multifamily housing has historically been a challenge in the multifamily industry. Consequently, HUD's Energy Innovation Fund is intended to develop programs to leverage private capital and promote innovative solutions that are scalable, replicable, and in effect "game changers." This program does that, combining the efforts of industry leaders with the potential to bring much needed capital to retrofit assisted housing.

At the core of this proposal lie two areas of innovation:

1. A funding mechanism providing secured private capital to finance efficiency projects in low income, assisted multifamily properties, and

2. A network of pre-qualified contractors using standardized bidding procedures, coordinated by a general contractor (subsidiary of WinnDevelopment) will provide the Energy Services Contracting (ESCo) function, increasing transparency, competition, quality, and capacity of the multifamily building energy services industry.

The funding mechanism will combine capital and credit support from multiple parties to establish a dedicated loan fund for multifamily efficiency upgrades, including renewable energy, which minimizes risks for lenders while creating effective ways to leverage private capital and execute energy retrofit projects. This "Multifamily Energy Loan Fund" (MELF) will be managed by LISC and will primarily lend to a single ESCo responsible for identifying and executing eligible projects, using energy savings performance contracts or power purchase agreements with qualifying properties located in the Northeast. When appropriate, equipment leases with property owners may be utilized, in which MELF would lend to a Winn-affiliated Lessor. The same energy services provider will identify and execute projects under the lease model.

There are two main methods of credit enhancement provided to the MELF. First, an innovative insurance product offered by Energi Insurance Services, Inc. and reinsured by Hanover Re, will insure against loss through coverage for each project's energy savings guarantee. An energy savings guarantee is a common requirement of an Energy Savings Performance Contract, but by itself does not typically satisfy as loan collateral. The underwriting process used for this insurance policy also helps to standardize the methodology used to model future energy savings. This Energy Services Warranty (ESW) provides a new mechanism to effectively limit the risk of loss for lenders, and limits the risks that energy savings will not materialize.

Second, the MELF will be backed by a LLR. HUD will provide primary funds for the LLR, and additional loan guarantees would be provided through CEFIA for projects located in Connecticut, and further credit enhancement funds from NYCEEC for projects in New York City. The specific terms of the MELF would be developed collaboratively with LISC and other participating partners.

Existing debt and complex partnerships limit the ability of low-income properties to add new debt to finance efficiency improvements. Consequently, this financing approach focuses on an off-balance sheet option. Through Energy Savings Performance Contracts (ESPC) and insured savings guarantees, a third party energy services integrator – the Open Market ESCO – will borrow from the fund to finance EE/RE project on behalf of the multifamily property owner.

The proposed multifamily efficiency fund will be integrated with an "open-market" ESCO, managed by WinnCompanies, to deliver turnkey energy services to selected properties. This open market concept proposes that a qualified contractor network, properly coordinated, can significantly support the effectiveness of a dedicated energy loan fund, while delivering job growth benefits to a regional economy.

The primary types of properties to be served are income restricted multifamily properties with between 40-300 residential units per property. Under this pilot program, approximately 1,200 units will be upgraded for efficiency, with an average cost per unit between $4,000- $9,000. A pipeline of prospective properties will be developed from LISC's and WinnCompanies' portfolios of non-profit and for-profit clients. The program anticipates serving a 50/50 split between for-

profit and nonprofit affordable housing. The primary intent is to demonstrate a model in which ESPC can be utilized on assisted multifamily housing. Supplemental benefits include marketplace development, and direct energy and cost savings to properties and residents.

Financing Summary

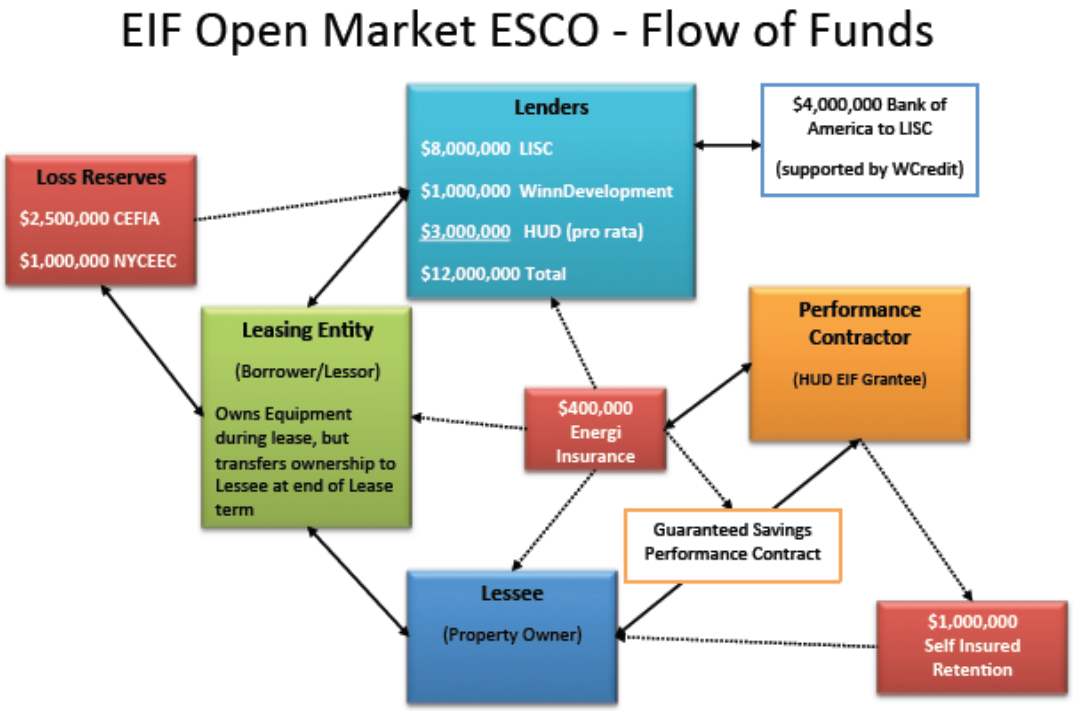
Total dollars of grant funds tentatively awarded **$5,250,000**

Primary Matching funds **$11,500,000**

a. Local Initiatives Support Corporation $8,000,000
b. WinnDevelopment / NRG Solutions $1,000,000
c. CT Clean Energy Finance & Investment $2,500,000

Additional leveraged amounts

New York City Energy Efficiency Corp. $1,000,000



In providing an innovative financing approach for the multifamily housing market, the proposed program offers CEFIA an opportunity to be part of a creative clean energy financing program that takes advantage of proven success in the solar financing arena and apply it to energy

efficiency. Elimination of the prohibitive up-front costs associated with photovoltaic systems through the use of creative financing programs has contributed to dramatic increases in the adoption of this technology in certain areas. In spite of superior returns for EE, the efficiency industry hasn't been nearly as innovative in designing new ways to accelerate EE through more user-friendly financing programs. The proposed Multifamily Open Market ESCO program is an opportunity to innovate in the financing of EE/RE projects for a chronically underserved, but needy, market.

Rationale for CEFIA:

The Multifamily Open Market ESCO Program is consistent with the new mission of CEFIA, to leverage private capital in the financing of energy efficiency and renewable energy projects.

This program allows CEFIA to test the suitability and scalability of energy efficiency performance contracts in the assisted multifamily housing market. Our strategic partner and the developer of this program, Winn Development, is an experienced owner and operator, with over 80,000 residential units in 23 states. They have conducted many energy efficiency and renewable energy retrofit projects at their properties over the past several years, and have established themselves as leaders in energy efficiency and conservation in the multifamily housing segment.

The partnership with the Local Initiatives Support Corporation (LISC) and with HUD should help attract additional capital from the private sector. As experience is gained with selected projects in Connecticut and New York, it is expected that the coverage ratio for the loss reserves will decrease, and will permit greater leverage of the available capital.

Multifamily Open Market ESCo Program – CEFIA's Partners

WinnDevelopment

Corporate Headquarters
Six Faneuil Hall Marketplace
Boston, Massachusetts 02109

Telephone: 617 742 4500
Fax: 617 742 0725
E-mail: info@winnco.com
Website: http://www.winncompanies.com/

WinnCompanies develops, acquires and manages multi-family and mixed income properties throughout the United States. Since 1971, WinnDevelopment has acquired and developed real estate holdings valued in excess of $1.5 billion. WinnDevelopment enjoys a 30-year history of successful development ventures, which are valued in excess of $1.5 billion. Properties developed range from garden-style apartment communities to medical office buildings to the Millennium Bostonian Hotel, an internationally recognized luxury hotel at Faneuil Hall in Boston.

A more recent focus for WinnDevelopment is the acquisition and turnaround of troubled properties using a combination of innovative financing, government subsidy mechanisms and improved management practices. In addition, WinnDevelopment is presently developing several highly visible and complex mixed-use projects in Boston. Winn is the seventh largest apartment management company in the United States.

NMHC 50 Largest Apartment Managers (Rankings)

2011 NMHC 50
50 Largest U.S. Apartment Managers as of January 1, 2011

Manager Rank 2011	Manager Rank 2010	Company Name	Units Managed 2011	Units Managed 2010	Corporate Officer	HQ City	HQ State
1	3	Greystar Real Estate Partners, LLC	187,360	153,819	Robert A. Faith	Charleston	SC
2	2	Riverstone	162,182	178,431	Walt Smith	Dallas	TX

3	1	Residential Group Pinnacle Family of Companies	151,367	183,877	Stan Harrelson	Dallas	TX
4	5	Lincoln Property Company	133,425	132,881	Tim Byrne	Dallas	TX
5	4	Equity Residential	129,604	136,843	David J. Neithercut	Chicago	IL
6	6	AIMCO	117,119	129,715	Terry Considine	Denver	CO
7	8	WinnCompanies	84,817	73,302	Samuel Ross	Boston	MA

Board of Directors

- Michael Putziger Chairman
- Samuel Ross Chief Executive Officer
- Lawrence Curtis President, WinnDevelopment
- William Wollinger President, WinnResidential
- Marvin Siflinger Director
- Daniel Willert General Counsel

WinnDevelopment

- Lawrence Curtis, President
- Gilbert Winn, Managing Principal
- Adam Stein, Senior Project Director
- Elizabeth Fish, Project Director
- Rachel Edwards, Vice President Acquisitions
- James Harger, Vice President
- Darien Crimmin, Vice President of Energy and Sustainability
- David Thunell, Construction Coordinator

New York City Energy Efficiency Corporation (NYCEEC)

110 William Street
New York, NY 10038
Email: info@nyceec.com
Website: http://www.nyceec.com/

NYCEEC's mission is to support New York City's energy and climate action goals by catalyzing an energy efficiency retrofit financing market for private building owners. NYCEEC is an independent, non-profit financial corporation established by New York City to assist the City in implementing its Greener, Greater Buildings Plan and to advance the goals of PlaNYC. NYCEEC's mission is to support the City's energy and climate action goals by catalyzing an energy efficiency retrofit financing market for private building owners.

To achieve its mission, NYCEEC partners with banks, community development financial institutions and energy services companies to provide financing products for energy efficiency and clean heat improvements in buildings throughout the five boroughs of New York City.

NYCEEC is financially supported by the Energy Efficiency and Conservation Block Grant Program under the American Recovery and Reinvestment Act of 2009, and by private philanthropic foundations. NYCEEC receives generous financial support from the Rockefeller Foundation, the Kresge Foundation, the Deutsche Bank Americas Foundation, and the Living Cities Foundation.

Board of Directors

Management

- Susan Leeds - Chief Executive Officer
- Posie Constable – Director, Clean Heat Finance
- Christopher Diamond – Director, Engineering and Technical Analysis
- Fred Lee – Director, Legal Affairs and Finance
- Jessica Luk - Associate Director, Business Development and Finance
- Crystal Mayanja - Associate Director, Operations and Administration

Product Overview

NYCEEC typically works with banks and energy services companies to help them provide financing solutions that best suits a property owner's needs. NYCEEC can also make loans to building owners for large energy retrofit projects.

- Building owners – NYCEEC provides information and financing expertise to help inform decisions about investing in energy efficiency and clean heat conversions.
- NYCEEC can provide unsecured or partially secured loans to large building owners (generally over 50,000 square feet) to finance retrofit measures and clean heat projects.
- NYCEEC can assist building owners in exploring alternative financing solutions to help them complete projects.
- Financial institutions -NYCEEC is a source of mission-specific credit enhancement and debt capital to help mitigate risk and incentivize lenders to provide financing products for energy efficiency and clean heat projects. NYCEEC is interested in developing partnerships with lenders and investors that are seeking to commit capital to energy efficiency and clean energy financing.
- Vendors and energy services companies – NYCEEC's financial products are an important tool for product vendors and service providers who are designing, installing and monitoring efficiency and clean heat retrofit measures. NYCEEC's financing solutions – including loans and credit enhancement – can facilitate energy efficiency projects that would otherwise remain unfunded.

Eligible buildings

Existing buildings in all five boroughs of New York City are eligible, with a focus is large buildings – generally defined as at least 50,000 square feet – in the multifamily, affordable multifamily, commercial and institutional sectors.

NYCEEC financing is not available to buildings that are owned and operated by state, local or federal government, or to buildings located outside of the City of New York.

Financing is available for:

- Installation of energy efficiency measures in existing buildings
- Inclusion of energy efficiency measures in building rehabs or tenant fit-outs
- Fuel conversions, under the City's Clean Heat Initiative, from #6 or #4 heating oil to ultra-low sulfur diesel or natural gas
- Building-sited combined heat and power systems that are part of an energy efficiency retrofit

NYCEEC will finance projects that are designed to save at least 15% energy, as demonstrated by a recent ASHRAE level II audit.

Local Initiatives Support Corporation (LISC)

95 Berkeley Street, Suite 301
Boston, Massachusetts 02116
Telephone: (617) 338-0411
Fax: (617) 338-2209
Website: http://www.lisc.org/

The Local Initiatives Support Corporation (LISC) helps community residents transform distressed neighborhoods into healthy and sustainable communities. LISC mobilizes corporate, government and philanthropic support to provide local community development organizations with:

- loans, grants and equity investments
- local, statewide and national policy support
- technical and management assistance

LISC is a national organization with a community focus. LISC is formally announced on May 23, 19890 with a $10 million capital pool from the Ford Foundation, Aetna Life & Casualty, Atlantic Richfield, Continental Illinois Bank, International Harvester, Levi Strauss & Co., and Prudential Insurance Co. Mike Sviridoff becomes LISC's first president and Robert D. Lilley, retired president of AT&T, becomes Chairman.

Board of Directors

- Robert E. Rubin (Chair) - Former U.S. Treasury Secretary (Board chair since 1999)
- Greg Belinfanti – Partner, One Equity Partners
- Kevin Johnson – Mayor, City of Sacramento, CA
- Kelly Caffarelli – President, The Home Depot Foundation
- Lynette Lee - Executive Director (retired), East Bay Asian Local Development Corporation
- Lisa Cashin -
- Ronald Phillips – President, Coastal Enterprises
- Audrey Choi - Managing Director, Morgan Stanley
- Andrew Plepler - Global Corporate Social Responsibility Executive, Bank of America
- Mary Crego - Senior Vice President, State Farm
- Rey Ramsey - President & CEO, TechNet
- Larry H. Dale - Chairman, The National Equity Fund, Inc.
- Don Randel – President, Andrew W. Mellon Foundation
- Michelle de la Uz - Executive Director, Fifth Avenue Committee
- Rip Rapson - President & CEO, The Kresge Foundation
- Tom Espinoza - President & CEO, Raza Development Fund
- Michael Rubinger - President & CEO, Local Initiatives Support Corp.
- Dean Esserman - Chief of Police, New Haven Police Department
- George H. Walker - Chairman & CEO, Neuberger Berman Group

- Pamela P. Flaherty - Director, Corporate Citizenship, Citi; President & CEO, Citi Foundation
- Seth H. Waugh - Chief Executive Officer, Deutsche Bank Americas
- Lisa Glover - Senior VP & Director of Community Affairs, U.S. Bank
- Bernard Winograd - Chairman of the Executive Committee, Local Initiatives Support Corp.
- Colvin W. Grannum - President, Bedford Stuyvesant Restoration Corporation

Executive Leadership

Michael Rubinger - President & CEO
Tobin Levy - Executive Vice President & CFO
Michael Levine - Executive Vice President & General Counsel
Tina Brooks - Executive Vice President for Programs
Mary Jo Allen - Senior Vice President, Human Resources
Matt Josephs - Senior Vice President, Policy
Geraldine Baum - Senior Vice President, Marketing & Communications
Greg Maher - Senior Vice President, Lending
Joe DiFilippi - Senior Vice **P**resident & Chief Information Officer, Information Technology
Stephen Sagner - Senior Vice President, Foundation & Corporate Relations
Joseph Hagan - Senior Vice President, LISC; President & CEO, NEF, Inc.

Lending
LISC is a Community Development Financial Institution (CDFI) that offers financing during all stages of projects — predevelopment, property acquisition, construction, and permanent. They seek to strike the right balance between taking risks consistent with their role as a charitable lender, and recovering their capital so they can make funds available to future projects. Following are some examples of loan products:

- Pre-Development Loans
- Acquisition Loans
- Construction Loans
- Mini-Permanent Loans
- Revolving Working Capital Loans and Lines of Credit

October 2011

Proposal Abstract

The need to facilitate effective investment of private capital to improve the energy efficiency of low-income multifamily housing is one of the greatest persistent challenges in the multifamily industry. Designed to encourage new solutions and promote private sector investment, HUD's Energy Innovation Fund will award up to $7.5M for selected programs to leverage private capital and promote innovative solutions that are scalable, replicable, and in effect "game changers." The practical vision shared in this proposal offers HUD a market-driven solution, combining the efforts of renowned industry leaders with the potential to transform the landscape of energy financing, and bring much needed capital to retrofit Assisted Housing.

At the core of this proposal lie two areas of innovation:

1. A funding mechanism providing secured private capital to finance efficiency projects in low income, assisted multifamily properties, and
2. A collaborative service delivery mechanism designed to increase transparency, competition, quality, and capacity of the multifamily building energy services industry.

The funding mechanism will combine capital from Local Initiatives Support Corporation (LISC), Bank of America, WinnCompanies, the State of Connecticut, and NYC Energy Efficiency Corporation to establish a dedicated loan fund for multifamily efficiency upgrades, including renewable energy, which minimizes risks for lenders while creating effective ways to leverage private capital. This "Multifamily Energy Loan Fund" (MELF) will be managed by LISC and will primarily lend to a single energy services provider responsible for identifying and executing eligible projects, using energy savings performance contracts or power purchase agreements with each property included in the service areas of CT, NY State, NYC, MA, ME, and VT. Because loans will be made to an intermediary and off the balance sheet of each property, the fund will eliminate many barriers to traditional multifamily efficiency financing. This financing and service delivery model will be shared beyond region, assimilating best practices, tweaking the model to incorporate lessons learned, and then replicating.

There are two main methods of credit enhancement provided to this fund, which will be supported with HUD EI Funds. First, an innovative insurance product offered by Energi and reinsured by Hanover Re, will insure against loss through coverage for each project's energy savings guarantee. An energy savings guarantee is a common requirement of an Energy Savings Performance Contract, but by itself does not typically satisfy as loan collateral. This insurance policy not only insures against loss if those projected energy savings are not realized, but also helps to standardize the methodology used to model future energy savings through appropriate energy-specific underwriting. This Energy Services Warranty (ESW) provides a new mechanism

to effectively limit the risk of loss for lenders, and removes the risks that energy savings will not materialize.

Second, the fund will be backed by a loan loss reserve. HUD will provide primary funds for this loss reserve, and we have negotiated additional loan guarantee through the Connecticut Energy Finance and Investment Authority for projects located in Connecticut, and further credit enhancement funds from New York City's Energy Efficiency Corporation. The specific term requirements of the fund will be developed collaboratively with LISC and other participating partners, and the fund will be governed by an independent board, including lenders, policy makers, consultants and owners.

Because existing debt and complex partnerships limit the ability of low-income properties from adding new debt to finance efficiency improvements, our proposed financing approach focuses on an off-balance sheet option. Through Energy Savings Performance Contracts (ESPC) and insured savings guarantees, a third party energy services integrator – the Open Market ESCO – will borrow funds to finance the efficiency or renewable energy project on behalf of the multifamily property owner. HUD EI Funds will facilitate a new platform of efficiency investments, while private capital will be leveraged into a specific energy retrofit fund.

The proposed multifamily efficiency fund will be integrated with an "open-market" energy services company (ESCO), managed by WinnCompanies, to deliver turnkey energy services to selected properties. The Open Market ESCO will establish a qualified contractor network and develop specific bidding procedures to engage contractors, creating a new platform for energy service delivery. This open market concept proposes that a qualified contractor network, properly coordinated, can significantly support the effectiveness of a dedicated energy loan fund, while delivering job growth benefits to a regional economy. Using energy performance contracting as the bridge to connect capital with the capacity to execute efficiency projects, the Open Market ESCO will bring innovation to the energy services industry, while increasing competition, transparency, quality of work, and capacity in the workforce.

The proposal put forth to HUD combines secured financing with a mechanism to grow capacity in the multifamily energy services sector and improve project execution. By doing so, we are establishing a new model of public-private partnership that can be applied throughout the industry. In essence, we are leveraging capital with capacity.

The primary types of properties to be served are income restricted multifamily properties with between 40-300 residential units per property. We expect to retrofit approximately 1,200 units, with an average cost per unit between $4,000- $9,000. A pipeline of prospective properties will be developed through targeted outreach across both LISC's and WinnCompanies' portfolios of non-profit and for-profit clients. The primary outcomes of this pilot demonstration will demonstrate a model in which Energy Savings Performance Contracts

can be utilized on assisted multifamily housing. Additional outcomes include direct energy and cost savings benefits to properties and residents.

As demonstrated by numerous past partnerships with HUD and other federal agencies, both LISC and WinnCompanies are familiar with the programmatic and reporting requirements of Federal grants. Appropriate resources will be allocated to ensure proper documentation and reporting throughout the performance period. Additionally, a detailed work plan has been proposed, which outlines specific milestones and timelines for each activity proposed.

It is our belief that greater cooperation and collaboration across various sectors of the multifamily and energy industries are needed to create effective solutions to persistent challenges. It is in this spirit of collaboration and creative problem solving that we put forth an approach that can be replicated across the energy finance industry.

Summary

Total dollars of grant funds requested by applicant = $5,250,000

Primary Matching funds	**$11,500,000**
a. Local Initiatives Support Corporation	$4,000,000
b. Bank of America	$4,000,000
c. WinnCompanies / NRG Solutions	$1,000,000
d. CT Clean Energy Finance & Investment	$2,500,000

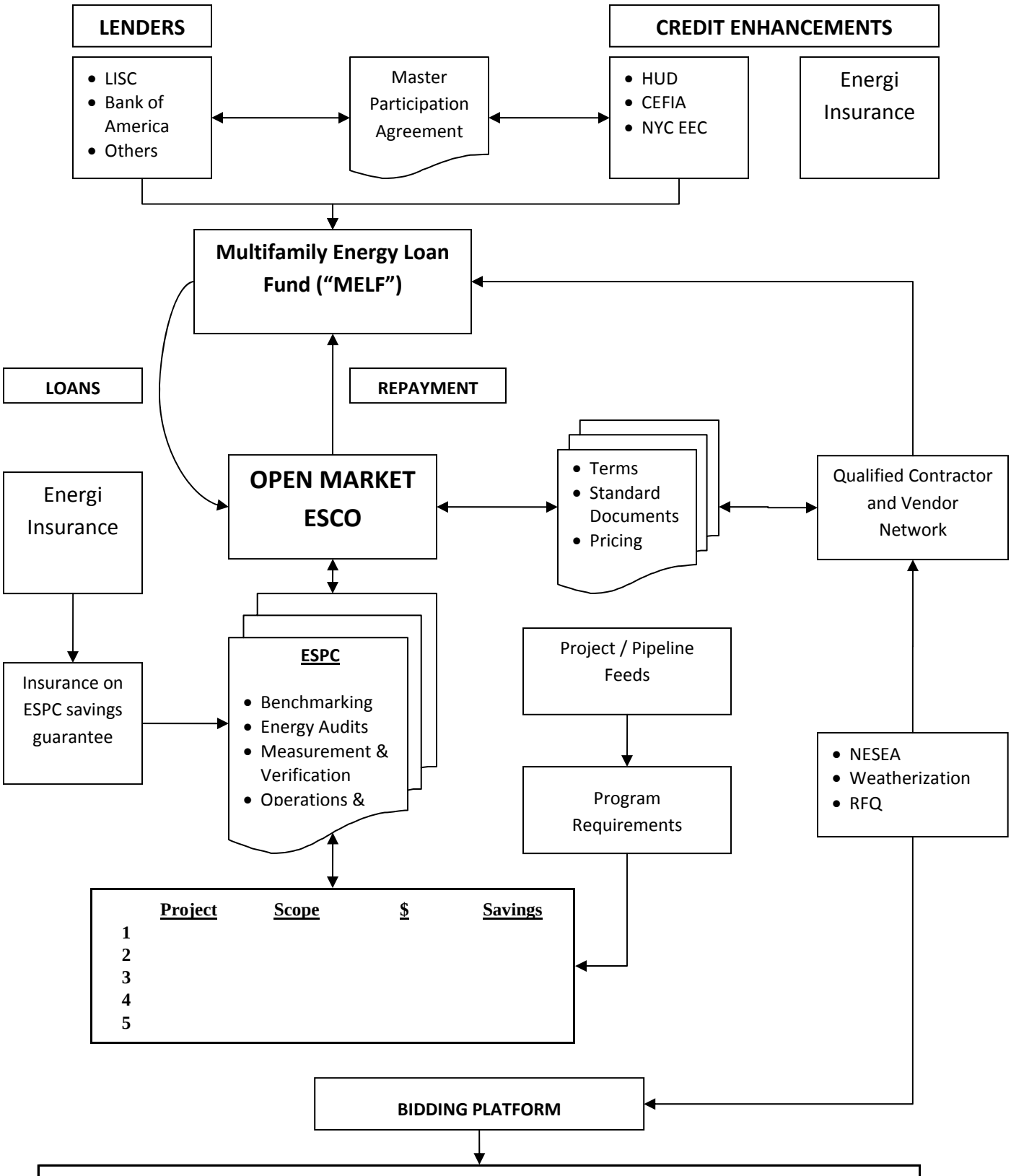
Additional leveraged amounts

a. New York City Energy Efficiency Corp.	$1,000,000
b. Imprint Capital	$2,500,000

Proposed Use of the HUD IE Fund Award

a. Loan Loss Reserve
b. Insurance on Energy Savings Guarantees
c. Project Technical Support
d. Project Technical Assistance
e. Administration

Open Market ESCO – Financing Demonstration – HUD Energy Innovation Fund



	C(x)	Solar	Insulation	Audits	MEP	Mech / HVAC	Other Services
1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1
2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2
3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3
4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4
5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5

Rating Factor 1 – Relevant Experience and Capacity (25 points)

Management team and key staff

Few organizations have demonstrated the capacity and leadership within multifamily housing as LISC and WinnCompanies. Each organization has become successful through years of dedication, industry collaboration, and creative problem solving. This current partnership effort reflects an integration of both mission driven and business driven philosophies, which is essential to create effective sustainability solutions.

The management team and key staff leading this proposal include:

- Lawrence Curtis, President WinnDevelopment
- Darien Crimmin, Vice President of Energy and Sustainability, WinnDevelopment
- Tina Brooks, Executive Vice President, Local Initiatives Support Corporation (LISC)
- Greg Maher, Senior Vice President for Lending, Local Initiatives Support Corporation
- Madeline Fraser-Cook, Program Director, Green Development Center, LISC

The experience of the management team spans decades of leadership in both private, non-profit, and governmental roles, including significant experience related to efficiency upgrades in multifamily housing.

Lawrence Curtis is the Managing Partner and President of WinnDevelopment. As Managing Partner and President for WinnDevelopment, Mr. Curtis leads a full range of real estate development and acquisition activities for WinnCompanies, a Boston-based firm with over 80,000 residential units under management in 23 states across the country. While maintaining a wide range of real estate interests, Larry's primary focus has been on the creation of affordable housing and historic rehabilitation. Larry is immediate past Chairman of the Board of Directors of the National Housing and Rehabilitation Association, a Director of National Multi-Housing Council and a Director of CHAPA. Larry was the 2006 Chairman of the Greater Boston Real Estate Board. Larry has received numerous awards, including the Paul E Tsongas Award for Preservation Massachusetts. Larry received a Bachelor's degree from Cooper Union for the Advancement of Art and Science in New York and a Master's degree from Harvard University Graduate School of Design.

Darien Crimmin is the Vice President of Energy and Sustainability at WinnDevelopment. Darien is responsible for managing energy efficiency projects across Winn's expansive portfolio of residential properties. Recent greening efforts include the installation of 1 MW of solar photovoltaic, numerous HVAC and insulation efficiency upgrades, water conservation improvements, and extensive training for Winn management and maintenance staff.

Darien has also supported WinnDevelopment's current undertaking of the largest residential Deep Energy Retrofit of its kind in the country, at Boston's Castle Square Apartments. Castle is enrolled in HUD's Green Retrofit Program, and is expected to deliver over 70% energy savings after renovation is complete. In addition, Darien has supported the achievement of LEED Platinum certification in affordable and historic developments. Prior to joining Winn Development, Darien Crimmin worked for Harvard University's Office for Sustainability and managed the University's Green Building Services. He was also a Teaching Fellow and Thesis Director at Harvard University in 2007 and 2008.

Tina Brooks is Executive Vice President for Programs for the Local Initiatives Support Corporation (LISC). LISC is the nation's largest community development support organization. Before coming to LISC, Tina was appointed by Governor Deval Patrick to serve as Undersecretary for Housing and Community Development and Director of the Department of Housing and Community Development (DHCD) for Massachusetts. Under her leadership, Massachusetts reinvigorated its community development agenda. Tina oversaw the strengthening of the state's public housing portfolio, the efficient investment of state and federal housing resources to preserve and produce affordable housing and expand housing responses for extremely low-income households and the homeless in the face of declining national economic trends. Tina also directed DHCD to pursue a number of initiatives advancing the economic development of Massachusetts communities from Gateway Cities programs to IDAs.

Gregory Maher is Senior Vice President for Lending at Local Initiatives Support Corporation (LISC), the nation's largest community development support organization. He has been a member of LISC's Credit Committee since joining the company in 1990, and has made over fifty presentations nationally on a diverse range of community development topics, including new markets tax credits; joint ventures between nonprofit and for-profit entities; tax-exemption issues for community development corporations; green community development; and LISC's underwriting guidelines. In 2006 Mr. Maher founded LISC's Green Development Center (GDC), an effort on the national level to bolster green development support strategies throughout LISC's local program network.

Madeline Fraser Cook, Program Director for the Green Development Center at the Local Initiatives Support Corporation (LISC), is an urban planner with a strong commitment to greening community based economic development. Her focus at LISC has been to fully integrate green issues into LISC's comprehensive community development approach. With more than a decade working specifically on green affordable housing issues, Ms. Fraser Cook has co-authored the ground-breaking report, *The Costs and Benefits of Green Affordable Housing*, was the director of the Massachusetts Green CDCs Initiative, provided direct technical assistance to housing developers on green affordable housing best practices, and has been an

active voice for promoting full integration of affordability and sustainability in our nation's housing stock.

Organizational Experience

More than 30 years ago, the Ford Foundation founded the Local Initiatives Support Corporation (LISC) to create and strengthen community development corporations (CDCs) and Community Housing Development Organizations (CHDOs) to become pillars of revitalization activities in their neighborhoods. LISC has evolved to become the nation's largest community development intermediary – while maintaining its unique structure with staff based in 30 cities and serving 62 rural communities spanning 39 states. Because of this long-standing presence in the communities we serve, LISC is the trusted partner able to capitalize on its in-depth knowledge of resident priorities, local leadership, and partnership opportunities to bring together a diverse, yet complementary, array of public and private financial resources to drive comprehensive neighborhood revitalization strategies forward in the nation's poorest communities. With an investment of $9.6 billion, LISC has leveraged $29.5 billion from public and private sources to build the capacity of CDCs and CHDOs to create 253,000 affordable homes, 38.5 million square feet of retail and community space, 225 playing fields for more than 420,000 kids, 132 schools serving 46,200 students, and 157 childcare facilities for 16,500 children.

From its beginnings in 1971 with the development of a 250-unit apartment building, Winn Companies has grown into a nationally recognized owner, developer, and manager of real estate. With headquarters in Boston's historic Faneuil hall Marketplace, and regional offices throughout the country, WinnCompanies' portfolio of properties extends from New England to the West Coast and from the southeast to the northeast. WinnCompanies has excelled in large and small scale development and management operations in urban and suburban settings, from spearheading urban redevelopment to delivering quality housing to small town America. Recently WinnCompanies has become an industry leader in the redevelopment of historic building into housing with a specific focus on Green Building and Sustainable Development practices. WinnCompanies is now the seventh –largest manager of apartments in the country.

In more recent years, WinnCompanies has stayed especially attuned to improving energy and water efficiency and producing its' own electricity from solar technologies in its housing developments. Through comprehensive energy audits, building envelope and HVAC upgrades have been implemented at various Winn developments. Winn has implemented a policy of using Energy Star lighting and appliances at all of its new renovation projects and has begun upgrading its older developments. In addition, Winn is piloting an effort to transition to low-water, low maintenance landscaping at its sites. Winn has developed its own a green operations and maintenance manual, implementing policies on water assessment, energy assessment, cleaning material and practices, recycled materials, maintenance products, waste

reduction, recycling and disposal, laundry equipment, air-conditioning, best practices in offices, landscaping and watering, pest management and painting. Winn has also become one of the first property management companies to enroll its on-site staff in courses offered by the National Apartment Association's Credential for Green Property management (CGMP) program.

WinnCompanies is fully committed to developing affordable energy solutions within affordable housing. As part of Winn's green initiative, NRG Solutions LLC was established in 2009 as a subsidiary of WinnDevelopment, to facilitate energy investment opportunities throughout the Winn portfolio. Through NRG Solutions, Winn has pursued and undertaken numerous weatherization opportunities in partnership with local and state agencies to reduce energy cost burdens for both residents and owners.

Capacity

In addition to decades of traditional multifamily development, financing, and management support, both WinnCompanies and LISC have embraced efforts to improve energy efficiency and adopt renewable energy within their portfolios of assisted housing. Our organizations bring specific experience related to DOE's Weatherization Assistance Program, HUD's Green Retrofit Program, HUD's Mark to Market Green Initiative, and various state and utility based efficiency programs. Over the past few years, both Winn and LISC have moved forward with innovative approaches to financing efficiency retrofits in assisted housing.

Local Initiatives Support Corporation - Green Development Center

For nearly eight years, LISC has become deeply involved in efforts to accelerate the use of green design, construction and management principles in the built environment of low-income neighborhoods. Our work has focused on providing financing, training, partnership development and technical assistance to create green affordable housing. While our green work has grown to impact significantly more than just buildings, green affordable housing remains a central component of our work. Since 2004, LISC has invested over $665 million in grants, loans and equity to help develop over 20,000 units of green affordable housing. Our projects run the gamut of residential development: new construction and preservation rehabilitation; rental, homeownership and mixed-use; single-family and multi-family. Our national rural program and all of our 30 local urban offices have supported green projects, and our National Equity Fund (NEF) affiliate has also developed a robust pipeline of green projects as a nonprofit syndicator of Low Income Housing Tax Credits and New Markets Tax Credits.

The Green Development Center- a national program at LISC- provides three different kinds of financial tools to support local projects along the development continuum. First, it provides green planning grants in order to intervene at the early stages of projects and ensure an integrated design process that maximizes green potential. Further, the GDC provides green construction grants as well as financing through a Green Loan Fund to help project sponsors

cover the incremental costs of greening their projects. LISC's lending department, led by Greg Maher the founder of LISC's Green Development Center, is committed to advancing green innovation in financing.

In addition to its financial resources, the GDC offers an array direct technical assistance and educational support. Combined with the green grants and loan program, these activities are critical to the greening of buildings in low income communities. A number of publications have been created to support the integration of green principles into the work of affordable housing practitioners.

The threat to affordability posed by skyrocketing utility bills provided the impetus for LISC to partner with Enterprise to form the Community Weatherization Partners, LLC (CWP). In early 2010 CWP entered into a $15 million Weatherization Assistance Program (WAP) contract with the NY State Division of Homes and Community Renewal (HCR) to weatherize over 2,200 multifamily housing units, using funding provided by the American Recovery and Reinvestment Act (ARRA). Through this initiative, LISC NYC will weatherize 1,033 units in sixty buildings, providing energy-efficiency retrofits to CDC-owned and managed housing that was developed with Low Income Housing Tax Credit (LIHTC) investment and various city subsidies.

Through WAP, each multifamily building undergoes an energy audit, in which technical providers inspect the building and analyze historical energy and cost information to determine the most efficient retrofits. CWP staff and consultants oversee the work in the field through the end of construction, and verify that the weatherization is completed to the prescribed scope of work. Verification is done through on-site systems testing and photographic documentation of post-installation settings and the condition of equipment.

At a national level, ARRA supported weatherization funds have addressed over 80,000 units of low-income multifamily housing, producing lasting savings benefits for residents, agencies, and owners, while putting thousands of contractors to work. A core objective of this proposal is to continue the success of the WAP program, while improving capacity to deliver quality upgrades and facilitate access to private capital. The Open Market ESCO will build on the administrative and workforce capacity that has been developed through the Weatherization Assistance Program. By combining the first-hand experiences of LISC and WinnCompanies with targeted collaboration between Weatherization grantees and sub-grantees in New York, Massachusetts, and Connecticut, best practices from local implementation of weatherization projects will be shared.

WinnCompanies and Sustainability

From multimillion dollar green developments, to dedicated property operations and maintenance, WinnCompanies is a national leader in managing the complexities associated with multifamily housing. Diligence in complying with state and federal regulatory reporting

requirements is one of Winn's strongest attributes. WinnCompanies currently employs over 3,000 professionals in 23 states. The Open Market ESCO will be based in the firm's Boston corporate headquarters, and have access to appropriate company resources and personnel. A financial contribution of $1 million has been committed by WinnCompanies to develop the capacity of this effort. The management team will create a detailed staffing plan to execute the projects identified in this proposal, and has allocated funds to hire two full time personnel.

Executing the activities set forth in this proposal is critical to the program's success. Regardless of how innovative a solution, our team recognizes the importance of effective implementation to ensure property level energy savings are realized. Because the challenge to create a supplemental energy financing program for multifamily affordable housing is so significant, our approach from the beginning is to invite collaboration from leaders across the housing, energy, and finance industries. Because of this intentional effort, we have enlisted a powerful team capable of success.

By growing existing relationships and establishing new dedicated partnerships with industry-leading consultants, Winn will augment its in-house capacity. Specifically, technical expertise will be supported by companies familiar with multifamily energy conservation, including Bright Power, New Ecology, LPB Energy Management, Recap Advisors and Onsite Insight. In addition to these key partners, additional partnerships will be formed as the qualified contractor network is established. Please refer to appropriate attachments for additional information on the capacity and qualification of our partners.

As an example of energy finance innovation, in 2010 WinnCompanies independently partnered with Enterprise Community Partners to create a pilot energy financing mechanism. Through the Winn affiliate NRG Solutions LLC, a Line of Credit was extended by Enterprise Community Partners to pilot a new model of retrofit financing. Basic terms of the Line of Credit include $964,474 10-year note at 3.75%, repaid through 75% of forecasted savings or the amount needed to repay in 120 months (whichever is higher). Additionally, 20% owner equity was required, and was satisfied entirely through utility rebates. To secure the loan, the entire Line of Credit was covered by a personal guarantee from the owner.

This Line of Credit was used in 2011 at a property called the Village at Brookline in Brookline MA, a 307 unit affordable, Section 42, HFA, containing three mid-rise buildings 7-9 stories high, 2-3 story townhomes, parking garage, significant green space, one senior building, and family housing. The scope of work included replacement of oil heating plants in each of four buildings with natural gas condensing boilers; removal of underground oil storage tanks; installation of new pumps and controls to work in tandem with a gas cogeneration system; installation of an internet interface allowing staff to monitor and manage loop temperatures remotely; a lighting upgrade that in common spaces and units; and new refrigerators. Whereas savings are estimated at $140,000 per year, the property will repay approximately $120,000 per year to

NRG Solutions, which in turn will repay Enterprise. As part of the solution, a project management fee was charged by NRG and incorporated into the financing package.

Rating Factor 2 – Soundness of Approach (35 Points)

The Problem in Context

The need to facilitate effective investment of private capital to improve the energy efficiency of low-income multifamily housing is one of the greatest persistent challenges in the multifamily industry. A number of supplementary financing mechanisms exist in the marketplace to support energy efficiency projects, each having strengths and weaknesses, but few are available to multifamily assisted housing. Typical energy financing sources include debt options (such as bank loans, government loans provided by bonds, and utility loans through on-bill financing) and non-debt options (such as operating lease financing and energy service agreements provided by ESCOs or Utilities). Due to various challenges, private multifamily housing has had little success financing efficiency upgrades through either debt or non-debt financing.

Our approach is to enlist support of industry-leading housing, finance and energy experts to collaboratively address the challenges to supplemental energy financing in affordable multifamily properties. With capital support from Bank of America, LISC, CT Clean Energy Finance and Investment Authority, a loan fund will be established with appropriate credit enhancements. The purpose of the fund will be to demonstrate a supplemental financing mechanism to deliver efficiency and renewable projects on qualifying multifamily properties, in which the borrower is the energy services company engaged to execute the work. For participating lenders, the loans will be offered to qualifying projects at a pre-negotiated market rate of return.

The Multifamily Energy Loan Fund will allow a borrower to utilize funds as a service provider to upgrade eligible multifamily properties, but the property owner will not borrow funds. Borrower will essentially be an Energy Services Company (ESCO), but with a more transparent business model that is geared specifically towards the multifamily industry. Utilizing energy savings performance contracts, we will create a mechanism to finance qualifying energy projects through an innovative new service delivery mechanism, that relies on qualified sub-contractor networks. This new service delivery model is called an Open Market ESCO.

Our approach reflects the team's many years of experience owning and operating multifamily affordable housing and a keen awareness of what works and what does not work in the sector, for both the privately-owned stock and public housing. Specifically, our program has been

designed to avoid the pitfalls associated with the largely unsuccessful vehicles created by others in the space, so that the new capital that has been raised can be deployed as intended and the program can operate at lowest possible cost and retrofit as many apartments as possible. Before our approach is fully detailed, an overview of supplemental energy financing, performance contracting, and energy service companies is particularly useful.

Performance Contracts, Assisted Housing, and Energy Services Companies

For decades, Energy Services Companies have served commercial clients across many industries, utilizing a pay out-of-savings paradigm. The primary advantage of contracting an ESCO comes from their ability to delivery "turnkey" energy efficiency upgrades with no owner capital requirement. Whereas the original Energy Services Company invested their own capital and engaged in a direct shared savings model with owners, a typical ESCO today utilizes 3rd party financing through performance contracting, implied energy savings cash flow, and an energy savings guarantee. Most of the successful ESCOs in the US are represented by the National Association of Energy Service Companies (www.naesco.org).

Although many markets are served by ESCOs, 84% of revenues are derived from public and institutional markets, which include K-12 schools, universities, governments, and hospitals. According to a recent LBNL study, ESCO industry revenues in 2008 totaled approximately $4.1 Billion, and are expected to exceed $7.1 Billion in 2011, due to greater government spending through ARRA (Satchwell, et al, 2010). Public housing represented 2% of ESCO industry revenues in 2006, and 3% in 2008. Although public housing has received growing attention from the performance contracting industry, Assisted Housing has not benefited from performance contracts or privately financed ESCO arrangements.

On the surface, financing efficiency upgrades using implied cash flow generated from energy savings is straightforward. The past few decades have seen a surge in activity across various sectors using models that accomplish this successfully. However, there exist persistent and major challenges to develop scalable efficiency financing approaches within Assisted Housing, and those challenges have minimized successful attempts to integrate Energy Performance Contracting in the multifamily market.

For many years, HUD and others have encouraged the retrofit of multifamily housing. However, while many share these energy and water conservation goals, the reality is that it is very difficult to successfully align the interests of all parties and efficiently process and close new loans for these improvements. By far the most successful program has been HUD's Energy Performance Contracting (EPC) program for Public Housing. Under this program, an Energy Service Company enters into performance-based contract with a Public Housing Authority (PHA) to install agreed energy improvements and guarantees a level of energy savings that will

result from the new equipment. The ESCO arranges financing for the work and sizes the loan to pay for the retrofit costs; the savings are used to pay back the loan over time.

While the EPC program has successfully resulted in millions of dollars in new public housing investment, the model does not translate well to privately-owned affordable housing for several reasons:

- Existing Mortgages and Regulatory Agreements. Generally, unlike public housing, most affordable housing properties are already encumbered by one or more mortgage loans. Securing consent of the first mortgage lender, as well as regulators such as HUD, to any new property debt for any purpose has been problematic. The existing lender has a duty to defend the collateral, cannot be compelled to agree to new subordinate debt, and in any case may extract "review fees" as part of the process – driving up the costs for the borrower.

- Partner Consents. Most assisted properties are owned by entities with multiple partners. Unlike Public Housing, where a straightforward board vote can approve proposed new financing, private owners generally must conduct a formal consent process to solicit approval of the partners. This may be costly in terms of developer effort and legal costs, and as a practical matter, a general partner cannot effectively pursue consent without having first spent significant time and money formulating a retrofit plan. There is no guarantee of a successful vote, as limited partners may have different investment parameters and horizons than the general partner/property manager and may not want to encumber the property with new debt even if it will result in excellent property-level benefits over time.

- Insufficiency of Savings Guarantee. The savings guarantee that is a fundamental component of the EPC program has not proven sufficient, in and of itself, for lenders interested in financing retrofits for privately-owned properties. To secure a supplemental loan, these lenders may also require owner (borrower) guarantees for the savings or repayment of the loan. Most borrowers will not agree to this structure, since non-recourse financing is the norm for virtually all debt on these properties and the borrower cannot completely control the performance of the equipment installed by the ESCO.

- Lack of Transparency and Cost-Effectiveness. The EPC program is most effective with larger PHAs and retrofit plans and, at the ESCO level, is not particularly transparent. Greater transparency will bring the potential for greater cost savings and reduced ESCO fees, and improve the viability and reach of the performance contracting model for smaller initiatives or smaller properties.

Numerous lenders have tried to adopt a performance contracting model for the privately-owned affordable housing inventory. Some have had limited success, but today no program operates nationwide or truly at scale. To address the issues above, many programs have moved from a secondary financing model to a first mortgage financing model. While this eliminates many of the issues – the lender now has a first mortgage and lender consent and savings guarantees are mooted – this approach brings new issues for borrowers. Most notably, some owners can't or won't prepay their existing debt, which may be on very favorable terms, simply to access funds for a retrofit. And, as the first mortgage loans are much larger than supplemental loans to address energy conservation, the transaction costs incurred by the owner (particularly traditional closing costs such as third party and legal fees, title and recording, etc.) may be much larger.

Our team understands the promise of supplemental retrofit financing from many years of ownership, management, lending, consulting, and retrofitting experience with assisted and public housing. We propose to build off of this experience to overcome the lender, partner, efficiency, and transparency issues associated with supplemental loans and performance-based contracting, and create a demonstration program that can ultimately work throughout the country for privately-owned affordable housing properties and those PHA properties (smaller, rural) for whom this initiative would be superior to the EPC program.

The Open Market ESCO Innovation

There exist distinct differences between the energy service providers currently operating in the multifamily marketplace and large national ESCOs. Energy services for multifamily Assisted Housing are currently provided by a host of diverse companies, ranging from mid-size HVAC mechanical firms, to specialized multifamily energy auditors, to small scale plumbers, engineers, architects and electricians. The diversity of this marketplace is a result of various economic development opportunities at the state and federal level.

In contrast, ESCO activities are distinct from activities of most other efficiency contractors (such as firms providing HVAC services, insulation, window replacements, lighting upgrades, etc) in that ESCOs have the capacity to use energy performance contracts with savings guarantees. Compared to a highly diverse network of weatherization contractors and similar service professionals, the ESCO industry is powered by a few very large firms. According to Hopper et al. (2007), the ESCO market is dominated by eight companies with reporting revenues over $100 million, representing 79% of industry activity.

Through ARRA, a major driver of workforce capacity has been the Department of Energy's Weatherization Assistance Program, which received $5 Billion in funds. Since 2009, Grantees in each state have coordinated training and development of weatherization contractors, and successfully weatherized over 350,000 homes, 85,000 of which were multifamily units. The net

effect of the WAP program is not only measured in energy savings at the property level, but perhaps more importantly, the program has invested in the workforce capacity of hundreds of firms specializing in multifamily energy efficiency projects. Many of these jobs provide employment opportunities to underserved populations, also a priority for this proposal.

WinnCompanies and LISC recognize the capacity for public funding to support 'green workforce' development is at risk due to congressional debates on the federal debt crisis and high government spending. Our proposed energy services bidding platform will create the capacity for private sector financing to utilize existing weatherization contractors to target affordable multifamily retrofits, securing green job creation even if federal weatherization spending is cut.

Connecting a bidding platform to a funding source has many scalable benefits, and once the structure and format for the platform is created, the model could be replicated at many levels. A municipality, for example, could solicit qualified contractors to support the effectiveness of a revolving loan fund. At the state level, this contractor network could help to better administer existing weatherization programs and utility sponsored programs. In the private sector, the model promotes industry best practices, standardization, and competitiveness.

Based on our direct experience, the non-ESCO energy services industry is severely disorganized and inconsistent, despite recent attempts to improve standards and build capacity amongst weatherization contractors. As a result, differences in vendor pricing for specific efficiency work can vary up to 300%, quality control is challenging, and commissioning is not common. In short, the marketplace for a range of energy efficiency services is underdeveloped, non-standardized, and in need of support.

The business model used by many Energy Service Companies is one of a general contractor who retains a few core competencies in-house, but subcontracts many functions to 3rd parties. In general, an ESCO's in-house expertise may include engineering, estimating, project management, product selection (especially building automation technologies), accounting, and performance contracting, while outsourced expertise includes the actual contracts to perform HVAC physical upgrades, water efficiency, commissioning, system maintenance, measurement and verification, etc. We will follow a similar model, while expanding the transparency and competitive process to hire sub-contractors.

The Open Market ESCO will utilize and strengthen existing networks of qualified contractors and subcontractors, while connecting them with performance contracts and innovative financing mechanisms required to retrofit affordable housing. By facilitating both the process through which projects are awarded and the program requirements needed to guarantee savings, an Open Market ESCO will expand the performance contracting option to a competitive marketplace of service providers, and increase the availability of funds to worthy projects.

Barriers and Challenges

Because energy performance contracting in assisted multifamily housing has yet to be programmatically successful, we hope to remain realistic about the challenges. The primary known barriers to a high-volume, cost-efficient energy performance contract financing program for privately-owned affordable housing are noted above, and include:

- Lien priority. Securing approval of second mortgages for retrofit financing has been extremely difficult. Our initiative alleviates this barrier by making the loan to the energy performance contractor rather than the property owner, ensuring that it is the contractor's responsibility to repay the loan, and not encumbering the real estate with a mortgage or lien for the new financing. The program's intention is that existing lender consent will not be required for this arrangement. However, each property's mortgage documents will need to be reviewed to ensure that disclosure or review rights of the existing lender are met. To minimize costs and maintain an efficient program, the team will create template program description, disclosure, and approval documents for use by program participants.

- Owner Downside Protection. The property owner will not be responsible for repaying the new loan but must still be certain that suitable agreements are in place to ensure that the equipment is working properly all at times – borrowers will not risk resident safety and comfort even if it is the contractor entity that is responsible for the savings guarantees and equipment performance. Our program will address these concerns by requiring rigorous performance obligations of the contractors, and embedding these into service agreements between the equipment providers and the property owner.

- Partner Consents. We expect that most property owners will at a minimum seek to disclose the new proposed financing and any owner obligations associated with the retrofit to limited partners. However, depending on the final terms of the financing, formal consent may not be required. In the interest of minimizing costs and maintaining as efficient a program as possible, the team will create template program description, disclosure, and partner approval documents for use by program participants.

- Small Loans. Loans for energy and water retrofits are generally small compared to other types of real estate loans and it is very important to keep processing costs to a minimum. We will draw on the team's extensive program design and lending experience to limit participant costs for the initiative and will employ the Open Market ESCO concept to improve transparency and generate cost savings opportunities, improving the overall economics of the transaction at the property level.

- Project Size. Typical performance contracts executed by national ESCO's tend to be over $2 million, aggregating opportunities from multiple properties and bundling the savings. This

approach works well in some industries, but has been challenging in the private multifamily sector, where each property is owned by a separate entity. The Open Market ESCO will focus on projects over $200,000 but less than $2M. If possible, bundling of projects within a portfolio of properties will be explored.

Implementation Strategy

Our implementation strategy is based off of the activities in the Work Plan. We have identified 7 primary activities and have associated multiple milestones with each, the timelines for completion of which are detailed in the Work Plan Exhibit.

Activity 1 – Establishment of the Multifamily Energy Loan Fund
Activity 2 – Establishment of the Open Market ESCO
Activity 3 – Assemble Contractor Network
Activity 4 – Project Identification
Activity 5 – Program, Performance Contracting, and Legal Compliance
Activity 6 – Energy Project Implementation
Activity 7 – Project Reviews

ACTIVITY 1 - Establishment of a Multifamily Energy Loan Fund (MELF)

To meet the requirements of the HUD EIF, capital contributions from private lenders and credit enhancement from 3rd parties will be used to leverage HUD Energy Innovation Funds. The 2:1 matching amount of private capital currently aggregated is $11,500,000, although LISC and WinnCompanies expect to further grow the amount of private capital to reach a $20 million target. As evidenced by letters of intent, multiple sources of private matching funds will be combined.

Subject to normal underwriting policies and procedures, LISC will provide an initial contribution of $4,000,000 to the Multifamily Energy Loan Fund (MELF) as part of a larger credit-enhanced loan pool, which will blend public and private funds. Bank of America will also contribute $4,000,000. These funds will be used as loan capital to fund efficiency projects through the Open Market ESCO. MELF will be used to make loans to one or more open market ESCOs for qualifying efficiency / renewable energy work on residential multifamily projects in New York City, New York State, Connecticut, Massachusetts, Rhode Island, Vermont and Maine. In addition to being a source of much needed loan capital for MELF, LISC anticipates playing a significant role in the management of it, and also expects to originate a pipeline of projects through the community groups with which it works, and through its affiliate, the National Equity Fund, Inc

Credit enhancements play an important part of this proposal, absorbing a portion of the risk that capital providers must assume when they fund a loan. Credit enhancement will be provided by a number of sources, including a $2,500,000 loan guarantee from Connecticut's Clean Energy Finance and Investment Authority (CEFIA). Additionally, a non-conventional credit enhancement will be purchased through insurance on the energy savings guarantee by Energi. The Energi insurance covers the savings guarantees that the Open Market ESCO will make for each efficiency project. If savings do not materialize as expected as defined in the savings guarantee, claims would be paid to the Open Market ESCO to cover the difference in savings, less a 10% deductable. The cost for this insurance is a one-time premium equal to approximately 4% of energy savings guaranteed, and there is a required 10% reserve deductable paid first on any claim, totaling 14% of energy savings guaranteed. This proposal assumes that the Open Market ESCO will guarantee approximately $10 Million of energy savings over the life of all EPCs, and with related insurance costing $1,400,000.

HUD contributions in the amount of approximately $3,000,000 will be used as a loan loss reserve, the specific terms and conditions of which will be negotiation in collaboration with HUD and all lenders, and facilitated by LISC as the fund administrator. HUD contributions of $850,000 are requested to pay for other eligible costs, including technical assistance related to energy audits, data collection/measurement and verification costs, operations and maintenance plans, and a portion of administrative costs.

Activity 1 requires LISC, WinnCompanies, and all related financial partners to further expand on the Letters of Intent. Specific negotiations regarding terms and conditions of the loan fund are required, and will clarify each party's obligations, management of loan capital and loan loss reserves, loan securities, process to release funds, process for repayment. We expect these negotiations will further the collaborative effort of this proposal, while protecting each party's inherent interests. All financial parties have significant experience negotiating financing arrangements, although this particular arrangement is novel. It is expected that legal counsel will be necessary to complete this milestone.

Furthermore, we will require all financial parties to execute a "Master Participation Agreement" in which each individual lender will be engaged in the formation of MELF. The agreement will clearly commit each lender's contribution and define the terms and conditions of the financing source. Further negotiations and clarifications regarding specific structure of the loan guarantee and other credit enhancements is required by all lenders. As an organization, LISC has significant experience coordinating and layering financing from various sources and will facilitate the process to execute the Agreement. If required, parties may alternatively agree to form a new separate entity to manage loan capital, which will have LISC and WinnCompanies as members. This first milestone will begin immediately upon recognition of EIF award and last

approximately 90 days. It is expected that legal counsel will be necessary to complete this milestone.

In addition to the participation agreement, financing parties will define the terms of ESCO Loan Documents. The Master Participation Agreement will also define how funds will flow from lenders to the Open Market ESCO, including the specific terms of engagement required for the Open Market ESCO and for each project identified. These terms will be included in a standard set of loan documents, negotiated at the inception of the fund. All eligibility factors defined in this NOFA will be included into the Master Participation Agreement and ESCO Loan Documents, and confirmed before a specific project receives funding from lenders. Creating loan documents will follow the same timeline as the finalization of the Master Participation Agreement. It is expected that legal counsel will be necessary to complete this milestone.

To the extent possible, future expansion of MELF will remain a priority beyond the 24 month program term. LISC and Winn will continue to solicit participation from additional lenders to further capitalize the fund and increase capacity. Specifically, the approach put forth in this proposal has received interest from organizations such as Deutsche Bank, Imprint Capital Advisors, the MacArthur Foundation, and Enterprise Community Partners. Finally, the staffing plan required to administer the MELF will be developed by LISC, with support from interested parties.

Activity 2 – Establishing the Open Market ESCO

WinnCompanies will use NRG Solutions LLC as the Open Market ESCO. This entity will be the borrower to the loan fund and coordinate all development and general contracting functions related to energy efficiency and/or renewable energy services. The Open Market ESCO will become the primary interface with each property receiving upgrades, essentially delivering a turnkey service to property owners. In addition, the ESCO will facilitate all procedures required to effectively manage performance contracts, including measurement and verification processes, and operations and maintenance arrangements.

Standard EPC Templates

The Open Market ESCO will create or otherwise adopt standard Energy Savings Performance Contract (EPC) documents to be used in affordable housing. EPCs offer a significant function, in that they connect private financing to the energy savings work being performed, while mitigating the need to add debt to the asset. The general format and terms included in the EPC will be similar to the sample EPC found in the appendix.

There currently exist resources aimed at accelerating the use of EPCs, including efforts to standardize language and content. One particular effort is the “Energy Services Coalition” (http://www.energyservicescoalition.org), a public-private partnership between DOE, State

Energy Offices, and NAESCO, whose mission is to grow the capacity and adoption of EPC. The Open Market ESCO will research and adapt similar EPC tools and resources to the specific types of multifamily efficiency projects targeted through MELF. It is expected that legal counsel will be necessary to complete this milestone.

In addition to the main body of a performance contract, the format for all required schedules, appendices, and exhibits to the performance contract will also be defined. Schedules found in EPCs can be broken down into general categories, as follows:

Savings Guarantee Schedules: Savings Guarantee; Baseline Energy Consumption; Methodology to Adjust Baseline; Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements

Payments Schedules: Final Project Cost & Project Cash Flow Analysis; Financing Agreement and Payment Schedule; Compensation to ESCO for Annual Services; Rebates, Incentives and Grants;

Design and Construction Phase: Description of Project Site; Equipment to be Installed by ESCO; Construction and Installation Schedule; Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment; Standards of Comfort; ESCO's Training Responsibilities

Post-Construction: ESCO's Maintenance Responsibilities; Institution's Maintenance Responsibilities; Facility Maintenance Checklist

More detailed description of these schedules is also found as an attachment in the appendix, courtesy of Energy Services Coalition. The development of transparent and unbiased Energy Savings Performance Contracts is necessary to facilitate owner level agreement.

Data Collection

In addition to the contractual EPC documents, the Open Market ESCO will be responsible for creating standards required for energy auditing, data collection, measurement and verification, and operational maintenance of equipment. The ESCO will establish a sub-grantee relationship with Bright Power to serve as technical consultant to collect utility data and establishing energy auditing standards to be used throughout this program. Bright Power has extensive experience providing energy efficiency audits and related services to multifamily housing, for public, private, non-profit and utility clients. Since 2006, they have completed energy audits and related services on over 600 multifamily properties (13,000+ units) under numerous programs.

Relative to common area and tenant level data collection, the Open Market ESCO will define specific data collection procedures with support of Bright Power. Per the NOFA's requirements and industry best practices, the data collection and analysis will include:

- At least 12 months of pre-retrofit utility data for all owner-paid accounts and, where tenant-paid energy accounts will be impacted by the scope of work, at least 50% of affected tenant accounts. This includes getting signed utility release forms from tenants in order to gain access to this information. The data will be collected in an electronic spreadsheet format (MS-EXCEL), with each available bill for each available account in the appropriate unit of measure for that utility (e.g. kWh for electric, therms/CCF for natural gas, gallons for fuel oil, gallons for water/sewer, etc).

- Occupancy Normalization. Energy consumption will be normalized to 100% occupancy in a similar manner to how Bright Power has conducted this analysis for the HUD M2M program.

- Weather Normalization – We will use heating degree days and cooling degree days to normalize consumption by determining the consumption amount per degree day and multiplying by the average year degree day value. We use Typical Meteorological Year 3 (TMY3) data published by the National Renewable Energy Laboratory for average daily temperature data from the closest weather station to the property, and industry standard base-65 degree days. The first step in weather normalization is to separate out the baseload from the heating and cooling load. We will use a regression algorithm to fit coefficients for energy/HDD, energy/CDD and non-seasonal energy/Day based on the number of days, HDDs and CDDs in each billing period for each fuel type. These coefficients will then be combined with the TMY3 weather data to determine the overall energy usage for a typical weather year, per the following:

$$\textbf{Weather-Normalized Adjusted Usage} = (\text{energy/HDD} \times HDD_{TMY3}) + (\text{energy/CDD} \times CDD_{TMY3}) + (\text{baseload}_{day} \times 365)$$

While Bright Power has developed a proprietary energy benchmarking software tool, called EnergyScoreCards, this tool will not be used in this project (per section 2.b.(2)(c) in the NOFA), unless otherwise requested by HUD. All analysis will be done in a non-proprietary spreadsheet format that will be supplied to HUD. Data analysis will be done in the same way as the Utility Consumption Baseline Analysis that Bright Power has performed for over 100 HUD GRP and M2M projects. We will use the same data collection, analysis and presentation spreadsheets that we use for this program unless otherwise instructed by HUD.

This proposal will also address the often cited split incentive that exists if a landlord does not pay for energy consumed by residents. For properties that have tenant level metering, in which the landlord does not pay utilities, WinnCompanies will work with HUD and local housing agencies to establish clear protocols for developing project specific utility allowances. In many HUD supported properties, adjusting the future utility allowance to reflect increased efficiency, would effectively help landlord charge more rents. This added cash could be applied to the performance contract to pay for the energy improvements. For Low Income Tax Credit properties, the IRS has already approved the ability to adjust utility allowances to promote

greater energy efficiency. The IRS requires each state to formalize a methodology for reviewing and approving changes to standard utility allowances. Winn looks forward to utilizing project specific utility allowances to increase energy savings in tenant-paid utility apartments, and capture the higher effective rents to repay the cost of energy improvements.

Energy Audits

Related to energy audits, WinnCompanies is very familiar with energy audits and green capital needs assessments (GCNA). Recap Advisors will support Winn's evaluation and use of GCNA's for use in this program. The green capital needs assessment is aimed at determining the development's current and prospective physical circumstances, on both a traditional and green basis. A traditional CNA focuses on those capital activities that reasonably can be expected to ensure that a property is viable and in good condition over a twenty-year horizon. In a traditional CNA, it is common for On-Site Insight (OSI) to informally comment on maintenance practices, or suggest discretionary upgrades that might affect operations, marketability, or occupant well being. The GCNA is aimed at more rigorously and more formally identifying green alternatives to conventional replacement of major components and systems.

Both Recap Advisors and Bright Power support the ESCO in define energy audit standards, to be included in the bid packages for energy audit contractors participating in the qualified contractor network. A protocol will be established for evaluating the energy performance and identifying the cost-effectiveness of energy investments. At a minimum, the energy audit standard will use HUD GRP/M2M standards as a base, combined with ASHRAE Level II best practices. A specific energy modeling software, such as TREAT, will be reviewed for applicability. In addition to creating the standard, Bright Power will provide project specific technical evaluation of the energy audits performed by selected energy audit firms. Reviewing energy audits for "reasonableness" of building characteristics and savings calculations will provide quality control and feedback to auditors. Site-visits will confirm the quality and accuracy of the audits; an estimated 25% of properties will be audited.

An important aspect of the Open Market ESCO will be to develop procedures and program requirements related to finalizing the scope of work, bidding process, contract management, construction, and contract documents. These considerations will be weighed against energy savings and project costs. The Open Market ESCO will establish a series of scope review and pricing exercises with auditing firms, engineering firms and sub-contractors to remove variability and finalize assumptions. Once scope and energy savings are finalized, Bright Power will also provide the interface between the energy auditing results and the review of savings calculations by Energi. Once Energi confirms that the scope and energy savings have been reviewed, the project's savings guarantee will be established.

Measurement & Verification

The Open Market ESCO will establish an energy savings Measurement and Verification Protocol using a technical assistance provider. The protocol will reference appropriate industry standards to collect and analyze actual utility bills over the course of the performance contract, a period between 7-12 years following the installation of the ECMs. The utility data will be collected and analyzed as described in the "Data Collection and Analysis" section. It will include at least 12 months of baseline pre-retrofit consumption data as well as at least 8 months of post-retrofit consumption data. (We will attempt to get 12 months of post-retrofit data but 8 months is sufficient to evaluate performance in all seasons.) The occupancy and weather normalization enables accurate comparison of the pre-retrofit and post-retrofit energy usage data. The difference between these normalized values represents the savings of the project, within a statistical margin of error, which we will also include in the spreadsheet. This analysis will be performed on a yearly basis for a period of up to 10 years to ensure savings are maintained throughout the term of the performance contract and the savings guarantee is achieved. Bright Power has performed M&V work on hundreds of multifamily projects using similar utility data analysis methodology.

Operations & Maintenance Plan

Bright Power will work with Winn to develop and implement an operations and maintenance plan for the participating properties that is in compliance with the Enterprise Green Communities Operations and Maintenance Plan mandatory requirements. These include:

- **Building Maintenance Manual** - Includes determining scope of manual, gathering data, information, schedules from the proper parties, and collating into a comprehensive document. The manual will also provide specific detail regarding green operations, including integrated pest management and other non-energy related components.
- **Resident Manual** - Includes determining scope of manual, gathering data, information, schedules from the proper parties, and collating into a comprehensive document.
- **Resident and Property Manager Orientation** – Comprehensive walk-through and orientation for residents and property managers to review the project's green features, operations, maintenance and healthy neighborhood amenities. To be done at the same time as the installation verification inspection whenever possible. Property managers and maintenance staff will be empowered to continue to provide information on proper operations and maintenance to new staff and residents.

- **Resident Outreach and Education –** To the extent supported by HUD, resident engagement efforts will be developed to promote energy savings under control of the tenant.

Bright Power is an Enterprise Green Communities Technical Assistance Provider and has worked on a number of Enterprise Green Communities projects. Bright Power will also develop and deliver training to the maintenance staff at these properties, based upon trainings in conjunction with LISC and Enterprise undertaken through the WAP work in New York City that the company has provided in the multifamily sector and based upon BPI EEBO standards.

Activity 3 – Assemble Contractor Network

Behind the Open Market ESCO concept lies the belief that a qualified contractor network, effectively coordinated, can significantly support the work of a dedicated energy loan fund. Our Open Market ESCO will support the development and qualification of such a network. The benefits of a qualified contractor network are significant: enhanced competition, increased accountability, capacity building, quality assurance, etc. From a lender and ESCO perspective, qualification of sub-contractors and vendors mitigates risk. From an agency perspective, transparent bidding procedures will ensure all projects fully vetted. From a contractor's perspective, there is an incentive to provide quality work, in order to maintain good standing status amongst a network of competitors.

To pilot this contractor network, WinnCompanies has chosen to partner with the Northeast Sustainable Energy Association. NESEA is uniquely positioned to assist WinnCompanies in developing a collaborative service delivery mechanism designed to increase transparency, competition, quality, and capacity within the multifamily building energy services industry. Each year, NESEA works with its constituents, more than 22,000 leading professionals in energy efficiency and renewable energy, to plan the premier conference in the Northeast on energy efficiency, renewable energy, and whole systems thinking.

NESEA is poised to leverage the expertise within its professional network to help establish criteria for qualifying contractors for this program, and for selecting integrated design teams. In addition, NESEA has already developed an online directory of professionals involved in sustainable energy projects in the built environment. NESEA's Sustainable Green Pages, http://www.nesea.org/greenpages/), allow building and energy professionals to list their products and services online in a searchable format. The Sustainable Green Pages, already populated with information on almost 300 companies, can be readily adapted to fulfill WinnCompanies' need for an online bidding platform for qualified energy contractors.

NESEA will support the development of an online platform for matching projects coordinated by WinnCompanies as the Open Market Energy Service Company (ESCO) and private contractors. The process will establish anticipated project types, categories of skills, qualifications and contractor expertise most essential to serving multifamily energy projects.

The contractors will be vetted using a certification program to be developed collaboratively among WinnCompanies, NESEA, and other project stakeholders.

The Open Market ESCO will seek specifically to utilize existing weatherization providers to deliver services. Because of LISC and WinnCompanies' good standing relationship with numerous WAP Grantees and Sub-Grantees, the MELF contractor network will maintain a direct connection to current providers. Because technical requirements to address multifamily energy upgrades differ substantially from other commercial buildings, the contractor qualifications will specifically ensure that all providers maintain appropriate training, certifications and designations.

Activity 4 – Project Identification

WinnCompanies and LISC will be responsible for developing a project pipeline at qualifying properties. MELF and the Open Market ESCO will target energy upgrades in 1200 qualifying units. This anticipates that loans will be made to the ESCO for projects that cost between $4,000-$9,000 per unit. The areas being targeted by these funds will predominantly be Connecticut, Massachusetts, Vermont, Rhode Island, New York, and Maine. Through each organizations own assets, and those of affiliates and clients, WinnCompanies and LISC will provide a pipeline of properties to the ESCO for review and consideration. In addition, weatherization grantees and sub-grantees in Massachusetts, Rhode Island, and New York have offered to recommend projects for this program that were not selected for WAP but are otherwise good candidates.

To facilitate project selection and execution, we will identify universal best practices to deliver successful efficiency retrofits. Such a standardized approach begins with a preliminary review of utility bills, energy consumption and cost metrics, and capital needs assessments. Qualifying properties with promising savings receive an investment grade energy audit from an accredited professional, after an open bidding process via the qualified contractor network. The audit defines energy conservation measures (ECMs) and correlated energy savings. This scope of work is refined and verified, and put out to bid. A financial analysis then determines which measures are selected, the sources of funding are identified, and financing is secured as needed. Selected ECMs are designed and specified, and work is contracted to appropriate service vendors. Once work is complete, a commissioning effort ensures upgrades perform as designed, a measurement and verification protocol calculates savings, and a maintenance program is implemented.

Fundamental to the success of this program is the ability to target additional properties with significant energy savings potential. To accomplish this, the WinnCompanies will utilize the technical services of Bright Power Inc. (or a comparative firm) to provide for portfolio energy benchmarking, energy baselines and preliminary energy assessments for each potential

property. To analyze both Winn and LISC's regional portfolios, the technical service provider will be responsible for collecting the property and utility bill data for potential projects, as well as analyzing this data to distill the worst energy offenders, and the best candidates for retrofits. This will be used to establish a usage baseline for evaluating the effectiveness of retrofit efforts in the measurement and verification phase.

We would like to emphasize that this proposal will address real properties throughout Northeast US. Specific properties from Winn's portfolio will be reviewed and targeted, in addition to properties across LISC's investments, including the NEF portfolio. As a frame of reference, Winn currently operates 296 properties in the states being addressed, with a total of 30,973 apartment units (see attached for detailed list of qualifying properties). Combining this with the local offices of LISC's affiliates will yield a hundreds of properties to select for this pilot demonstration.

Specific properties within LISC and WinnCompanies portfolio have already been identified, because their significant energy savings potential is already known. For example, Boston Housing Authority's Eva White Apartments, is situated next to – and in fact encapsulated by – the Deep Energy Retrofit work underway at Castle Square. The building is one of five mid-rise structures connected together with Castle Square on Tremont Street. Although the building appears to be part of the Castle Square property, it is in fact owned by BHA.

Because the energy savings calculations and technical scope of work from Castle Square can be shared with Eva White, there is an immediate opportunity to pilot a performance contract, combined with additional 3rd party funds. A project proforma for the energy work required at Eva White is attached in an appendix. The approximate cost of the work is $2 million, and the estimated annual energy savings resulting from that work equal $40,000. If no additional funds were leveraged, the repayment performance period required to finance the entire $2M would be too long. As a result, significant project level funds have been identified to "buy-down" the amount required to be financed through a EPC.

Activity 5 – Program Requirements, Performance Contracting, and Legal Compliance

This section of the Work Plan focuses on the development of standard documents for legal contracting, reporting, required approvals, disclosures and other compliance necessary during project implementation. Legal compliance includes identifying and meeting all accounting, program income, audit, and regular reporting requirements for the Energy Innovation Fund grant, especially at the project level. In addition to basic compliance and record-keeping, the grantee will document and publicize best practices and case studies for use in promoting the Open Market ESCO model.

A specific barrier to energy efficient retrofits is the need for consent from a variety of parties and the lack of clarity and incentives for such consent. Typical parties needing to consent or

approve of retrofits include senior mortgage lenders, limited partners, other business partners, and government agencies including HUD. As part of creating the Open Market ESCO described in this proposal, the grantee would identify documents and other information required by approving parties, thus streamlining the approval process. As part of this streamlining, the grantee will develop simple and consistent language that can be used to receive such approvals. This phase of the Work Plan will also include drafting and approval of any Extended Use Agreements required as part of the Energy Innovation Fund grant.

The overall activities related to fund administration, including loan financing, will continue well beyond the 24-month grant period. In addition to all HUD reporting requirements, independent reporting procedures will be established to satisfy all interested parties. Nonetheless, the timeframe for activities identified in the Work Plan indicates the period of most intense work in order to obtain approvals and put in place adequate systems to maintain compliance with all legal and grant requirements.

Related to income reporting, WinnCompanies will track program income through special accounts set up in an accounting system. Specific reporting roles and responsibilities will be established as part of the Work Plan. WinnCompanies will report on program income in the federal financial reports - the SF 425s. All disbursements, repayments and earnings on reserves will be track separately by LISC in a system similar to Fundware. This will ensure no commingling of these funds in LISC's general investment pool.

While attempts will be made to streamline and standardize contract formats, each individual property must execute a separate performance contract, including all exhibits related to energy savings guarantees, measurement and verification procedures, etc. Property specific requirements will be integrated into the standard documents as needed.

Activity 6 – Energy Project Implementation

WinnCompanies will develop a streamlined method to contract with all vendors and manage project implementation. Utilizing in-house and 3rd party program administrators, we will effectively manage project delivery. Implementation of efficiency projects will require general contracting and contract management responsibilities for each property serviced. This implementation plan will define a process of assessment, audit, design, specifications, contract management, and commissioning that WinnCompanies has implemented for various energy-related projects. Priority will be given to quality controls, price sensitivity and realization of energy savings.

Quality assurance through hands-on oversight of work will be provided for each project, and a significant emphasis will be placed on project planning, specification review, and contracting to avoid complications during construction. The process to requisition loans and payments to sub-contractors will be clearly defined for each project. After projects complete, an independent

commissioning program will be performed for each measure. The commissioning plan for each project will verify the proper installation and calibration of equipment, and prepare for the transition for operations. In addition to commissioning, the Energi and lender inspections will be required to ensure work is satisfactorily completed.

Activity 7 – Project Reviews

At the end of each project's construction period, the transition to operations and contract performance begins. The ESCO will work closely with property operations and management to ensure the new maintenance procedures are effectively implemented. Training programs will be implemented for site staff, ensuring the capacity to maintain equipment exists. Each project will clearly define responsibilities for proper operations and maintenance. Depending on the capacity of existing staff, the site may be responsible for maintenance. In other cases, the ESCO – with support from 3rd parties and WinnCompanies staff – will provide operations and maintenance support.

During this activity, the ESCO and property owner will implement the measurement and verification protocol designed for the specific project. Payment through the performance contract will commence and savings will be monitored. Simultaneously, the ESCO will begin paying debt service on the MELF loan. The protocols to structure all loan repayments will be supported by accounting services at WinnCompanies and LISC.

Additional Innovation and Replicability

The fundamental innovations presented in this proposal are the performance contract service delivery platform (previously described) and the insurance product covering the energy savings guarantee. The addition of Energi's insurance product allows lenders to secure that portion of risk associated with energy savings guarantees. Perhaps the most promising aspect of the Energi insurance product is its potential application in commercial PACE financing. According to the New York Times, Energi has become an integral member of the PACE Commercial Consortium, an independent non-profit organized by the Carbon War Room and founded by Sir Richard Branson to harness the power of entrepreneurs to unlock solutions for climate change. Specifically, the Pace Commercial Consortium recently announced a targeted $550 Million energy retrofit solution that combines the pioneering insurance partnership between Energi and Hannover Re, with the engineering capacity of Lockheed Martin, the financial sophistication of Barclays Capital, and administration by Ygrene Energy Fund. Although residential PACE programs are not permitted by FHFA, and Fannie Mae has not supported commercial PACE lending, WinnCompanies recognizes significant opportunities to work with state finance agencies and other lenders to create commercial PACE lending programs targeting multifamily assisted housing that utilize insurance on energy savings guarantees.

Reporting Factor 3 – Matching funds and leveraging above matching funds (15 points)

As a requirement for funding, HUD asks for a 2:1 contribution. WinnCompanies has identified the following private capital sources to lend to performance contractor(s) working on low-income housing. Confirmed matching capital sources include:

Organization	Type	Matching Contribution
1. LISC	Private	$4,000,000
2. Bank of America	Private	$4,000,000
3. WinnCompanies	Private	$1,000,000
4. Connecticut CEFIA	Public	$2,500,000

None of the verified sources prohibit those funds from being combined with federal sources.

Leveraging Above Minimum Threshold

The New York City Energy Efficiency Corporation has confirmed that $1,000,000 could be used to add further credit enhancement in support the loan fund. The EEC utilizes approximately $37 million in ARRA funding through the Department of Energy, restricted by to the 5 boroughs of New York. Additional sources of financing are expected to become available to support the confirmed commitments mentioned above. Imprint Capital, for example, is seeking to place mission-driven investments into affordable housing energy investments in the New England area, and has indicated support for the Multifamily Energy Loan Fund up to $2,500,000.

Furthermore, we expect to raise an estimated $5 million in additional funding over the life of the HUD award. Specifically, WinnCompanies is working on collaboration with the following additional entities:

- Deutsche Bank
- Enterprise Community Partners
- MacArthur Foundation
- US Bank

These potential sources are familiar and supportive of this proposal and will be specifically targeted to participate in the loan fund, as part of our effort to grow capacity to retrofit more units and regional scale. The decision-making processes at several potential lenders precluded them from making a firm Letter of Intent commitment pre HUD award.

A number of project specific sources of capital are available through state programs. Specifically, Massachusetts and Connecticut offer renewable energy certificates (solar photovoltaic) and alternative energy certificates (cogeneration). We will explore utilizing these supplemental funds for all applicable projects.

In addition, WinnCompanies will aggressively seek out utility grants, weatherization funds and other sources to "buy down" the cost of improvements and reduce financing burdens. Combining multiple sources of funds is something that the affordable housing industry has excelled at. Existing programs offered by utilities or weatherization programs are only effective for costs that those specific funding sources can sustain. Similarly, financing 100% of the costs associated with energy improvements may require a performance contract and financing terms that extend too far. There exists a price point in which financing and programmatic incentives (project rebates, grants, etc) find a balance.

To the extent required by HUD, performance contracts will require 1:1 matching funds at the property level. It is the experience of Winn and LISC that state and utility sources are available to support this requirement. The pilot financing project at The Village at Brookline, for example, satisfied the minimum 20% owner requirement threshold by utilizing a variety of utility grants.

The extent to which this program can sustain itself beyond the grant period will depend on how effective we can interface and support existing weatherization programs.

Regarding property level matching requirements for performance contracts, the NOFA and HUD's subsequent document "Frequently Asked Questions" (Updated October 14th) appear to be ambiguous as applied to our proposed model. The NOFA states that: "the plan must include a requirement that all properties utilizing financing through the Demonstration obtain additional matching funds at the property level of at least $1 of matching funds for every $1 of Demonstration financing used at the property." The frequently asked questions document states on page 16, "*it is not necessary to demonstrate the 1:1 match at the project level for any activity that is not a loan."* Because the Open Market ESCO will facilitate upgrades through Energy Savings Performance Contracts or Power Purchase Agreements, funds will not be loaned at the property level.

Rating Factor 4 – Low Income Housing Needs (10 points)

With geographic and programmatic expertise, WinnCompanies and LISC will utilize these funds to specifically target low-income areas and properties in need. Both organizations have a history of focusing services on high-need populations. Currently, LISC operates in 30 urban and rural areas throughout the country and Winn manages properties across 23 states, the majority of this work being initiated to help develop and revitalize their surrounding communities. This expansive combined portfolio gives the partnership unparalleled experience and resources that will allow assets to be fully leveraged to benefit the areas that need it most. This new program will focus specifically on the upper Northeast, including Connecticut, Massachusetts, New York and Rhode Island where both organizations have a great amount of experience and support.

LISC's work takes place in communities that are significantly disadvantaged in relation to their metropolitan statistical areas. Focusing on “blighted neighborhoods so they could improve their quality of life”, over the past 30 years LISC has helped create over 277,000 affordable homes and apartments. In 1995, the Rural LISC program was established to further extend their reach into rural areas. In addition to targeting neighborhoods of high need, LISC's work often targets specific groups within the low-income populations living in these communities, including homeless and formerly homeless persons, seniors, ex-offenders, disabled persons, farmworkers and others. We strongly believe that it is precisely these communities and the people that live in them that stand to benefit the most from reduced energy costs and increased comfort associated with energy retrofits.

Partnering with various non-profit and for-profit organizations to manage their portfolio, Winn has found clients with similar goals of revitalizing blighted urban areas and providing homes for low-income residents. Some of Winn’s clients include SWAP, a local organization that matches unwanted housing with owners in need to avoid abandoned buildings and further blight, Harlem Congregations for Community Improvement, Inc., devoted to the holistic revitalization and empowerment of their community, and Codman Square Neighborhood Development Corporation who aim to foster stabilization of the community through real estate, economic and community development. See attachment in appendix for a full list of clients.

WinnCompanies currently manages almost 500 multi-family housing properties. The Northeast region that these funds will be directed to includes about 300 properties containing over 30,000 units. Almost 90% of these are low-income properties and through thorough evaluation and review, the low-income properties with the highest needs will be identified for project implementation. In addition to the properties that qualify through LISC’s local partner CDC’s portfolios, NEF’s portfolio in the Northeast alone brings the potential for over 400 properties with over 24,000 units that could theoretically benefit from access to a program such as the one we propose. Adding to the list of affordable housing that would qualify are those projects that come through LISC’s Affordable Housing Preservation program.

Once potential projects are identified, each of the eligible properties will be thoroughly reviewed for Low Income Housing Tax Credit compliance and extended use agreements. To be considered, properties will be required to have extended use agreements already in place that meet the minimum ten-year requirement. Properties with longer terms of use agreements will maintain priority over all others. Since the Low Income Housing Tax Credit requires compliance for an initial 15-year compliance period and a 30-year extended use period, it can be assumed that the majority of these properties will have extended affordability periods of at least 15 years and therefore be eligible for participation, and in fact exceed the 10 year minimum. All Section 8 properties, in order to participate, will be required to create an extended use agreement as well. Evidence of all such terms for each property will be provided in order for participation in the program. Furthermore, we assume that between 75%-100% of units targeted will meet the 80% AMI threshold.

Rating Factor 5 – Sustainable Solutions (15 points)

Measuring the energy savings and positive environmental attributes due to this program will be closely tied into the measurement and verification plans. As a requirement for receiving the services of the Open Market ESCO for an EPC, properties must have undergone a preliminary review of energy efficiency status. Whether the owner uses proprietary benchmarking software or a publicly available one, the property needs to exhibit the potential of exceeding the 20% energy use reduction target in order to qualify for the services. Because the portfolio of properties we are targeting will have been screened to isolate the best candidates for efficiency upgrades, energy savings will exceed the 20% threshold, and we assume 25% savings. Based on experience with retrofits within WinnCompanies portfolio, this is very realistic.

Although propriety data systems such as WegoWise and Energy Scorecards are discouraged in the NOFA, the energy savings and related environmental benefits would be easily quantifiable using such tools. At HUD's discretion, we will correlate energy savings (therms, BTUs, KWH) in to metric tons of carbon dioxide equivalent (MTCDE) using appropriate conversion factors. Because electricity not used at the property level, in fact also saves on the fuel used to create and distribute the electricity from power plants, we will calculate both local and aggregate GHG emissions reductions.

For purposes of forecasting the energy savings and environmental benefits, Bright Power's sample database of 2000 properties was reviewed. Assuming 1200 units targeted, data shows:

	Energy	CO2	Water
Totals	93000000	15000000	37000000
25% Savings	23000000	3800000	9300000
Units	kBTU/yr	lbs/yr	gallons/yr

Additionally, WinnCompanies has been a leader in controlling energy costs through directly buying energy from suppliers. Negotiating and locking in a fixed rate for electricity, natural gas, and oil supplies helps to stabilize the costs over time, and hedge against price volatility. WinnCompanies has consulted with an independent advisor – not a broker – to develop an energy procurement strategy across multiple states and utilities. For properties engaged through MELF, the Open Market ESCO will evaluate cost containment and price stability through direct deregulated energy supply contracts.

In order to further capacity building and knowledge sharing associated with this program, a number of tools and resources will be created and shared publically. As part of this effort, we plan to develop resources describing the current state of efficiency investments, including a "who's who" of energy related financing efforts. This separate initiative will be called Green Market Finance and seek to document valuable resources for energy financing practitioners and policy makers, and improve upon best practices used throughout the emerging "green

financing" industry. The initial focus of this new website will be the development of a website dedicated to publishing case studies, resources, and relevant information from energy-related loan funds and similar energy financing efforts from across the U.S. There currently does not exist a clearinghouse of case studies related to energy efficiency loan funds, and such a resource would be invaluable to the emerging sector of the energy and finance industries.

A compilation of case studies from a variety of loan products would encourage further research to compare the parameters and attributes of various funds, and distill best practices. The long term vision for this website, in addition to case studies, is to develop tools and market research that can be used to replicate successful energy financing models at various scales. The first case study documented on the website will highlight the collaborative financing pilot between WinnCompanies and Enterprise Community Partners.

For an example of a website developed in connection with a grant received by WinnCompanies, please view www.Castledeepenergy.com. In addition to case studies, this program will further promote best practices used in performance contracting by sharing templates and educational resources with multifamily owners and operators.

In addition, LISC's Green Development Center in partnership with New Ecology, Inc. created an interactive website called *buildingwell.org* (www.buildingwell.org). This website was designed for owners and developers of multifamily affordable housing to be able to access the latest in best practices on green retrofits. It enables them to not only answer some of their most pressing questions on implementation of energy efficiency and greening measures, but it provides a platform for industry interaction and sharing of successes and challenges. All information on the site is independently vetted and discussion forums are monitored for accuracy. This resource is an excellent complement to the proposed work in that it serves not only as a best practices forum, but a forum to expand the ideas and financing models that result from our work.

Open Market ESCO - Financing Demonstration - Work Plan Milestones and Timelines

	Month																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ACTIVITY 1 – Establishment of a Multifamily Energy Loan Fund (MELF)																								
Milestone – Finalize negotiations of terms and conditions																								
Milestone – Execute Master Participation Agreement																								
Milestone – Draft ESCO Loan Documents																								
Milestone – Define loan administration staffing plan																								
ACTIVITY 2 – Establishment of the Open Market ESCO																								
Milestone – Define and/or establish entity and staffing plan																								
Milestone – Develop standard ESPC templates and PPA templates																								
Milestone – Design marketing approach and project pipeline																								
Milestone – Formalize technical assistance, consulting and sub-grantee contracts																								
Milestone – Establish Energy Audit Requirements																								
ACTIVITY 3 – Assemble Contractor Network																								
Milestone – Define anticipated project types and work scopes																								
Milestone – Engage DOE Weatherization Grantees and Sub-Grantees																								
Milestone – Engage NESEA (Northeast Sustainable Energy Association)																								
Milestone – Define Contractor Qualifications																								
Milestone – Solicit Qualified Contractors and Contractor Partnerships																								
Milestone – Standardize terms and format of contract documents																								
Milestone – Create Bidding Platform and Define Bidding Procedures																								
Milestone - Confirm broad and diversified industry participation																								
ACTIVITY 4 – Project Identification																								
Milestone – Review existing portfolios for candidates																								
Milestone – Implement marketing and outreach efforts																								
Milestone – Conduct energy benchmarking and preliminary audits																								
Milestone – Conduct energy audits of anticipated projects and work scopes																								
Milestone – Initial Pricing Review																								
Milestone – Specifications and Design Development																								
Milestone – Final Savings Review by Energi Insurance																								
Milestone – Final Pricing Review																								
Milestone – Secure pipeline of feasible loans sized to MELF capacity																								
ACTIVITY 5 – Program, Performance Contracting, and Legal Compliance																								
Milestone – Project Compliance Review																								
Milestone – Creation of Templates for Project Owners/Managers																								
Milestone – Develop Extended Use Agreements																								
Milestone – Assist Project Owners in meeting disclosure/consent regs. (ongoing)																								
Milestone – Satisfy Quarterly and Annual HUD Reporting Requirements																								
Milestone – Modify standard ESPC into final contract																								
Milestone – Finalize all exhibits to ESPC																								
Milestone – Legal review/approval of documents																								
Milestone – ESCO Loan Closing Procedure																								
ACTIVITY 6 – Energy Project Implementation																								
Milestone – Confirm final contract, program and financing costs																								
Milestone – Contract with sub-contractors																								
Milestone – Close MELF loan for individual projects																								
Milestone – Release initial and ongoing funding per drawdown procedures																								
Milestone – Contract Management																								
Milestone – Commissioning																								
ACTIVITY 7 – Project Reviews																								
Milestone – Implement Measurement and Verification Plan																								
Milestone – Service MELF loan per ESCO agreement																								
Milestone – Closeout MELF loan upon repayment of all funds																								
Milestone – Program Performance Evaluation																								
Milestone – Share Best Practices and Lessons Learned																								

Sources/Uses	Source: HUD EIF Grant Funds	Source: Matching Funds WinnDevelopment	Source: Matching Funds from LISC	Source: Matching Funds from Bank of America	Source: Matching Funds from Connecticut Energy Finance and Investment Authority	Source: Additional Leveraged Funds from NYC EEC	Total
ACTIVITY 1 – Establishment of a credit enhanced Multifamily Energy Loan	$ 3,000,000.00	$ 50,000.00			$ 2,500,000.00	$ 1,000,000.00	$ 6,550,000.00
ACTIVITY 2 – Establishment of the Open Market ESCO	$ 115,000.00	$ 100,000.00					$ 215,000.00
ACTIVITY 3 – Assemble Contractor Network	$ 150,000.00	$ 75,000.00					$ 225,000.00
ACTIVITY 4 – Project Identification	$ 385,000.00	$ 75,000.00					$ 460,000.00
ACTIVITY 5 – Program, Performance Contracting, and Legal Compliance	$ 1,400,000.00	$ 135,000.00	$ 100,000.00	$ 100,000.00			$ 1,735,000.00
ACTIVITY 6 – Energy Project Implementation	$ 200,000.00	$ 425,000.00	$ 3,900,000.00	$ 3,900,000.00			$ 8,425,000.00
ACTIVITY 7 – Project Reviews		$ 140,000.00					$ 140,000.00

Community Development Banking

Bank of America
Merrill Lynch
GLOBAL COMMERCIAL BANKING

October 19th , 2011

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment / NRG Solutions LLC, and
Lawrence H. Curtis, President and Managing Partner, WinnDevelopment
6 Faneuil Hall Marketplace,
Boston, MA 02109

RE: HUD NOFA - Energy Innovation Fund for a Multifamily Energy Pilot
Dear Mr. Crimmin,

On behalf of Bank of America, I am pleased to write this letter demonstrating our interest in providing financing for a potential Multifamily Energy Loan Fund (the Fund) offered in collaboration with the US Department of Housing and Urban Development.

We understand that the primary intent of WinnDevelopment, through its affiliate NRG Solutions LLC and in partnership with Local Initiatives Support Corporation, is to secure a pool of private capital to provide innovative solutions for efficiency upgrades to multifamily housing in New England and New York State. As you know, Bank of America has extended to WinnCompanies financing on numerous projects and endeavors. Winn has demonstrated an outstanding track record of performance as an innovator in real estate development generally and in affordable housing particularly.

Bank of America is pleased to support WinnDevelopment's proposal for funding from HUD to establish the Fund. We are interested in participating in the Fund as a lender. Our participation would be based on the Bank's underwriting guidelines and limited by terms and conditions established by the Bank following our full underwriting and subject to standard approval requirements. We anticipate providing debt capital into the Fund of $4,000,000 to be used to finance energy efficient capital improvements to existing multifamily properties in New England and New York to reduce operating expenses of those properties. We also anticipate that our support would be available for at least the duration of the twenty-four month demonstration period.

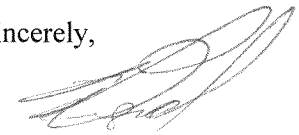
As you know Bank of America is among the country's largest banks and a leader in providing debt and equity to support affordable housing and community development. Evidencing our capacity is the fact that we extended about $141 billion in credit in the third quarter of 2011 alone.

Bank of America
Merrill Lynch
GLOBAL COMMERCIAL BANKING

We applaud Winn for its efforts to develop an innovative approach to improving the energy efficiency of low-income multifamily properties and would welcome the opportunity to work with you to further that objective. When funding is secured from HUD, and you are ready to move forward, we will prioritize underwriting of your financing request.

Please be aware that this is not a commitment of Bank of America to extend credit, and any commitment would be subject to the Bank's full due diligence and approval process.

Sincerely,



David Leopold

Senior Vice President

BRIGHT POWER INC.

Tel 212.803.5868
Fax 866.379.8026
info@brightpower.com

11 Hanover Square
15th Floor
New York, NY 10005

10/19/2011

Mr. Darien Crimmin
Vice President of Energy and Sustainability
Winn Development
6 Faneuil Hall Marketplace
Boston, MA 02109

Dear Darien,

Bright Power is pleased to provide this letter in support of Winn's proposal to the Department of Housing and Urban Development (HUD) in response to the Notice of Funding Availability (NOFA) for The Energy Innovation Fund for a Multifamily Pilot Program (Docket no. FR-5505-N-01). We are glad to be an integral part of the Winn team and we look forward to working with Winn to successfully implement this innovative approach to financing energy retrofits in multifamily properties. We are fully committed to fulfilling our responsibilities as the technical service provider, as detailed in your proposal to HUD.

Sincerely,

Gregory Sherman, BPI-MFBA, LEED EBOM
VP of Existing Buildings Division
Bright Power, Inc.

865 Brook Street
Rocky Hill, Connecticut 06067-3444
T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

October 19, 2011

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace,
Boston, MA 02109

RE: HUD NOFA - Energy Innovation Fund for a Multifamily Energy Pilot

Dear Mr. Crimmin:

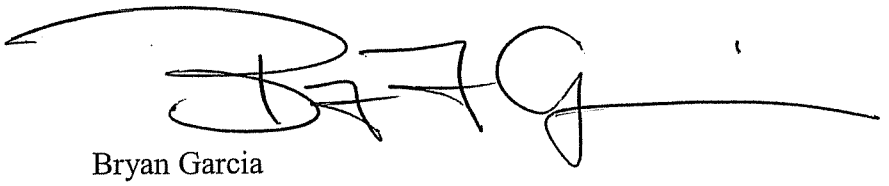
This letter certifies the intent of the Connecticut Clean Energy Finance and Investment Authority (CEFIA) to support WinnDevelopment's proposal to create an innovative fund for attracting performance contractors to the multifamily housing market in Connecticut, for the purpose of installing cost-effective energy efficiency (EE) and renewable energy (RE) measures in multifamily housing developments. Subject to CEFIA's Board of Directors and the State of Connecticut's bond commission approvals, we anticipate providing a loan guaranty covering up to $2,500,000 to enable privately-financed energy efficiency projects to secure low-interest debt capital. The capital will be used in Connecticut limited income multifamily households to permit a number of smaller performance contractors to offer financially attractive projects to this underserved market.

CEFIA was created by Public Act 11-80 in July, 2011 to function as a "green bank" for RE and EE programs in Connecticut. In addition to approximately $28 million in funding received each year through the legislatively-mandated Combined Public Benefits Charge on the electric utility bills, CEFIA is also authorized to secure other funding sources, and provide green loan guarantees for residential ratepayers per Section 124 of Public Act 11-80. We anticipate the establishment of several funding programs similar to the instant case, as we expand our efforts to encourage energy efficiency and renewable energy in homes, businesses and institutions in Connecticut.

The establishment of the fund contemplated in the WinnDevelopment proposal is consistent with the purposes of CEFIA, and we intend to support this fund as described above for the duration of the demonstration period. Terms and conditions will be negotiated with WinnDevelopment to protect our mutual interests, and to insure the proper application of the loan guaranty funds.

It is understood that this Letter of Intent does not create any binding obligations among any of the parties to the HUD NOFA application. Only a definitive loan guaranty agreement executed by all affected parties shall establish the obligations of each party to the others. If a grant is awarded to the WinnDevelopment proposal under the HUD pilot program, CEFIA agrees to enter into good faith negotiations to achieve a mutually satisfactory loan guaranty agreement for the purposes stated above.

Respectfully submitted,



Bryan Garcia
President

Cc: David Ljungquist

October 20, 2011

Re: Letter of Support – Energy Savings Warranty
(WinnCompanies)

To Whom It May Concern:

The intent of this letter is to convey Energi's support with regards to WinnCompanies HUD Energy Innovation Fund application. After reviewing the WinnCompanies HUD proposal, Energi sees that it represents a unique opportunity to facilitate energy retrofit projects through an innovative financing mechanism. Energi recognizes the opportunity to assist WinnCompanies in their retrofit efforts through the application of our Energy Savings Warranty (ESW) program. By backstopping the savings guarantees issued on retrofit projects, the Energi ESW program would add security for both the property owner and financial lender and ultimately mitigate the risk of project failure.

This letter confirms that Energi has received the WinnCompanies HUD proposal and supports its efforts in developing energy efficient multi-family housing projects. Energi believes that the addition of the ESW program to the WinnCompanies submission would strengthen WinnCompanies' position as a candidate for the HUD Energy Innovation Fund program. Energi recognizes the potential for a beneficial insurance partnership on the upcoming projects and will look to provide insurance coverage, which is contingent upon the results of our thorough underwriting process of the specific projects.

If you have any questions please do not hesitate to call.

Regards,

Kevin Kaminski
Director of Engineering
Energi Insurance Services, Inc.
10 Centennial Drive, Suite 201
Peabody, MA 01960
Tel: (978) 531-1822 x304
Fax: (978) 531-4847

ImprintCapital

October 19, 2011

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace,
Boston, MA 02109

RE: HUD NOFA – Energy Innovation Fund for a Multifamily Energy Pilot

Dear Mr. Crimmin,

On behalf of Imprint Capital Advisors, I write this letter to demonstrate our interest in helping our clients provide financing for a potential Mutifamily Energy Loan Fund offered in collaboration with the United States Department of Housing and Urban Development.

We advise a variety of foundation and family office clients in their mission-driven investing, and in particular have several clients interested in energy efficiency financing. More specifically, we have a client interested in initiatives and programs that would touch New England and low-income families, which this project aims to do.

If there ultimately was a client fit and our approval and due diligence process was satisfactory, we would anticipate being able to provide capital somewhere in the range of $500,000 to $2,500,000 from our clients. It is understood that this letter does not create any binding obligations among any of the parties to the HUD NOFA application.

Respectfully Submitted,

John Goldstein

LISC

Helping neighbors build communities

October 19, 2011

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace,
Boston, MA 02109

RE: HUD NOFA - Energy Innovation Fund for a Multifamily Energy Pilot

Dear Mr. Crimmin,

This letter certifies the intent of the Local Initiatives Support Corporation ("LISC") to support WinnDevelopment's proposal to create an innovative fund for attracting performance contractors to the multifamily housing market in the Northeast (the States of Connecticut, Maine, New York and Rhode Island, and the Commonwealth of Massachusetts (the "Target Area")) for the purpose of installing cost-effective energy efficiency and renewable energy measures in multifamily housing developments. Subject to LISC's normal underwriting policies and procedures, we anticipate providing a loan or loans in the aggregate amount of up to $4,000,000 as part of a larger credit-enhanced loan pool, which will blend public and private funds (the Multifamily Energy Loan Fund, "MELF").

MELF will aggregate public and private loan and other funds, which will be used to make loans to one or more open market ESCOs for qualifying efficiency / renewable energy work on residential multifamily project in the Target Area.

In addition to being a source of much needed loan capital for MELF, LISC anticipates playing a significant role in the management of MELF, and also expects to originate a pipeline of projects through the community groups with which it works, and through its affiliate, the National Equity Fund, Inc.

We believe that the financing that will be provided by MELF will result in significantly improving the energy efficiency and/or use of renewable energy by approximately 1,200 units of multi-family affordable rental housing, thereby assisting in the preservation of such housing and enhancing its long term viability.

Providing this financing, and helping to manage MELF, is consistent with, and will further, LISC's charitable and strategic goals of helping community residents transform distressed neighborhoods into healthy and sustainable communities of choice and opportunity.

LISC
Helping neighbors build communities

LISC is more than able to provide these resources and to play this role. As of September 30, 2011, LISC's net assets were $135.4 million and its available loan capital was in excess of $100 million.

LISC has had many years of experience assembling, and administering, special purpose loan funds that include public and private dollars, including funds in Cook County (Illinois), Louisiana, New York City and San Francisco.

Over LISC's 30-year history, we have provided financing, technical assistance and policy support to help local community development partners transform distressed neighborhoods. We bring national resources, financial leverage and a broader vision to the local work. Since our inception, LISC has invested more than $11.1 billion in equity, loans and grants, which has leveraged nearly $33.9 billion for development projects and programs directed at low-income communities. LISC's investments have helped to finance 277,000 affordable homes and apartments and 44 million square feet of retail and commercial space. These accomplishments demonstrate the continuing power of LISC's national-local partnership approach, which enables locally-driven efforts to draw upon nationally-aggregated capital and talent.

In addition to our local offices, LISC supports affordable housing development through our affiliate, the National Equity Fund. Founded in 1987, NEF is a leading national syndicator of low-income housing tax credits with one of the largest portfolios of projects in the marketplace. In both urban and rural communities, NEF invests tax-credit equity in multi- and single-family developments, as well as in supportive housing, public housing revitalization, assisted living projects and historic rehabs.

LISC has also provided financing for other energy efficiency projects through our standard loan capital as well as through LISC Green Development Center's Green Loan Fund. LISC is also taking a more hands-on approach to weatherizing thousands of units of affordable housing in New York City as a partner in a state authorized *Temporary Weatherization Agency.* To date, the program has weatherized 1,718 apartment units in 69 buildings. It has invested $11,353,000 in the retrofits as of September 30 and has created or retained 185 jobs.

The establishment of MELF, as contemplated in the WinnDevelopment proposal, is consistent with LISC's charitable and strategic goals, and we intend to support this fund as described above for the duration of the demonstration period. Terms and conditions will be negotiated with WinnDevelopment to protect our mutual interests and to insure the proper use of MELF funds.

LISC
Helping neighbors build communities

It is understood that this Letter of Intent does not create any binding obligations among any of the parties to the HUD NOFA application. Only definitive legal documents executed by all affected parties shall establish the obligations of each party. If a grant is awarded to the WinnDevelopment proposal under the HUD program, LISC agrees to enter into good faith negotiations to establish MELF, provide the financing described above, and play a suitable role in assisting with the management of MELF.

Sincerely,

Local Initiatives Support Corporation

By: Tina Brooks

Tina Brooks, LISC Executive Vice President for Programs

CONCORD, MA - MANCHESTER, NH - WASHINGTON, DC

47 JUNCTION SQUARE DRIVE
CONCORD, MA 01742

978-369-5533
www.mjbradley.com

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace
Boston, MA 02109

October 19, 2011

Dear Mr. Crimmin,

This letter of support pertains to an application being made by WinnDevelopment (Winn) to the U.S. Department of Housing and Urban Development (HUD) for funds to support energy efficiency investments. The purpose of this letter is to confirm that M.J. Bradley & Associates LLC (MJB&A) has the resources and capacity needed to assist Winn as it carries out the duties described in the application.

MJB&A is a strategic environmental consulting firm based in Concord, Massachusetts, with offices in Manchester, New Hampshire and Washington, D.C. MJB&A has an international reputation for helping clients achieve business objectives while meeting environmental goals. Founded in 1994, MJB&A has over 15 years of experience providing services to multiple sectors including: electric & gas utilities, power generation, transportation, government, not-for-profit, industrial, and manufacturing. The firm's diverse team of 20 professionals has backgrounds in law, economics, engineering, business, policy, marketing, corporate strategy, and public relations.

MJB&A plans to support Winn with financial structuring and due diligence and general project management. We have a successful track record of managing energy sector projects, many of which have been built around public-private partnerships and funding models. We have also performed extensive work in energy efficiency by establishing and evaluating programs. MJB&A would bring experience in project management, financial analysis, and investment strategy to the WinnCompanies team. In addition, we have engineering expertise from implementing energy efficiency technologies, and a deep knowledge of the utility sector and electricity markets.

We invite WinnCompanies to utilize the skills and network of MJB&A staff to complement your project team during design and implementation over the lifetime of the project. MJB&A has the capacity for, and interest in, serving as a strategic advisor to Winn by evaluating new projects, screening and managing contractors, tracking and reporting on the performance of existing projects, and identifying regions of the country where there is an opportunity for the fund to advance adoption of energy efficiency.

Thank you for your consideration and we look forward to working together.

Sincerely,

Austin F. Whitman
Vice President
M.J. Bradley & Associates, LLC
awhitman@mjbradley.com

NESEA
NORTHEAST SUSTAINABLE ENERGY ASSOCIATION

50 Miles Street, Greenfield, MA 01301 p 413.774.6051 f 413.774.6053 www.nesea.org

October 17, 2011

Darien Crimmin, Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace
Boston, MA 02109

Dear Darien:

The Northeast Sustainable Energy Association (NESEA), a membership organization dedicated to advancing the adoption of sustainable energy practices in the built environment in the Northeastern United States, is pleased to submit this letter in support of the WinnCompanies' proposal to create a new Multifamily Efficiency Loan Fund and an Open Market ESCO to promote energy efficiency projects in low-income multifamily housing. We believe that this project will fill an important need in the marketplace, by supplying low risk funding for energy efficiency projects that would otherwise never happen, and by connecting the owners of these multifamily buildings to a qualified team of contractors to ensure the work is done well, and delivers the anticipated results.

NESEA is uniquely positioned to assist WinnCompanies in developing a collaborative service delivery mechanism designed to increase transparency, competition, quality, and capacity within the multifamily building energy services industry. Each year, NESEA works with its constituents, more than 22,000 leading professionals in energy efficiency and renewable energy, to plan the premier conference in the Northeast on energy efficiency, renewable energy, and whole systems thinking. This conference, called "BuildingEnergy" attracts more than 4,000 sustainable energy professionals – architects, engineers, builders, contractors, developers, facilities managers, policymakers and others – and 160 exhibitors. NESEA is poised to leverage the expertise within its professional network to help establish criteria for qualifying contractors for this program, and for selecting integrated design teams.

In addition, NESEA has already developed an online directory of professionals involved in sustainable energy projects in the built environment. NESEA's Sustainable Green Pages, (http://www.nesea.org/greenpages/), allow building and energy professionals to list their products and services online in a searchable format. The Sustainable Green Pages, already populated with information on almost 300 companies, can be readily adapted to fulfill WinnCompanies' need for an online bidding platform for qualified energy contractors.

Finally, NESEA is a large regional chapter of a national organization, the American Solar Energy Society. Should the WinnCompanies model prove successful, NESEA has contact with other regional and national organizations who can help replicate and scale it in other markets.

In short, NESEA believes that WinnCompanies has developed a compelling proposal, and that we are well positioned to help them deliver on it. We have provided a broad outline of how we might approach developing the bidding platform, and the resources we might need to do so.

We appreciate the opportunity to participate in this unique pilot, and look forward to working with WinnCompanies to make HUD's investment in an Energy Innovation Fund a great success.

Sincerely,

Jennifer J. Marrapese

Jennifer J. Marrapese, JD, MA
Executive Director

National Housing
& Rehabilitation
Association

1400 16th St. NW
Suite 420
Washington, DC 20036
(202) 939-1750
Fax (202) 265-4435
www.housingonline.com

October 19, 2011

Mr. Darien Crimmin
Winn Companies
6 Faneuil Hall Marketplace
Boston, MA 02109

Dear Darien,

National Housing & Rehabilitation Association is pleased to offer support to Open Market ESCO and their application for a Multifamily Energy Loan Fund through the U.S. Department of Housing & Urban Development. We support Open Market ESCO in its efforts to facilitate the flow of private capital into energy efficiency for low-income multifamily housing.

National Housing & Rehabilitation Association (NH&RA) is a national trade association comprised of developers, owners and operators of multifamily affordable rental housing. Through our Council for Energy Friendly Affordable Housing (CEFAH) our members are pursuing innovative policy and financial solutions to aide in the energy retrofitting of the nation's affordable housing portfolio. Our members see great value in the creation of a weatherization loan program.

Open Market ESCO, a concept put forth by WinnCompanies, is an innovative approach supported by NH&RA. Further, NH&RA recognizes WinnCompanies and NRG Solutions as a pioneer in the development and rehabilitation of sustainable affordable housing. They are already one of the most active multifamily owners engaged in using the Department of Energy's Weatherization Assistance Program and other federal energy efficiency incentives. Creating a funding mechanism for energy efficiency loans will help for-profit and non-profit owners of affordable housing leverage additional public and private sector resources to finance retrofits. This financial tool will increase the efficiency of the program and deliver more direct benefits to residents.

NH&RA supports the Open Market ESCO's efforts to create and disseminate this important financing tool to our membership and the affordable housing community at large.

Sincerely,

Thom Amdur
Executive Director

NYCEEC
New York City Energy Efficiency Corporation

October 19, 2011

Darien Crimmin
Vice President of Energy and Sustainability
Winn Development
6 Faneuil Hall Marketplace
Boston, MA 02109

Dear Mr. Crimmin:

It is my pleasure to provide this letter in support of Winn Development's application to the NOFA for the HUD Energy Innovation Fund – Multifamily Pilot Program.

The New York City Energy Efficiency Corporation (EEC) has discussed with Winn Development and its partner, the Local Initiatives Support Corporation the development of an investment fund for the energy efficiency upgrades in New York City. EEC is charged with developing and facilitating access to energy efficiency financing products, generating demand for retrofits, and facilitating active coordination with workforce development entities. In addition, EEC is committed to providing education, marketing and outreach services to communicate the value of energy efficiency, and to encourage greater investment in energy efficiency measures in the existing built environment in NYC.

Should Winn Development receive a HUD award to pilot an investment fund New York City, and our collaboration yields an opportunity that satisfactorily meets EEC's programmatic requirements, it would be EEC's intention to make available up to $1,000,000 in credit enhancement funds. EEC is initially capitalized with two Federal grants, totaling $37,500,000, awarded to the City of New York under the Energy Efficiency and Conservation Block Grant (EECBG) provisions of the American Recovery and Reinvestment Act (ARRA) of 2009. Any formal approval for financing would require compliance with EEC's capital requirements (Federal Department of Energy ARRA allocated monies), underwriting standards and approval from its Corporate Officers.

It is understood that this Letter of Intent does not create any binding obligations among any of the parties to the HUD Energy Innovation Fund application. Only a definitive agreement executed by all parties shall establish the obligations of each party to the others. We look forward to working with Winn Development and the Local Initiatives Support Corporation on this exciting project.

Sincerely,

Susan Leeds
Chief Executive Officer
New York City Energy Efficiency Corporation

RECAP
REAL ESTATE ADVISORS

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace
Boston, MA 02109

Re: Credentials of Recap Real Estate Advisors and On-Site Insight

Dear Darien:

I am writing to confirm the interest of Recap Real Estate Advisors, and our subsidiary On-Site Insight (OSI), in providing services to WinnDevelopment in connection with its efforts to create a Multifamily Efficiency Loan Fund (MELF) and an Open Market ESCO. These services will include assisting you in defining the structure of the MELF and the loans it makes, defining and resolving obstacles at the property level (lender and owner challenges, including consents), expediting financing applications and streamlining the processes and costs associated with the program, and (through On-Site Insight) providing green capital needs assessments and/or energy audits consistent with program requirements.

As highlighted in the attached Summary of Credentials, Recap and OSI have extensive experience in multifamily affordable housing, including in particular real estate underwriting, affordable housing lending, long-term capital needs assessments, and energy audits and retrofits. We believe that both the MELF and Open Market ESCO concepts would bring significant value to the marketplace, and that these innovations would ultimately result in the successful retrofit of many multifamily affordable housing properties. We are pleased to be a part of your team.

Please let us know if additional information regarding our firms would be helpful.

Regards,

Todd Trehubenko, CEO

cc: David Smith, Casius Pealer

38 Chauncy Street, Suite 600 | Boston, MA 02111
Telephone: 617.338.9484

780 Third Avenue, 10th Floor | New York, NY 10017
Telephone: 646.576.7665

E: info@recapadvisors.com | W: recapadvisors.com

RECAP
REAL ESTATE ADVISORS

Summary of Credentials:
Recap Real Estate Advisors and On-Site Insight

Recap Real Estate Advisors. Recap works with multifamily owners, investors, lenders and regulators to execute cutting-edge transactions, stabilize and reposition properties, and design innovative programs and strategies. Recap's more than twenty-year record of accomplishment in multifamily housing provides unmatched expertise. The firm's client list includes major national and regional banks, institutional equity providers, non-profit and for-profit owners, and public agencies. This range of interaction allows Recap to view multifamily finance and operations from many perspectives and to understand the motivations of various stakeholders.

On-Site Insight. On-Site Insight (OSI), a wholly-owned subsidiary of Recap, is the recognized leader for high-quality capital needs assessment and energy audit services for multifamily housing. OSI's rigorous approach to property system evaluation, useful life estimation, and reserve funding analysis has set the standard in the multifamily industry over the past twenty years. OSI's methodology is widely used and has been adopted by many lenders, funders, and regulators, including Fannie Mae and federal and state agencies.

OSI's clients include leading owners, investors, managers, lenders, and regulators in every state in the country. OSI has performed more than 6,500 assessments across the United States on multifamily properties, condominiums, hotels, healthcare facilities, and school dormitories.

Experience Highlights: Recap and On-Site Insight

- Completed over 6,500 PNAs in all 50 states and Puerto Rico for HUD, Enterprise, and other leading owners, investors, managers, lenders, and regulators
- Created the Green CNA, which combines a standard 20-year PNA with a comprehensive energy audit, detailed financial analysis of retrofit opportunities, and analysis of indoor air quality
- Completed over 80 Green CNAs over the last 24 months for Enterprise, Winn, the Michigan State Housing Development Authority, and many other owners and operators.
- Co-authored the Enterprise Retrofit Audit Protocol with Enterprise Community Partners.
- Retained by Energy Capital Partners (ECP) in the 1990s to assist in the development of an energy loan program for FHA-insured multifamily properties. Although the program did not ultimately go forward, it was approved by FHA, and Fannie Mae agreed to purchase the first $200 million of loans.

38 Chauncy Street, Suite 600 | Boston, MA 02111
Telephone: 617.338.9484

780 Third Avenue, 10th Floor | New York, NY 10017
Telephone: 646.576.7665

E: info@recapadvisors.com | W: recapadvisors.com

National Equity Fund, INC.
an affiliate of LISC

High-Impact Investing

$8.8 billion Invested

133 LIHTC Funds

2,022 Projects

121,720 Units

NEF is a 501(c)4 national nonprofit and an affiliate of the Local Initiatives Support Corporation (LISC).

LISC is the nation's leading community development support organization. It has raised $10.7 billion in equity, loans and grants to finance neighborhood revitalization efforts focused on Building Sustainable Communities across the country.

Who We Are

National Equity Fund, Inc. is a nonprofit Chicago-based affiliate of the Local Initiatives Support Corporation (LISC) and the nation's largest syndicator of Low Income Housing Tax Credits (LIHTC). Since 1987, we have worked with 210 institutional investors to help them meet their financial, regulatory and public relations goals through public-purpose investments with a strong track record of performance.

Project Investments

NEF evaluates project investment opportunities that meet our investors' goals. We work with developers to make sure deals are structured to support their long-term success. Since 1987, we have invested nearly $9 billion in LIHTC developments, which includes more than 2,000 projects and some 122,000 units of affordable rental housing. We have worked with 700 developers to make those deals happen. The projects in which we invest run the housing gamut. They include "green" housing for families, permanent supportive housing for homeless veterans and the disabled, and service-enriched projects for frail seniors.

In addition, we administer the largest New Markets Tax Credit (NMTC) program in the nation, with $693 million in NMTC investment authority that the Treasury Department has allocated to our parent, the Local Initiatives Support Corporation (LISC). On behalf of LISC, we concentrate our NMTC activity in "High Distress" communities.

Fund Offerings

NEF currently has 133 funds under management. Multi-Investor Funds pool capital from multiple investors to spread risk and leverage impact. Proprietary Funds invest in projects on behalf of one investor. The investor typically exercises more control over underwriting and product selection than is the case with a multi-investor fund, though there is less opportunity to spread risk.

Fund Structure

NEF's fund structure is unique in the industry.

Our asset management operation is self-sustaining and fully funded. Regardless of how much or how little new business we close, our asset management efforts continue intact through the 15-year compliance period.

Reserves are specifically earmarked for professional services and workout needs. Most syndicators utilize a working capital line that combines asset management fees, reserves and front-end fees. They draw that down for various uses as they see fit and often deplete capital that will be needed as projects age. We believe separate reserves better protect investors' interests, and we have structured our funds to reflect that.

National Equity Fund, INC.
an affiliate of LISC

KEY CONTACTS:

Joe Hagan
NEF President & CEO
312.697.6116
jhagan@nefinc.org

Robert Johnston
SVP Acquisitions
972.342.6621
rjohnston@nefinc.org

Karen Przypyszny
SVP Equity Placement
312.697.6120
kprzypyszny@nefinc.org

Howard Sereda
SVP Capital Markets
312.697.8254
hsereda@nefinc.org

Asset Management

NEF's asset management operation is at the top of the industry. We can pursue high-impact, mission-rich projects because we have invested so heavily in the staffing and expertise that help them perform as expected. Our asset managers visit most properties every year...more often when a project is facing unique challenges. We risk-rate each property to determine the appropriate staff level and develop action plans to address problems early. We have a workout team in place to focus specifically on troubled assets. And we coordinate Year-15 disposition activity with investors and developers to make sure funds are wound down appropriately, with the goal of both protecting investors' interests and keeping the project affordable after we exit the partnership.

e-Management

Technology is a critical asset at NEF. We have used it to increase our overall productivity and enhance our asset management capabilities. And we have tailored it to the needs of both our project and investor partners, helping them better manage their LIHTC activity.

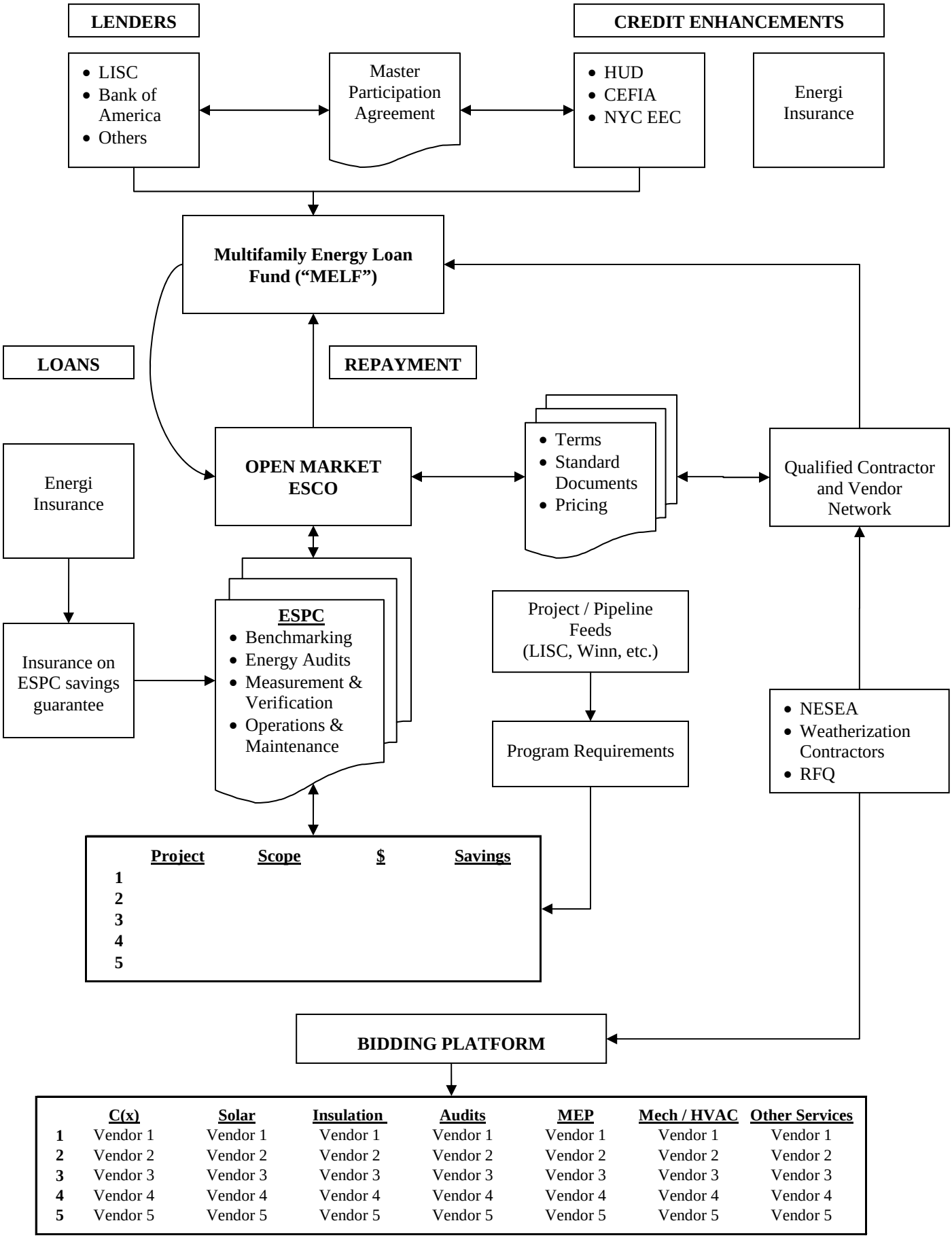
The web-based platform we designed—known as SMT, for Syndication Management Tool—contains all our data related to individual projects, investments and funds, as well as detailed market information. It allows us to aggregate data and identify trends that impact our portfolio and the LIHTC business more broadly. It is the most comprehensive, transparent system for syndication management in the industry.

Through it, we offer our project partners the DOT: the Developers Online Tool. It supports e-filing capabilities for key documents, which are then available as part of each developer's online library of information. It also helps track financial results, disbursements and key insurance information, and offers access to closing checklists and construction information. For investors, we offer our online Investor Resource Center. It gives them the opportunity to track details about all their projects and funds. Quarterly investor reports are also available online.

NEF and LISC

LISC created NEF back in 1987 to ensure that capital attracted to the Low-Income Housing Tax Credit would make its way to the projects and communities that need it most. That close partnership has continued for more than two decades, with NEF's field staff collaborating with LISC's 30 local program offices to identify opportunities and mitigate risks.

NEF currently upstreams 50 percent of its net income to LISC to be redeployed as new community development capital in the places that we and our investors do business. To date, we have reinvested $100 million of our earnings in communities through our connection to LISC.



	C(x)	Solar	Insulation	Audits	MEP	Mech / HVAC	Other Services
1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1	Vendor 1
2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2	Vendor 2
3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3	Vendor 3
4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4	Vendor 4
5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5	Vendor 5

WinnCompanies

State	City	Site Name	Res Units	Client	Agency	Program Type
CT	Bethel	Augustana Homes - Bethel	100	Diocese of Bridgeport	HUD	Section 8, Section 236
CT	Bethel	Augustana Homes - Congregate	44	Diocese of Bridgeport		Subsidy
CT	Bridgeport	Augustana Homes - E Bridgeport	48	Diocese of Bridgeport	HUD	Section 202, PRAC
CT	Bridgeport	Augustana Homes - Jewett	72	Diocese of Bridgeport	HUD	Section 202, PRAC
CT	Bridgeport	Augustana Homes of Bridgeport -	186	Diocese of Bridgeport	CHFA # 80024M	Section 8
CT	Bridgeport	Hall Commons	40	Hall Neighborhood House	HUD	Section 202, PRAC
CT	Bridgeport	Laurelwood Place	100	Bridgeport Rotary Housing Corporation	HUD	Section 8, Section 202
CT	Bridgeport	Sycamore Place Apartments	118	Bridgeport Rotary Housing Corporation	HUD	Section 8, Section 236
CT	Bristol	Huntington Woods	280	Boston Financial Management Investment	CHFA # 88016P (+1 NR)	Market, Affordable
CT	Broad Brook	Millpond Village	360	LHC	East Windsor Hsg Auth	Section 42, Market
CT	Danbury	Augustana Homes - Danbury	40	Diocese of Bridgeport	HUD	Section 202, PRAC
CT	Fairfield	Augustana Homes - Fairfield	15	Diocese of Bridgeport	HUD	Section 202
CT	Greenwich	Augustana Homes - Greenwich	31	Diocese of Bridgeport	HUD	Section 202
CT	Hartford	ArtSpace - Hartford	46	ArtSpace Management LLC		Section 42
CT	Hartford	Hollander Foundation Center, The	70	Common Ground Community	CHFA # 05013M	Section 42 (56), Market (14), Home (4)
CT	Hartford	Lofts at Main & Temple, The	78	Marc S. Levine Real Estate Interests	CHFA # 02-015-M	Market
CT	Hartford	Temple Street Townhouses	42	Marc S. Levine Real Estate Interests	CHFA # 02-015-M	Market
CT	New Haven	Casa Familia	30	Casa Otonal Housing Corporation, Inc.	CHFA # 02004M	Section 42
CT	New Haven	Casa Otonal	105	Casa Otonal Housing Corporation, Inc.	HUD	Section 8
CT	New Haven	Eastview Terrace	102	Housing Authority of New Haven	Hsg Auth of New Haven	Section 42, Public Housing
CT	New Haven	Quinnipiac Terrace - Phase I	81	Trinity Financial	Hsg Auth of New Haven	HOPE VI, Section 42, Section 8
CT	New Haven	Quinnipiac Terrace - Phase II	79	Trinity Financial	Hsg Auth of New Haven	HOPE VI, Section 42, Section 8
CT	New Haven	Quinnipiac Terrace Phase III	33	Trinity Financial	CHFA # 09037-M	Section 42, Public Hsg
CT	New Haven	Trinity Rowe Apartments	104	Trinity Financial	CHFA # 09028-M	Section 42, Public Hsg
CT	Norwich	ArtSpace - Norwich	58	ArtSpace Management LLC	CHFA # 98014M	Section 42, Market
CT	Norwich	Wauregan Hotel	70	Wauregan Development LLC	CHFA # 02001M	Section 42
CT	Somers	Woodcrest Elderly Housing	86	Housing Authority of the Town of Somers	Hsg Auth of Town of Somers	Section 42, Elderly
CT	Stamford	Augustana Homes - Glenbrook	30	Diocese of Bridgeport	CHFA # 87006M	Market
CT	Stamford	Metro Green Apartments - Phase 1	50	Jonathan Rose Associates		Section 42
CT	Stamford	Metro Green Residences - Phase 2	50	Jonathan Rose Associates	CHFA # 09010	Section 42 (40), Mkt (10), HOME (15)
CT	Thompson	River Mill Village	53	LHC	CHFA # N/A	Section 42
CT	Trumbull	Carmel Ridge	36	Diocese of Bridgeport		Market
CT	Trumbull	Teresian Towers	50	Diocese of Bridgeport		Market
CT	Vernon	Springville Mill	175	Atlantic Development & Investment	CHFA # -850-72M	Market (140), Affordable (35)
CT	Waterbury	Enterprise/Abbott	187	Winn / RMC	HUD	Section 8, Elderly / Disabled
CT	Waterbury	Schoolhouse Apartments	213	Winn / RMC	HUD	Section 8, Elderly / Disabled
CT	Waterbury	Watertown Crossings	108	Boston Financial Management Investment	CHFA # 94004M (+1 NR)	Section 42
CT	West Haven	Rolling Ridge Apartments	180	LHC	CHFA # 99010M	Section 42
CT	Wethersfield	Executive Square	240	Winn / RMC	CHFA # 82002M	Section 8, Elderly / Disabled
CT	Willimantic	ArtSpace - Windham	48	ArtSpace Management LLC	CHFA # 02006M	Section 42, Market
MA	Amherst	Mill Valley Estates	148	Winn	MHsg/SHARP # 86-007	Market
MA	Andover	Brookside Estates	28	Winn		Market, Condominiums
MA	Andover	Colonial Drive Condominium	220	Colonial Drive Condominium Trust		Condominiums
MA	Athol	School Street Residences	50	RSJ Group LLC		Section 42
MA	Berlin	Northbrook Village	40	Berlin Retirement Home, Inc.	Rural Development	Section 8, Rural Development
MA	Boston	Castle Square	500	Castle Square Tenants Organization	MHsg # 89-502 & HUD	Section 42, Section 8
MA	Boston	Eva White	102	Boston Housing Authority		Public Housing, Elderly
MA	Boston	Langham Court	84	Langham Court Limited Partnership	MHsg # 87-033	Section 42, Market
MA	Boston	Mass Pike Towers	200	Trinity Financial	MHsg # 99-007 & HUD	Section 42, Section 8, Section 236
MA	Boston	Mission Main - Phase I	310	Winn /Peabody /Cruz	BHA	Section 42, Public Housing
MA	Boston	Mission Main - Phase II	139	Winn /Peabody /Cruz	BHA	Section 42, Public Housing
MA	Boston	Mission Main - Phase III	86	Winn /Peabody /Cruz	BHA	Section 42, Public Housing
MA	Boston	Nazing Court	151	LHC	MHsg # 01-007	Section 42
MA	Boston	Oliver Lofts	62	LHC	MHsg # 08-115	Section 42 (43), Market (16), PBV (8), BRA (3)
MA	Boston	Parmelee Court	74	New Parmelee Court	MHsg # 87-041	Section 42, Market
MA	Boston	Roxbury Corners	54	UDC Housing Development Corporation	MHsg # 89-006	Section 42, Market
MA	Boston	Tai Tung Village	214	Chinese Consolidated Benevolent Association of NE	HUD	Section 8, BMIR
MA	Boston	Tremont Village	20	Chinese Consolidated Benevolent Association of NE	DHCD	Section 705
MA	Boston	Waterford Place	40	Chinese Consolidated Benevolent Association of NE	MHsg # 07-015S	Section 42, Market
MA	Boston	West Newton Street	28	Nuestra Communidad Development Corporation		MRVP & 1 NR Mkt for Hs Mgr
MA	Boylston	Sunbanke Village	24	Boylston Housing	Rural Development	Rural Development
MA	Brighton	Faneuil Gardens	258	Winn /Peabody /Cruz	BHA	Public Housing
MA	Brookline	Village At Brookline	307	Winn	MHsg # 73-088 & HUD	Section 42, Section 236
MA	Burlington	Arboretum, The	312	AEW Capital Management Limited Partnership		Market, Affordable

WinnCompanies

State	City	Site Name	Res Units	Client	Agency	Program Type
MA	Cambridge	808 Memorial Drive	300	Homeowner's Rehab, Inc.	MHsg #72-035 & HUD	Section 42, Section 236, RAP, Market
MA	Cambridge	Auburn Court	77	Homeowner's Rehab, Inc.	MHsg # 92-007	Section 42, Market
MA	Cambridge	Auburn Park	60	Homeowner's Rehab, Inc.		Section 42, Market
MA	Cambridge	CCHDI	265	Homeowner's Rehab, Inc.		Section 8
MA	Cambridge	CCHI	162	Homeowner's Rehab, Inc.		Section 8
MA	Cambridge	Inman CAST II Apartments	125	Homeowner's Rehab, Inc.	MHsg # 71-034N & HUD	Section 8; Section 236
MA	Cambridge	Putnam Green	40	Homeowner's Rehab, Inc.	MHP	Section 42, Section 8, HOME (20)
MA	Cambridge	Putnam Square Apartments	94	Harvard University	MHsg # 69-011	Section 8
MA	Cambridge	Trolley Square Apartments	32	Homeowner's Rehab, Inc.	MHIC	Section 42, Section 8
MA	Cambridge	Trolley Square Condominiums	8	Homeowner's Rehab, Inc.	MHIC	Condominiums
MA	Cambridge	Trolley Square Garage	0	Homeowner's Rehab, Inc.	MHIC	Garage
MA	Cambridge	Walden Square	240	LHC	MHsg # 99-011& HUD	Section 42, Section 8, Section 236
MA	Charlestown	CharlesNewtown	262	Co-operatives of CharlesNEWtown Housing, Inc.	MHsg # 01-349 & HUD	Section 8, Section 236, Co-op
MA	Charlestown	General Warren	95	Boston Housing Authority		Public Housing, Elderly
MA	Charlestown	Mainstay House	14	Nuestra Communidad Development Corporation		Market
MA	Charlestown	Mezzo Design Lofts	146	Canyon Capital Realty Advisors LLC		Market
MA	Chelsea	Box Works Condominiums	26	Chelsea Neighborhood Developers, Inc.		Condominiums
MA	Chelsea	Broadway I	24	Chelsea Neighborhood Developers, Inc.		Market, HOME (11)
MA	Chelsea	Broadway II	5	Chelsea Neighborhood Developers, Inc.		Market, HOME
MA	Chelsea	Chelsea Homes I	86	Chelsea Neighborhood Developers, Inc.		Section 42, HOME (66)
MA	Chelsea	Janus Highland	41	Chelsea Neighborhood Developers, Inc.		Section 42, HOME (11), TOD (9), PBV (8)
MA	Chelsea	NSI Properties	14	Chelsea Neighborhood Developers, Inc.		Market, HOME
MA	Chelsea	Revere Properties	6	Chelsea Neighborhood Developers, Inc.		Market, HOME
MA	Chelsea	Spencer Green	48	Chelsea Neighborhood Developers, Inc.	MHsg # 07-003-N	Section 42, HOME (11), HSF,AHT,CBH,PBV
MA	Chelsea	Spencer Row	32	Chelsea Neighborhood Developers, Inc.		Section 42, HOME (11), CBH (3), PBV(8)
MA	Chicopee	Chicopee Village	290	LHC		Section 42
MA	Chicopee	Westover Field	124	Lend Lease	Navy	Military Housing
MA	Dorchester	412 Talbot Avenue	4	Codman Square Neighborhood Development Corporation		Market
MA	Dorchester	Brown Kaplan	60	Lena Park Community Development Corporation	MHsg # 88-002 - SHARP	Section 42
MA	Dorchester	Carruth Apartments	74	Trinity Financial	MHsg # 04-021N	Section 42, HOME
MA	Dorchester	Carruth Commercial	0	Trinity Financial		Commercial
MA	Dorchester	Carruth Condominiums	42	Trinity Financial		Condominiums
MA	Dorchester	Carruth, The Apartments at	25	Trinity Financial		Market
MA	Dorchester	Codman Square	80	Codman Square Neighborhood Development Corporatio	MHsg # 84-063	Section 8
MA	Dorchester	Dorchester Family Homes	1	Dorchester Bay Economic Development Corporation	LISC	Market
MA	Dorchester	Erie-Ellington	50	Codman Square Neighborhood Development Corporatio	HUD	Section 42
MA	Dorchester	Franklin Hill - Phase 1A	90	Trinity Financial	BHA	Section 42, Section 8, Public Hsg
MA	Dorchester	Franklin Hill - Phase 1B	24	Trinity Financial	BHA	Section 42, Section 8, Public Hsg
MA	Dorchester	Franklin Hill - Phase 2A	114	Trinity Financial	MHsg # 07-024N & BHA	Section 42, Section 8, Public Housing
MA	Dorchester	Franklin Hill - Phase 2B	38	Trinity Financial	MHsg # 07-025N & BHA	Section 42, Section 8, Public Housing
MA	Dorchester	Grand Families	27	Nuestra Communidad Development Corporation		Section 42
MA	Dorchester	Granite Lena Park	143	Lena Park Community Development Corporation	HUD	Section 42, Section 8
MA	Dorchester	Holborn Terrace	8	New Vision CDC	MHP	Section 42
MA	Dorchester	Hope in Dorchester	41	Nuestra Communidad Development Corporation		Section 42
MA	Dorchester	Latin Academy I	58	Codman Square Neighborhood Development Corporatio	MHsg # 84-049	Section 42, Market
MA	Dorchester	LBB Housing	103	Lena Park Community Development Corporation	MHsg # 84-070 - SHARP	Section 8
MA	Dorchester	Levedo Building	24	Codman Square Neighborhood Development Corporatio	MHP	Section 42
MA	Dorchester	Lithgow Commercial	0	Codman Square Neighborhood Development Corporatio	MHIC	Commercial
MA	Dorchester	Lithgow Residential	31	Codman Square Neighborhood Development Corporatio	MHP	Section 42
MA	Dorchester	Lofts At Lower Mills - Phase 1	60	LHC		Market, Affordable
MA	Dorchester	Lofts At Lower Mills - Phase 2	17	LHC		Market
MA	Dorchester	Lucerne Gardens	45	Trinity Financial	MHsg # 89-009 & MHIC	Section 42, HOME, Section 8
MA	Dorchester	Lyndhurst	8	Codman Square Neighborhood Development Corporatio	HUD	Market
MA	Dorchester	New Girls Latin Academy	35	Codman Square Neighborhood Development Corporatio	MHsg # 04-018	Section 42
MA	Dorchester	Norfolk Terrace	18	Codman Square Neighborhood Development Corporatio	MHP	Market
MA	Dorchester	Olmsted Green East - Phase 2	50	Lena Park Community Development Corporation		Section 42
MA	Dorchester	Olmsted Green West - Phase 1	51	Lena Park Community Development Corporation		Section 42
MA	Dorchester	On The Square	0	Codman Square Neighborhood Development Corporatio	Citizens Bank	Commercial
MA	Dorchester	Park Street Congregate Housing	18	Codman Square Neighborhood Development Corporatio	HUD	Section 8
MA	Dorchester	Phillips Brooks	56	New Vision CDC	MHsg # 87-038	Section 42
MA	Dorchester	Quincy Geneva II	94	New Vision CDC	HUD	Section 42, Section 8
MA	Dorchester	Quincy Geneva IV	26	New Vision CDC	HUD	Section 42
MA	Dorchester	Riverway Plaza	0	Trinity Financial		Commercial
MA	Dorchester	Sister Clara Muhammed Housing Coop.	25	Sister Clara Muhammed Housing Corporation	MHP	Section 42

WinnCompanies

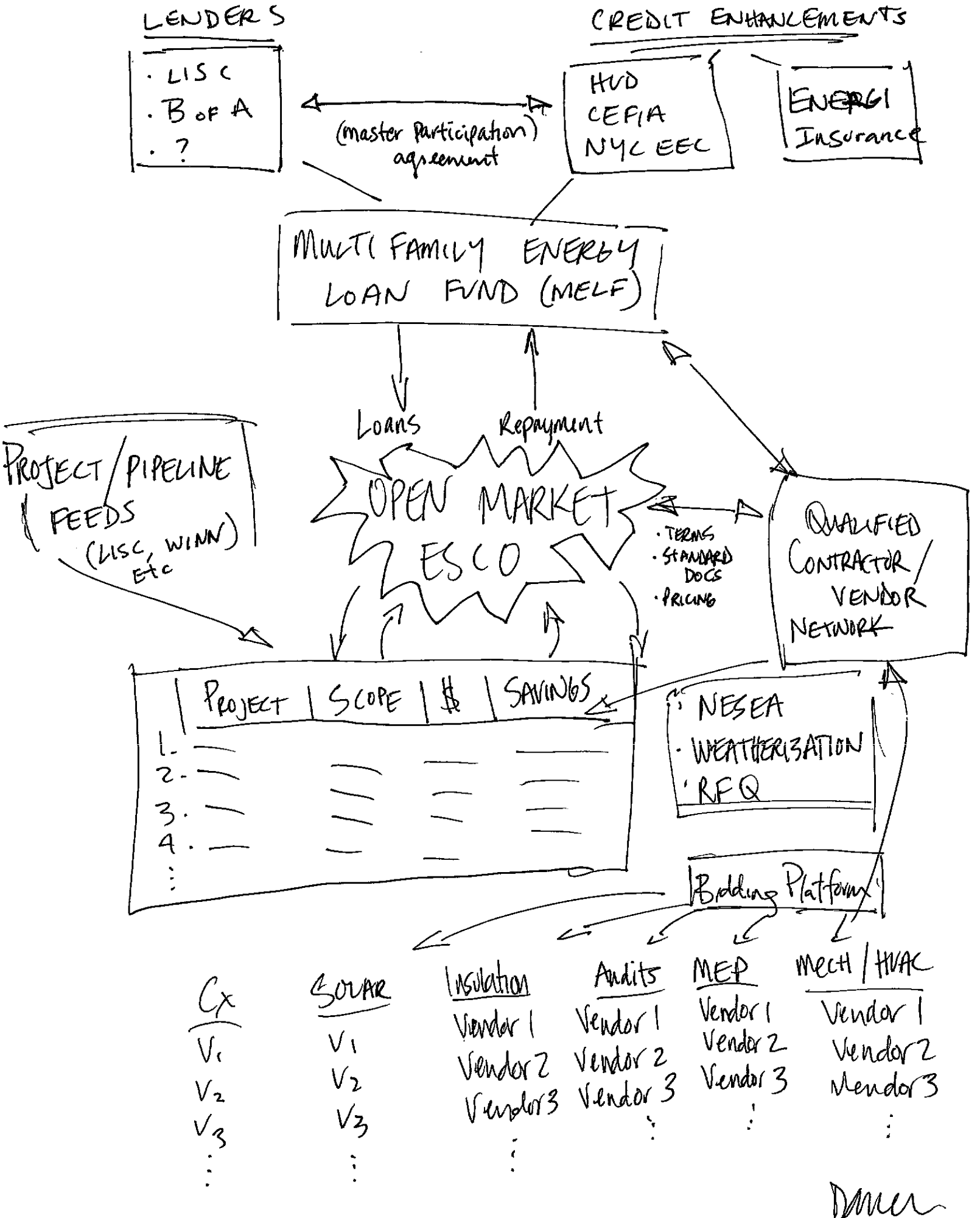
State	City	Site Name	Res Units	Client	Agency	Program Type
MA	Dorchester	Talbot Bernard Homes	44	Codman Square Neighborhood Development Corporatio	MHP	Section 42
MA	Dorchester	Talbot Bernard Senior Housing	30	Codman Square Neighborhood Development Corporatio	HUD	Section 202
MA	Dorchester	Talbot House	14	Codman Square Neighborhood Development Corporatio	HUD	Section 202
MA	Dorchester	Theroch	191	Urban Edge	MHsg # 00-04R, MHIC & HUD	Section 8
MA	Dorchester	Trinity Terrace	62	Trinity Financial	MHsg # 02-003 (incl 1NR)	Section 42, HOME, Section 8
MA	Dorchester	Washington Columbia I	151	Codman Square Neighborhood Development Corporatio	HUD	Section 42, Section 8
MA	Dorchester	Washington Columbia II	175	Codman Square Neighborhood Development Corporatio	HUD	Section 42, Section 8
MA	Dorchester	Washington Park	96	New Vision CDC	MHsg # 84-062	Section 8
MA	Dorchester	Whittier School	14	Codman Square Neighborhood Development Corporatio	DHCD	Budget Based Subsidy
MA	East Boston	Carlton Wharf Condominium	30	Trinity Financial		Condominiums
MA	East Boston	Maverick Landing - Phase 1	150	Trinity Financial	MHsg # 02-012 & BHA	Section 42, Market
MA	East Boston	Maverick Landing - Phase 2	80	Trinity Financial	MHsg # 02-013 & BHA	Section 42, Market
MA	East Boston	Maverick Landing - Phase 3	92	Trinity Financial	MHsg # 04-010N & BHA	Section 42, Market
MA	East Boston	Maverick Landing - Phase 4	74	Trinity Financial	MHsg # 04-012N & BHA	Section 42, Market
MA	Everett	Parkway Heights	74	LHC		Section 42, Market
MA	Fall River	Curtain Lofts	97	LHC	MHsg # 09-005R	Section 42, Market, HOME
MA	Framingham	Mill Falls Condominium	108	Mill Falls Condominium Trust		Condominiums
MA	Framingham	Saxonville Village	64	Winn / RMC	HUD	Section 8
MA	Framingham	Sherwood Park Apartments	81	Sherwood Park Apartments Trust	HUD	Section 8, BMIR
MA	Gardner	Olde English Village	200	LHC	HUD	Section 42, Section 8
MA	Holyoke	Churchill Homes I	50	The Community Builders	Holyoke Hsg Auth	HOPE VI, Section 42
MA	Holyoke	Churchill Homes II	50	The Community Builders	Holyoke Hsg Auth	HOPE VI, Section 42
MA	Hyde Park	Stony Brook Village	98	LHC	MHP	Section 42, Rent Stabilization
MA	Jamaica Plain	Dixwell Park	33	Urban Edge	MHIC	Market
MA	Jamaica Plain	Ennis Highland	6	Urban Edge	HUD	Market
MA	Jamaica Plain	Ennis Highlands Condominium Trust	7	Urban Edge	BCLF	Condominiums
MA	Jamaica Plain	Jamaica Plain	103	Urban Edge	HUD	Section 42, Section 8
MA	Jamaica Plain	Montebello	7	Urban Edge	MHIC & HUD & MHsg	Market
MA	Jamaica Plain	Stony Brook Gardens	50	Stony Brook Gardens Cooperative Corporation	MHP	Section 42
MA	Lowell	Appleton Mills Condominium Associates	130	Trinity Financial		Condominiums
MA	Lowell	Appleton Mills Redev Ph 1A	90	Trinity Financial	MHsg # 08-008	Section 42
MA	Lowell	Appleton Mills Redev Ph 1B	40	Trinity Financial	MHsg # 09-002	Section 42
MA	Lowell	Boott Mills, The Apartments At	154	LHC	MHsg # 03-007	Section 42, Market
MA	Lowell	Loft Two Seven	173	LHC	MHsg # 07-002	Market
MA	Lowell	Parkside Village	99	LHC		Section 42
MA	Lowell	Redwood Terrace	151	LHC	MHsg # 00-012 & Lowell Hsg	Section 42
MA	Lynn	Cobbet Hill	117	Landex Corporation	MHsg # 87-010	Section 42
MA	Malden	Bowdoin Apartments	226	LHC	MHsg # 01-339 & HUD	Section 42, Section 8
MA	Mattapan	Adams Court - A	50	Nuestra Communidad Development Corporation		Section 42
MA	Mattapan	Adams Court - B	45	Nuestra Communidad Development Corporation		Section 42
MA	Medford	Mystic Place	465	Winn	MHsg # 71-069	Market
MA	Melrose	Oak Grove Village - Phase I	550	Pembroke Real Estate		Market
MA	Natick	Deerfield Forest Condominium	334	Deerfield Forest Condominium Trust		Condominiums
MA	New Bedford	Whaler's Place	75	LHC		Section 42, Elderly, HOME
MA	Newburyport	Heritage House	101	Winn	MHsg/Sec8 # 79-002 & HUD	Section 8, Elderly / Disabled
MA	Oxford	New Orchard Hill Estates	215	Trinity Financial	MHsg # 72-013 & HUD	Section 42, Section 236
MA	Peabody	Brown School Residences	61	RSJ Group LLC	MHsg # 05-005	Section 42, Section 8
MA	Quincy	Kendrigan Place	78	LHC		Market, Affordable
MA	Revere	Broadway Tower	92	LHC	MHsg # 91-003	Market, Affordable
MA	Roslindale	Washington Beech - Ph 2A	50	Trinity Financial	BHA	Section 42, Public Housing (35), Section 8 (12)
MA	Roslindale	Washington Beech - Ph 2B	56	Trinity Financial	BHA	Section 42, Public Housing (39), Section 8 (14)
MA	Roslindale	Washington Beech - Phase 1A	28	Trinity Financial	BHA	Section 42, Pub Hsg, HOME, HOPE VI
MA	Roslindale	Washington Beech - Phase 1B	72	Trinity Financial	BHA	Section 42, Pub Hsg, HOME, HOPE VI
MA	Roxbury	11 Mount Pleasant Street	15	Nuestra Communidad Development Corporation		Market
MA	Roxbury	1542 Columbus	0	Urban Edge	MHIC	Commercial
MA	Roxbury	2010 Columbus Ave	0	Urban Edge	First Trade Union	Commercial
MA	Roxbury	4-4A Forest Street	6	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Academy Homes I	202	Urban Edge	MHsg # 97-003 & HUD	Section 42, Section 8, Market
MA	Roxbury	Amory Terrace	64	Urban Edge	MHsg # 03-107N & HUD	Section 42
MA	Roxbury	Bancroft	45	Urban Edge	HUD	Section 42, Section 8
MA	Roxbury	Beauford Green Condominium	29	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Beryl Gardens	20	Madison Park Development Corporation		Section 42
MA	Roxbury	Brunswick Holborn Apartments	49	Dorchester Bay Economic Development Corporation	MHP	Section 42

WinnCompanies

State	City	Site Name	Res Units	Client	Agency	Program Type
MA	Roxbury	Cleaves Court	36	Urban Edge	MHsg # 71-073R & MHIC	Section 42, Section 236
MA	Roxbury	Columbia Wood	49	Dorchester Bay Economic Development Corporation	MHP	Section 42
MA	Roxbury	Daly House	19	Nuestra Communidad Development Corporation	Frmly Site 1082	Section 42
MA	Roxbury	Dartmouth Commercial	0	Nuestra Communidad Development Corporation		Commercial
MA	Roxbury	Dartmouth Hotel	65	Nuestra Communidad Development Corporation		Section 42, Market
MA	Roxbury	Dimock-Bragdon	54	Urban Edge	MHsg # 81-059R & MHP	Section 8
MA	Roxbury	Egleston Center	0	Urban Edge	Citizens Bank	Commercial
MA	Roxbury	Egleston Crossing	64	Urban Edge	HUD	Section 42
MA	Roxbury	Egleston Station	0	Urban Edge	MHIC	Commercial
MA	Roxbury	Harvard Hill	37	Urban Edge	MHP & BHA	Market
MA	Roxbury	Haynes House	131	Madison Park Development Corporation	MHsg # 72-108	Section 42, Section 13A
MA	Roxbury	Howard Dacia	26	Nuestra Communidad Development Corporation		Section 42
MA	Roxbury	Infill 2	13	Nuestra Communidad Development Corporation		Section 42
MA	Roxbury	Kasanof Homes	48	Nuestra Communidad Development Corporation		Section 42, HOME
MA	Roxbury	La Concha	97	Nuestra Communidad Development Corporation	HUD	Section 8
MA	Roxbury	Madison Park III	120	Madison Park Development Corporation	MHsg # 73-041 & HUD	Section 236
MA	Roxbury	Madison Park IV	143	Madison Park Development Corporation	HUD	Section 8
MA	Roxbury	New Academy Estates	236	United Residents in Academy Homes	MHsg # 96-006 & HUD	Section 8
MA	Roxbury	Nuestra Palladio	0	Nuestra Communidad Development Corporation	Frmly Site 1088	Commercial
MA	Roxbury	Roussin Center, The	0	Urban Edge	MHP, BHA & MBHP	Commercial
MA	Roxbury	Roxbury Development	26	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Roxbury Triangle	9	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Sargent Prince	30	Nuestra Communidad Development Corporation		Section 42
MA	Roxbury	Senior Vacant Unit	3	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Smith House	132	Madison Park Development Corporation	MHsg # 72-058 & HUD	Section 42, Section 13A
MA	Roxbury	Stafford Heights	41	Nuestra Communidad Development Corporation		Section 42
MA	Roxbury	Swifty Auto Mall	0	Nuestra Communidad Development Corporation		Commercial
MA	Roxbury	U.E.L.P.	82	Urban Edge	MHsg # 86-037R & HUD	SHARP; MOD 8, MVRP
MA	Roxbury	Urban Edge II	65	Urban Edge	MHsg # 03-107N	Section 8
MA	Roxbury	Vila Nova	16	Nuestra Communidad Development Corporation		Market
MA	Roxbury	Wardman	88	Urban Edge	MHsg # 00-04R & MHIC	Section 8
MA	Roxbury	Westminster Court	70	Urban Edge	MHP	Section 42, Market
MA	Salem	Pequot Highlands	250	Winn	MHsg # 71-115 & HUD	Section 42, Section 236
MA	Somerville	Bow Street	18	Somerville Community Corporation		Section 42
MA	Somerville	Gilman Street	6	Somerville Community Corporation		Market
MA	Somerville	Linden Street	42	Somerville Community Corporation		Section 42, Section 8
MA	Somerville	Saint Polycarp Apartments II	29	Somerville Community Corporation		Section 42 (29), Section 8 (8)
MA	Somerville	Saint Polycarp Village	24	Somerville Community Corporation		Section 42
MA	Somerville	Sewall Place	14	Somerville Community Corporation		Section 8
MA	Somerville	Walnut Apartments	12	Somerville Community Corporation	HUD	Section 8
MA	Springfield	Allen Park I	170	Allen Park Tenants Association	MHsg # 94-006 & HUD	Section 42, Section 8
MA	Springfield	Allen Park II	94	Allen Park Tenants Association	MHsg # 94-007 & HUD	Section 42, Section 8
MA	Springfield	Eastbrook Village	160	LHC	MHsg # 71-016 & HUD	Section 42, Section 236
MA	Springfield	Forest Park Apartments	109	LHC	MHsg # 08-114	Section 42
MA	Springfield	Museum Park Condominiums	114	LHC		Section 42
MA	Springfield	Northern Heights	148	LHC	MHsg # 72-050	Section 42, Section 13A
MA	Tyngsboro	Whitman Woods	72	Dakota Partners	MHsg # 09-007	Section 42
MA	Webster	Hartley Terrace	54	LHC	HUD	Section 42, Section 8, Section 236
MA	Webster	North Village	134	Winn	MHsg # 70-117 & HUD	Section 42, Section 236, HOME
MA	Webster	Prospect Estates	25	LHC	MHIC	Section 42, HOME
MA	Westfield	Edgewood Apartments	84	LHC		Section 42
MA	Weymouth	Fulton School	63	RSJ Group LLC		Section 42
MA	Worcester	Canal Lofts	64	LHC		Section 42 (32), Market (32)
MA	Worcester	Coes Pond Village	250	LHC	MHsg # 73-090 & HUD	Section 42, Section 236, Elderly
MA	Worcester	Hadley Apartments	44	AEGON	MHsg # 05-009R (incl 1NR)	Section 42, HOME, Market
MA	Worcester	Matheson	70	Matheson Corporation	HUD	Section 8
MA	Worcester	Wellington Community	180	Winn / RMC	MHsg/Sec8 # 79-079 & HUD	Section 8
NY	Albany	Knox Street Apartments	47	LHC	DHCR/HUD	Section 42
NY	Black River	Fort Drum Mountain Community Homes	3,861	Lend Lease	Army	Military Housing
NY	Bronx	Diego Beekman	1,238	Diego Beekman Mutual Housing Association, HDFC		
NY	Bronx	Morris Heights Mews	110	Vitus Development	HUD	Section 8 Section 42 Rehab in Dev
NY	Fairport	Pines of Perinton	508	Affordable Housing Consultants, Inc.	DHCR/HUD	Section 42, Section 236, RAP
NY	Harlem	West 149th Street	78	Harlem Congregations for Community improvement, Inc.		Section 42 (78); HOME (25)
NY	Henrietta	Stonewood Village	188	PathStone Management Corporation, Inc.	HUD	Section 8, Section 42, Market

WinnCompanies

State	City	Site Name	Res Units	Client	Agency	Program Type
NY	Kingston	Spring Brook Village	122	LHC	DHCR/HUD	Section 42, Section 236
NY	New Windsor	Stewart Terrace	171	Lend Lease	Navy	Military Housing
NY	New York	60 St. Nicholas Housing	53	Harlem Congregations for Community improvement, Inc.		Section 42
NY	New York	Angelou Court	23	Harlem Congregations for Community improvement, Inc.		Section 42
NY	New York	Charles Inniss House	21	Harlem Congregations for Community improvement, Inc.		Market
NY	New York	Dinkins Gardens	85	Harlem Congregations for Community improvement, Inc.		Section 42
NY	New York	Garden of Eden	94	Harlem Congregations for Community improvement, Inc.		Section 42 (71), Market (23) , HOME (62)
NY	New York	Hurston Place	58	Harlem Congregations for Community improvement, Inc.		Market (22) , HOME (21)
NY	New York	Macombs Manor	55	Harlem Congregations for Community improvement, Inc.		Section 42
NY	New York	Parkside Plaza	36	Harlem Congregations for Community improvement, Inc.		Section 42
NY	New York	Sumpter Marcus	49	Northeast Brooklyn Housing Development Corporation		Section 42 (40), Market (9)
NY	New York	West 137th Street	72	Harlem Congregations for Community improvement, Inc.		Section 42 (53), Market (19) , HOME (36)
NY	New York	West 147th Street	41	Harlem Congregations for Community improvement, Inc.		Section 42 (30), Market (11) , HOME (27)
NY	North Syracuse	Centerville Court	152	LHC	DHCR/HUD	Section 236, Elderly
NY	Rochester	Andrews Terrace	526	PathStone Management Corporation, Inc.	HUD	Section 42, Section 8
NY	Syracuse	Madison Towers	232	Boston Financial Management Investment	DHCR/HUD	Market
RI	North Providence	Brook Village	101	Winn	RIHMFC #RI43-H023-001	Section 8, Elderly / Disabled
RI	North Providence	Spring Villa Apartments	100	Omni Development Corporation	HUD	Section 42, Section 8
RI	Providence	1890 House	53	Omni Development Corporation		Section 8
RI	Providence	Anchor Cooperative	9	Stop Wasting Abandoned Properties		Affordable
RI	Providence	Baffin Court	22	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Cornplanter Row	36	Omni Development Corporation		Section 42
RI	Providence	Friendship Pine	31	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Governor, The	57	Omni Development Corporation	HUD	Section 8
RI	Providence	Harvard / Broad I	9	Omni Development Corporation	RIHMFC	Section 42
RI	Providence	Harvard /' Dartmouth / Comstock II	43	Omni Development Corporation	RIHMFC	Section 42
RI	Providence	Lockwood Plaza	209	LHC	Providence Hsg Auth	Section 42
RI	Providence	Maple Gardens	90	Omni Development Corporation	HUD	Section 8
RI	Providence	Niagara Place	18	Omni Development Corporation	RIHMFC	Section 8
RI	Providence	Omni Point	51	Omni Development Corporation	HUD	Section 8
RI	Providence	Potters Avenue	37	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Providence Tanner	27	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Southside Gateways	50	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Trinity Place	41	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Turning Point	14	Omni Development Corporation		Affordable
RI	Providence	Upper Pine	47	Stop Wasting Abandoned Properties	RIHMFC	Section 42
RI	Providence	Valley Apartments	154	Omni Development Corporation	HUD	Section 42, Section 8
RI	Providence	Whitmarsh, The	16	Omni Development Corporation	RIHMFC	Section 42
RI	Providence	Wiggin Village	285	Providence Building, Sanitary & Education Association	HUD	Section 8
RI	Providence	Williams Woods	65	LHC		Section 42
RI	Woonsocket	Waterview Apartments	100	Omni Development Corporation	HUD	Section 42, Section 8
296		**TOTAL CURRENT PORTFOLIO**	**30,973**			


LENDERS
· LISC
· B of A
· ?
(master Participation) agreement
CREDIT ENHANCEMENTS
HUD
CEFIA
NYC EEC
ENERGI Insurance
MULTI FAMILY ENERGY LOAN FUND (MELF)
Loans
Repayment
PROJECT / PIPELINE FEEDS (LISC, WINN) Etc
OPEN MARKET ESCO
· TERMS
· STANDARD DOCS
· PRICING
QUALIFIED CONTRACTOR / VENDOR NETWORK
PROJECT | SCOPE | $ | SAVINGS
1.
2.
3.
4.
· NESEA
· WEATHERIZATION
· RFQ
Bidding Platform
Cx
V1
V2
V3
SOLAR
V1
V2
V3
Insulation
Vendor 1
Vendor 2
Vendor 3
Audits
Vendor 1
Vendor 2
Vendor 3
MEP
Vendor 1
Vendor 2
Vendor 3
Mech / HVAC
Vendor 1
Vendor 2
Vendor 3

ENERGY SAVINGS PERFORMANCE CONTRACT

This document is part of a collection of model procurement and contracting documents that represent Best Practices for state energy offices (SEOs) to launch and administer programs to increase energy efficiency through Energy Savings Performance Contracting. The documents draw from successful programs in various states and are continually updated to incorporate the latest strategies. They can be easily customized to meet the needs of any SEO or similar government department.

DESCRIPTION –Energy Savings Performance Contract

This Energy Savings Performance Contract is for design, construction, guarantee, and follow-up monitoring of energy-saving projects. An energy audit was previously completed that identified the costs and savings of each project. The audit provides the basis to develop and negotiate this Energy Savings Performance Contract.

This is a model document only and does not attempt to identify or address all circumstances or conditions you may encounter or desire. Consult with your legal counsel and procurement staff to adapt it to meet your needs.

MODEL ENERGY SAVINGS PERFORMANCE CONTRACT
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Schedule D-G Left blank for optional schedules

Payments and Schedule

Schedule H Final Project Cost & Project Cash Flow Analysis
Schedule I Financing Agreement and Payment Schedule
Schedule J Compensation to ESCO for Annual Services
Schedule K Rebates, Incentives and Grants
Schedule L-P Left blank for optional schedules

Design and Construction Phase

Schedule Q Description of Project Site(s)
Schedule R Equipment to be Installed by ESCO
Schedule S Construction and Installation Schedule
Schedule T Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment
Schedule U Standards of Comfort
Schedule V ESCO's Training Responsibilities
Schedule W-AA Left blank for optional schedules

Post-Construction

Schedule BB ESCO's Maintenance Responsibilities
Schedule CC Institution's Maintenance Responsibilities
Schedule DD Facility Maintenance Checklist
Schedules EE – II Left blank for optional schedules

Administration

Schedule JJ Alternative Dispute Resolution Procedures
Schedule KK – OO Left blank for optional schedules

Optional Schedules

Pre-Existing Service Contracts
Energy Savings Projections
Facility Changes Checklist
Current and Known Capital Projects at Facility

Exhibits

Exhibit I Performance Bond
Exhibit II Labor and Material Payment Bond ***if required***
Exhibit III (i) Certificate of Acceptance—Investment Grade Audit Report
Exhibit III (ii) Certificate of Acceptance—Installed Equipment
Exhibit IV Equipment Warranties
Optional Exhibits
Manifest of Ownership
Minority and Woman-Owned Business Certification
Certification that Financing Term is no Longer than the Aggregated Equipment Lifetime
Notice of Substantial Completion
Notice to Proceed with Construction Phase
Record of Reviews by Institution

Appendices

Appendix A RFP for ESCO Solicitation (Pre-qualification Phase; Final Selection Phase)
Appendix B ESCO Proposal (Pre-qualification Phase; Final Selection Phase)
Appendix C Investment Grade Audit and Project Development Contract
Appendix D Investment Grade Audit Report

MODEL ENERGY SAVINGS PERFORMANCE CONTRACT

This Energy Savings Performance Contract (the "Contract") is made and entered into as of this day of _____, at _____, in the County of _____, State of _____, by and between _____("ESCO"), having its principal offices at _____, and _____ ("Institution") having principal offices at _____, for the purpose of installing certain energy and water cost saving equipment, described in **Schedule R (Equipment to Be Installed by ESCO)**, and providing other services designed to save energy for the Institution's property and buildings, known as_____, located at _____ (the "Project Site(s)").

RECITALS

WHEREAS, Institution owns and operates the Project Site(s), and is in need of energy and water cost saving equipment and services designed to save energy and associated energy costs at said Project Sites; and

WHEREAS, Institution has been authorized to enter into a third party financing agreement for all professional services, equipment and construction for the purchase and installation of energy and water cost savings measures, collectively referred to as the "Work" (as herein after defined); and

WHEREAS, ESCO has developed or become knowledgeable about certain procedures for controlling energy and water consumption through services provided and equipment installed and maintained at project sites similar in scope and scale of Institution; and

WHEREAS**,** ESCO was selected after a determination that its proposal was the most advantageous to Institution pursuant to a Request for Proposal and contract for the Investment Grade Audit and Project Development Proposal (as hereinafter defined); and

WHEREAS, ESCO has made an assessment of the utility consumption characteristics of the Project Site(s) and existing Equipment described in **Schedule Q (Description of Project Site(s))**, which was delivered to Institution as a Investment Grade Audit Report which Institution has approved and is attached as **Appendix D: Investment Grade Audit Report**; and

WHEREAS, Institution desires to retain ESCO to purchase, install and service certain energy and water cost savings equipment and to provide other services and strategies described in the attached Schedules, for the purpose of achieving energy and water cost reductions within Project Site(s), as more fully described herein; and

WHEREAS, Institution is authorized under the Constitution and the laws of the State of _____ to enter into this Contract for the purposes set forth herein.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, and intending to be legally bound hereby, Institution and ESCO hereto covenant and agree that the following Schedules, Exhibits and Appendices are attached hereto (or will be, as provided in this Contract) and are made a part of this Contract by reference.

ARTICLE 1. DEFINITIONS, SCHEDULES, EXHIBITS AND APPENDICES

Section 1.1. Definitions.

Certificate of Acceptance: The certificate substantially in the form provided in **Exhibit III**.

Contract: This Energy Savings Performance Contract and all Schedules and Exhibits attached hereto.

Contract Sum: The sum of all materials, labor, auditing, design, engineering, project construction management fees, overhead, profit, contingency, subcontracted services related to the project.

Energy and Water Cost Savings: The savings as provided in **Schedule A (Savings Guarantee).**

Energy and Cost Savings Guarantee: The guarantee that is achieved as a result of the installation and operation of the Equipment and provision of services provided for in this Contract as specified in **Schedule J (Compensation to ESCO for Annual Service)** and in accordance with the Savings Calculation Formula as set forth in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements).**

Equipment: The goods enumerated on **Schedule R (Equipment to be Installed by ESCO)** that is now or hereafter from time to time become attached hereto and incorporated herein by reference, together and with any and all additions, modifications, attachments, replacements and parts thereof.

Event of Default: Those events described in **Section 20 (Events of Default)** hereof.

Interim Period: The period from contract execution until the Commencement Date.

Commencement Date: The date described in **Section 2.2 (Commencement Date).**

Project Site(s): The facilities of the Institution in need of energy and water saving equipment and services designed to reduce consumption and associated costs at said Project Site(s)

Investment Grade Audit: A study by the qualified energy services provider selected for a particular Energy Savings Performance Contract project which includes detailed descriptions of the improvements recommended for the project, the estimated costs of the improvements and the utility and operations and maintenance cost savings projected to result from the recommended improvements.

Work: Collectively, the Equipment, professional services and project construction related to the project.

Section 1.2. Investment Grade Audit Report and Project Development Proposal.

Section 1.2: This section records the approval and acceptance by the Institution of the Investment Grade Audit Report which must be completed prior to the execution of this contract. A Certificate of Acceptance of the audit should be signed by both parties and attached to the contract (Exhibit III (i). If the list of measures is not completely finalized prior to the signing of this contract, then language to that effect should be included.

ESCO has prepared the complete Investment Grade Audit Report of the Project Site(s) set forth in **Appendix D (Investment Grade Audit Report)** which has been approved and accepted by Institution as set forth in Exhibit III (i) (**Certificate of Acceptance—Investment Grade Audit Report)**. The audit includes all measures agreed upon by the parties.

Section 1.3. Schedules, Exhibits and Appendices

Section 1.3: The contract schedules detail the substantive technical parameters of the projects negotiated by the parties and accepted and approved by the Institution. These schedules are also referenced throughout the various sections of the Contract. Their titles may be included here for ease of reference or located at the end of the contract. If any schedules need to be completed after execution of the contract, language to the effect they are forthcoming should be included. (Please note that descriptions for each contract schedule are provided at the end of this sample contract document under the heading of Attachment I.)

ESCO has prepared and Institution has approved and accepted the following Schedules, copies of which are attached hereto (or will be as provided for in the Contract), set forth in their entirety as Attachment I and made a part of this Contract by reference.

Schedules

Savings Guarantee

Schedule A	Savings Guarantee
Schedule B	Baseline Energy Consumption; Methodology to Adjust Baseline
Schedule C	Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements
Schedule D-G	Left blank for optional schedules

Payments and Schedule

Schedule H	Final Project Cost & Project Cash Flow Analysis
Schedule I	Financing Agreement and Payment Schedule
Schedule J	Compensation to ESCO for Annual Services
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Design and Construction Phase

Schedule Q	Description of Project Site(s)
Schedule R	Equipment to be Installed by ESCO
Schedule S	Construction and Installation Schedule
Schedule T	Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment
Schedule U	Standards of Comfort
Schedule V	ESCO's Training Responsibilities
Schedule W-AA	Left blank for optional schedules

Post-Construction

Schedule BB	ESCO's Maintenance Responsibilities
Schedule CC	Institution's Maintenance Responsibilities
Schedule DD	Facility Maintenance Checklist
Schedules EE – II	Left blank for optional schedules

Administration

Schedule JJ	Alternative Dispute Resolution Procedures
Schedule KK – OO	Left blank for optional schedules

Optional Schedules

Pre-Existing Service Contracts
Energy Savings Projections
Facility Changes Checklist
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Certification that Financing Term is no Longer than the Aggregated Equipment Lifetime
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Section 1.4. Other Documents

Section 1.4: This section makes the original Request for Proposals (RFP) and the selected ESCO's proposal part of the contract. It also acknowledges the completion of the ESCO's Investment Grade Audit Report and its approval and acceptance by the Institution. It is recommended that the original Investment Grade Audit Report in its entirety be attached and/or referenced as an Exhibit to this contract. It is important to note the last sentence of this provision makes it clear that if there is any future discrepancy between the Investment Grade Audit Report and any technical schedule(s), the terms of this contract shall apply.

This Contract incorporates herein and makes a part hereof the entire RFP and ESCO Proposal for this Project labeled Appendix A and B respectively. Acceptance by the Institution of the Investment Grade Audit Report is reflected in Exhibit III (i). Notwithstanding, the provisions of this Contract and the attached Schedules shall govern in the event of any inconsistencies between the Investment Grade Audit Report and the provisions of this Contract.

PAYMENTS AND SCHEDULES

ARTICLE 2. PURCHASE AND SALE; COMMENCEMENT DATE AND TERMS; INTERIM PERIOD

Section 2.1. Purchase and Sale

Section 2.1. When using a third-party lease-purchase structure the ESCO will receive 100% of the Contract Sum from the Institution once the Certificate of Acceptance is signed. The payments to the ESCO during the construction period (Interim Period) can be drawn down by the ESCO from the proceeds of the lease through an escrow account set up by the leasing ESCO. Payments will be made based upon the percentage of work completed and approved by the Institution. The Institution should require a___% retainage be withheld from the ESCO until the Certificate of Acceptance is executed at which time final payment can be made.

Institution agrees to lease Equipment through a third party financier, name of lender, as provided for in a separate lease document, **Schedule I (Financing Agreement and Payment Schedule).** ESCO agrees to provide the Equipment, together with installation, maintenance and other services as provided herein, as in **Schedule R**, **(Equipment to be Installed by ESCO)** based upon the terms and conditions set forth in **Schedule I (Financing Agreement and Payment Schedule).**

The agreed to Contract Sum for the Work is a Guaranteed Maximum Price of $ _____ as set forth in **Schedule H (Final Project Cost & Project Cash Flow Analysis)**. Payment terms are described in **Schedule I (Financing Agreement and Payment Schedule)**.

ESCO will provide the Work and all related services identified in **Schedule R (Equipment to be Installed by ESCO)** and the services detailed in **Schedule BB (ESCO's Maintenance Responsibilities)** and **Schedule J (Compensation to ESCO for Annual Services)**. ESCO shall supervise and direct the Work and shall be responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under this Contract. ESCO shall be responsible to pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution and completion of the Work.

Institution shall pay ESCO the Contract Sum in accordance with **Schedule I (Financing Agreement and Payment Schedule)**. Payments will be made on a progress basis in accordance with **Schedule I (Financing Agreement and Payment Schedule),** for Work completed and authorized by Institution during the Interim Period. The Progress Payments outlined in **Schedule I (Financing Agreement and Payment Schedule)** will not be applicable to this Contract. Retainage of ___% will be withheld from each payment until the construction installation is completed as set forth in **Section 2.2 (Commencement Date)**.

Section 2.2. Commencement Date

Section 2.2: This section defines the Commencement Date which is the actual beginning date for the savings guarantee period. It is standard for this date to be the first month AFTER the ESCO has completed construction and delivered a notice that all equipment is installed and operating. In addition, the Institution will have accepted the installation by signing a Certificate of Acceptance which should be attached to the contract. It also clearly states that no payment for any of the ESCO's on-going services (e.g. measurement and verification, project monitoring, maintenance, training etc.) will be made prior to the Commencement Date. It is recommended that the repayment obligation of project financing be arranged to coincide with the Commencement Date. The timing of the Commencement Date may also need to be arranged to accommodate the Institution's fiscal year for the purpose of appropriations and budgeting. This date alignment should not prevent the ESCO from timely remuneration for training and other services performed prior to Commencement Date.

The Commencement Date shall be the first day of the month after the month in which all schedules are in final form and accepted by Institution and ESCO shall have delivered a Notice to Institution that it has installed and commenced operating all of the Equipment specified in **Schedule R (Equipment to be Installed by ESCO)** and in accordance with the provisions of **ARTICLE 8 (Construction Schedule and Equipment Installation; Approval), Schedule S (Construction and Installation Schedule)** and **Schedule T (Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment);** and Institution has inspected and accepted said installation and operation as evidenced by the Certificate of Acceptance as set forth in **Exhibit III (ii) (Certificate of Acceptance—Installed Equipment).**

Notwithstanding anything to the contrary in this **Article 2** and **Article 3 (Purchase and Sale; Commencement Date and Terms; Interim Period),** the Commencement Date shall not occur and the Institution shall not be required to accept the work under this Contract unless and until all Equipment installation for the Project Site(s) is completed by ESCO in accordance with the terms and conditions of this Contract. Institution shall have _____ days after notification by the ESCO to inspect and accept the Equipment. Institution reserves the right to reject the Equipment if installation fails to meet reasonable standards of workmanship, does not comply with applicable building codes, or is otherwise not in compliance with this Contract. ESCO shall not be paid in full, including retainage, until after the punch list is completed and ESCO has satisfied any and all claims for labor and materials and the Certificate of Acceptance has been signed. The Certificate of Acceptance will not be unreasonably withheld by the Institution.

Compensation payments due to ESCO for on-going services and maintenance under this Contract as set forth in **Schedule J (Compensation to ESCO for Annual Services)** shall begin no earlier than _____ from the Commencement Date as defined herein.

Section 2.3. Term of Contract; Interim Period

Section 2.3: Prior to the Commencement Date (Section 2.2) the final contract and technical schedules are negotiated and executed by signature. At that point in time the ESCO typically begins the final design of the project and finalizes the construction schedule with the Institution. The "Interim Period" refers to the construction period, during which some amount of energy savings will start to accrue. The treatment of those energy savings can be negotiated to either be credited to the ESCO's guarantee or credited to the Institution. If such savings are credited to the ESCO's guarantee, it is recommended that such credit be extended for a specified period of time (e.g. 1-2 years). If the ESCO is credited with the interim period savings, the Institution and ESCO will need to agree to develop an approach to the measurement of those savings.

Subject to the following sentence, the term of this Contract shall be _____ years measured beginning with the Commencement Date. Nonetheless, the Contract shall be effective and binding upon the parties immediately upon its execution, and the period from contract execution until the Commencement Date shall be known as the "Interim Period". All energy savings achieved during the interim period will be fully credited to Institution.

ARTICLE 3. SAVINGS GUARANTEE; ANNUAL RECONCILLIATION; PAYMENTS TO ESCO

Section 3.1. Energy and Cost Savings Guarantee

Section 3.1: This section establishes the term of the Energy and Cost Savings Guarantee to be on an annual basis and structured to cover any and all annual payments (debt service/lease payment and on-going ESCO fees) to be made by the Institution. It ensures that the ESCOs' savings guarantee will at least cover annual project lease-purchase costs (principal and interest) and all annual ESCO service fees for maintenance.

ESCO has formulated and, subject to the adjustments provided for in **ARTICLE 15 (Material Changes),** has guaranteed the annual level of energy and water cost savings to be achieved as a result of the installation and operation of the Equipment and provision of services provided for in this Contract in accordance with the methods of savings measurement and verification as set forth in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting**

Requirements). The Energy and Cost Savings Guarantee is set forth in annual increments for the term of the Contract as specified in **Schedule A (Savings Guarantee)** and has been structured by the ESCO to be sufficient to cover any and all annual payments required to be made by the Institution as set forth in **Schedule J (Compensation to ESCO for Annual Services)** and **Schedule I (Financing Agreement and Payment Schedule).**

Section 3.2. Annual Review and Reimbursement/Reconciliation

Section 3.2: At the end of each year of the contract and within a specified number of days, there will be a review and reconciliation of the actual achieved savings (subject to any adjustments made for weather, occupancy, operations etc.) with the ESCO's guaranteed savings. If there is a savings shortfall, the ESCO is contractually liable to reimburse the Institution for the difference between what was actually achieved and the amount guaranteed. If in any future year, the achieved savings exceed the guarantee, the excess savings will be used to reimburse the ESCO for any shortfall payments made in previous years. It is recommended that all excess savings be retained by the Institution except when the ESCO has had a previous year's shortfall and not be credited to satisfy savings guarantees in future years of the contract. Institution may negotiate to receive cash, equipment or services equivalent to any deficiency in savings.

Energy-related cost savings shall be measured and/or calculated as specified in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting)** and **Schedule B (Baseline Energy Consumption; Methodology to Adjust Baseline)** and a report provided within ninety (90) days of the end of the year for the previous year for each anniversary of the Commencement Date.

In the event the Energy and Cost Savings achieved during such guarantee year are less than the Guaranteed Energy and Cost Savings as defined in **Schedule A (Savings Guarantee),** ESCO shall pay the Institution an amount equal to the deficiency.

The ESCO shall remit such payments to the Institution within ___ days of written notice by the Institution of such monies due. When the total energy savings in any one year during the guarantee period exceed the Energy and Cost Savings Guarantee as set forth in **Schedule A (Savings Guarantee)** and are in addition to those monies due the ESCO for compensation for services as set forth in **Schedule J (Compensation to ESCO for Annual Services)**, such excess savings shall first be applied to reimburse ESCO for any payment ESCO made to Institution to meet ESCO's guarantee for previous years in which the energy savings fell short of ESCO's Energy and Cost Savings Guarantee under the terms as set forth in **Schedule A (Savings Guarantee)**. In no event shall credit for excess savings be used to satisfy saving guarantees in future years of the Contract

Section 3.3. ESCO Compensation and Fees

Section 3.3: This section ensures that the ESCO's savings guarantee will, at a minimum, cover annual project financing costs (principal and interest). In addition, it states that all annual ESCO service fees for maintenance will also be paid from savings.

ESCO has structured the Energy and Cost Savings Guarantee referred to in 3.1 above, to be sufficient to include any and all annual payments required to be made by the Institution in connection with financing/purchasing the Equipment to be installed by ESCO under this Contract as set forth in **Schedule I** (**Financing Agreement and Payment Schedule)**. Actual energy and operations savings achieved by ESCO through the operation of Equipment and performance of services by ESCO shall be sufficient to cover any and all annual fees to be paid by Institution to ESCO for the provision of services as set forth

and in accordance with the provisions of **Schedules J (Compensation to ESCO)** and **BB (ESCO's Maintenance Responsibilities)**.

Section 3.4. Billing Information Procedure

Sections 3.4 & 3.5: These sections which deal with payment can be negotiated and structured to suit the needs of the Institution. It is, however, important to provide the ESCO with monthly utility bills and to do so in a timely manner. The project's billing schedule for on-going ESCO services can be set up on a monthly or quarterly basis.

Payments due to ESCO under this Section 3 shall be calculated each _____in the following manner:

(i) By the _____ day after receipt, Institution shall provide ESCO with copies of all energy bills for the Project Site(s) which it shall have received for the preceding month;

(ii) Upon receipt of the required information, ESCO shall calculate the savings in accordance with the agreed-upon calculation formulae in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements)**.

(iii) Based upon paragraphs (i) and (ii) above, ESCO shall prepare and send to Institution a _____invoice which shall set forth for each_____ the amounts of the energy and operations dollar savings calculated in accordance with **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Report Requirements)** and for the services as provided for in **Schedule J (Compensation to ESCO for Annual Services)**. The invoice will set forth the total _____payment due from Institution.

Section 3.5. Payment

Institution shall pay ESCO within ___ days of receipt of ESCO's invoice.

Section 3.6. Effective Date of Payment Obligation

Section 3.6: This section states that no ESCO fees for ongoing maintenance, monitoring or other services shall be paid until all equipment in installed and operating in accordance with the agreed upon Construction Schedule and Institution has approved the completed installation and signed the requisite Certificate of Acceptance—Installed Equipment.

Notwithstanding the above provisions in Section 3, Institution shall not be required to begin any payments to ESCO under this Contract unless and until all equipment installation is completed by ESCO in accordance with the provisions of **Article 8 (Construction and Equipment Installation; Approval)** and **Schedule T (Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment),** and accepted by Institution as evidenced by the signed Certificate of Acceptance as set forth in **Exhibit III (ii) (Certificate of Acceptance—Installed Equipment)**, and unless and until said equipment is fully and properly functioning.

Section 3.7. Open Book Pricing

Section 3.7: This section establishes that the ESCO will fully disclose all costs, providing access to records for all labor and material costs, making them available for three years beyond final payment.

Open book pricing will be required, such that the Contractor will fully disclose all costs of materials and labor purchased and subcontracted by the ESCO and a list of hourly rates and position descriptions for labor or services provided by the ESCO. Estimates for number of hours required for the project and deviations of these budgeted hours shall require prior written approval by the owner or shall not be paid. Contractor will maintain cost accounting records on authorized work performed under actual costs for labor and material, or other basis requiring accounting records. Contractor will afford Agency access to these records and preserve them for a period of three (3) years after final payment. Costs will be evaluated through price analysis to compare costs with reasonable criteria such as established catalog and market prices or historical prices. The pricing methodology and individual cost markups disclosed during preliminary contract negotiations will be expected to be applied, providing the scope and size of the project remain the same as assumed when markups were disclosed.

Institution shall have the right to audit all books and records (in whatever form they may be kept, whether written, electronic or other) relating or pertaining to this contract or agreement (including any and all documents and other materials, in whatever form they may be kept, which support or underlie those books and records), kept by or under the control of the ESCO, including, but not limited to those kept by the ESCO, its employees, agents, assigns, successors and subcontractors.

The ESCO shall maintain such books and records, together with such supporting or underlying documents and materials, for the duration of this contract or agreement and for at least 3 years following the completion of this contract, guarantee period, or agreement, including any and all renewals thereof. The books and records, together with the supporting or underlying documents and materials shall be made available, upon request, to through its employees, agents, representatives, contractors or other designees, during normal business hours at the ESCO's office or place of business. In the event that no such location is available, then the books and records, together with the supporting or underlying documents and records, shall be made available for audit at a time and location at, location, which is convenient for ESCO.

ARTICLE 4. FISCAL FUNDING

Section 4.1. Non-appropriation of Funds

Section 4.1: This section protects the Institution in the event no funds or insufficient funds are appropriated to cover the financial payments due to the ESCO under the terms of this Contract, in effect terminating the contract with no penalty to the Institution. This is a standard provision in public sector performance contracting and is generally accepted by the ESCO industry since it is unlikely that funding for utilities (source of funds) would be withheld.

In the event no Institution or other funds or insufficient Institution or other funds are appropriated and budgeted, and funds are otherwise unavailable by any means whatsoever in any fiscal period for which payments are due ESCO under this Contract, then the Institution will, not less than ___ days prior to end to such applicable fiscal period, in writing, notify the ESCO of such occurrence and this Contract shall terminate on the last day of the fiscal period for which appropriations were made without penalty or expense to the Institution of any kind whatsoever, except as to the portions of payments herein agreed upon for which Institution and/or other funds shall have been appropriated and budgeted or are otherwise available.

Section 4.2. Non-substitution

Section 4.2: In the rare event that funds were not appropriated or the Institution is in default, and to protect the ESCO, this provision prevents the Institution from securing funding for the same purposes for a period of one year following the termination of the contract.

In the event of a termination of this contract due to the non-appropriation of funds or in the event this Contract is terminated by ESCO due to a default by the Institution, the Institution agrees, to the extent permitted by state law, not to purchase, lease, rent, borrow, seek appropriations for, acquire or otherwise receive the benefits of any of the same and unique services performed by ESCO under the terms of this Contract for a period of three-hundred sixty five (365) calendar days following such default by Institution, or termination of this Contract due to non-appropriations.

AUDIT AND CONSTRUCTION PHASE

ARTICLE 5. ENERGY USAGE RECORDS AND DATA

Article 5: This section ensures that the ESCO has access to the historical energy consumption, facility operations and occupancy data in order to develop baseline utility consumption. At a minimum, there should be 24 months of data made available, however, 36 months is recommended. Existing facility conditions, operations and equipment needs to be carefully recorded to establish an accurate baseline. This will serve as a record of your buildings as they were configured prior to project installation and will be critical to the establishment and adjustment of baseline, and measurement of savings. As well, any prior technical studies and/or energy audits should also be made available for the ESCO's review and verification.

Institution has furnished and shall continue to furnish (or authorize its energy suppliers to furnish) during the Term of this Contract to ESCO or its designee, upon its request, all of its records and complete data concerning energy and water usage and related maintenance for the Project Site(s).

ARTICLE 6. LOCATION AND ACCESS

Article 6: This provision states the Institution's responsibility for providing adequate space and protection for the installed equipment and authorizes the ESCO's access to the facility to perform routine and emergency operations.

ESCO acknowledges that there exists sufficient space on the Project Site(s) for the installation and operation of the Equipment. Institution shall take reasonable steps to protect such Equipment from harm, theft and misuse during the term of this Contract. Institution shall provide access to the Project Site(s) for ESCO to perform any function related to this Contract during regular business hours, or such other reasonable hours as may be requested by ESCO and acceptable to the Institution. ESCO shall be granted immediate access to make emergency repairs or corrections as it may, in its discretion, determine are needed. The ESCO's access to Project Site(s) to make emergency repairs or corrections as it may determine are needed shall not be unreasonably restricted by the Institution. ESCO shall immediately notify the Institution when emergency action is taken and follow up with written notice with three (3) business days specifying the action taken, the reasons therefore, and the impact upon the Project Site(s), if any.

ARTICLE 7. PERMITS AND APPROVALS; COORDINATION

Section 7.1. Permits and Approvals

Section 7.1: This standard construction provision requires the ESCO comply with all code requirements, pay all associated permit fees and provide the Institution with copies of each permit and license required to do the work. The Institution agrees to assist the ESCO to the best of its ability to obtain all required permits and approvals.

Institution shall use its best efforts to assist ESCO in obtaining all necessary permits and approvals for installation of the Equipment. In no event shall Institution, however, be responsible for payment of any permit fees. The equipment and the operation of the equipment by ESCO shall at all times conform to all federal, state and local code requirements. ESCO shall furnish copies of each permit or license which is required to perform the work to the Institution before the ESCO commences the portion of the work requiring such permit or license.

Section 7.2. Coordination During Installation

Section 7.2: This standard provision directs the Institution and ESCO to coordinate the equipment installation activities to not interfere with the Institution's business activities. If an installation will require interference, the ESCO must first obtain the Institution's written approval to proceed. If a facility generates revenue for the Institution (e.g. civic center, theater, arena etc.) and scheduled revenue-producing activities are interrupted due to the fault of the ESCO, either during project installation or operation, then a provision for the collection of damages may be negotiated.

The Institution and ESCO shall coordinate the activities of ESCO's equipment installers with those of the Institution, its employees, and agents. ESCO shall not commit or permit any act which will interfere with the performance of business activities conducted by the Institution or its employees without prior written approval of the Institution.

ARTICLE 8. CONSTRUCTION SCHEDULE AND EQUIPMENT INSTALLATION; APPROVAL

Section 8.1. Construction Schedule; Equipment Installation

Section 8.1: It is important that the construction/installation phase of the project be managed in compliance with individual Institution requirements and the appropriate governing statutes. Since construction is just one component of the overall project, a separate construction contract may be desirable and in some cases necessary. The construction contract would then be referred to in the body of the contract and attached as an exhibit, appendix or other type of attachment. Another approach would be to consolidate the appropriate construction language for inclusion in the body of the final contract.

Construction and equipment installation shall proceed in accordance with the construction schedule approved by Institution and attached as **Schedule S (Construction and Equipment Installation Schedule)**.

Section 8.2. Systems Startup and Equipment Commissioning

Section 8.2: This section requires the ESCO to conduct performance testing of the equipment as specified in its Commissioning Plan located in **Schedule T (Systems Start-Up and Commissioning; Operating**

Parameters of Installed Equipment), and verify the specified operating parameters to make certain the system is working properly. In most instances this activity occurs prior to the Institution's final acceptance of the project as fully installed, however, if any testing is negotiated to occur after project acceptance, language to that effect should be included here. It also requires the ESCO notify the Institution of when the testing will take place and gives the Institution (or its designee) the right to be present during all tests. Make sure the commissioning plan includes manufacturer's startup and performance sheets.

The ESCO shall conduct a thorough and systematic performance test of each element and total system of the installed Equipment in accordance with the procedures specified in **Schedule T (Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment)** and prior to acceptance of the project by the Institution as specified in **Exhibit III (i) (Certificate of Acceptance)**. Testing shall be designed to determine if the Equipment is functioning in accordance with both its published specifications and the Schedules to this Contract, and to determine if modified building systems, subsystems or components are functioning properly within the new integrated environment. The ESCO shall provide notice to the Institution of the scheduled test(s) and the Institution and/or its designees shall have the right to be present at any or all such tests conducted by ESCO and/or manufacturers of the Equipment. The ESCO shall be responsible for correcting and/or adjusting all deficiencies in systems and Equipment operations that may be observed during system commissioning procedures as specified in **Schedule T (Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment)**. The Contractor shall be responsible for correcting and/or adjusting all deficiencies in Equipment operation that may be observed during system testing procedures. Prior to Institution acceptance ESCO shall also provide Institution with reasonably satisfactory documentary evidence that the Equipment installed is the Equipment specified in **Schedule R (Equipment to be Installed by ESCO)**.

ARTICLE 9. EQUIPMENT WARRANTIES

Article 9: This warranty provision requires all installed equipment be new and protected by appropriate written manufacturers warranties for a minimum of one year, covering parts and performance. It also requires warranties provide for the installation of only new parts (not used or reconditioned) during the warranty period. While equipment warranties will be transferred to the Institution after completed project installation, this provision makes the ESCO responsible for pursuing any necessary remedies during the warranty period. If the ESCO fails to exercise the warranty and damages occur, the ESCO is responsible for all costs of repair and any lost savings.

ESCO warrants that all equipment sold and installed as part of this Contract is new, will be materially free from defects in materials or workmanship, will be installed properly in a good and workmanlike manner, and will function properly for a period of one (1) year from the date of the Substantial Completion for the particular energy conservation measure if operated and maintained in accordance with the procedures established per building. Substantial Completion shall be defined as the stage in the progress of the Work where the Work is sufficiently complete in accordance with the Contract Documents so that the Institution can utilize and take beneficial use of the Work for its intended use or purpose. Substantial Completion does not occur until the Equipment or system has been commissioned, accepted, and the "Substantial Completion" form fully executed.

After the warranty period, ESCO shall have no responsibility for performing maintenance, repairs, or making manufacturer warranty claims relating to the Equipment, except as provided in **Schedule BB (ESCO's Maintenance Responsibilities)**.

ESCO further agrees to assign to Institution all available manufacturer's warranties relating to the Equipment and to deliver such written warranties and which shall be attached and set forth as **Exhibit IV (Equipment Warranties)**; pursue rights and remedies against the manufacturers under the warranties in the event of Equipment malfunction or improper or defective function, and defects in parts, workmanship and performance. ESCO shall, during the warranty period, notify the Institution whenever defects in Equipment parts or performance occur which give rise to such rights and remedies and those rights and remedies are exercised by ESCO. During this period, the cost of any risk of damage or damage to the Equipment and its performance, including damage to property and equipment of the Institution or the Project Site(s), due to ESCO's failure to exercise its warranty rights shall be borne solely by ESCO.

All warranties, to the extent transferable, shall be transferable and extend to the Institution. The warranties shall specify that only new, not reconditioned, parts may be used and installed when repair is necessitated by malfunction. All extended warranties shall be addressed as the property of the owner and appropriately documented and titled.

Notwithstanding the above, nothing in this Section shall be construed to alleviate/relieve the ESCO from complying with its obligations to perform under all terms and conditions of this Contract and as set forth in all attached Schedules.

ARTICLE 10. STANDARDS OF COMFORT

Article 10: This section references the **Schedule U (Standards of Comfort)** which the ESCO is contractually liable to maintain throughout the term of the contract. These standards are negotiated between the ESCO and Institution to reflect realistic ranges of heating, cooling and hot water temperatures, lighting levels, chilled water requirements, and other specified comfort and operating parameters to be maintained.

ESCO will maintain and operate the Equipment in a manner which will provide the standards of heating, cooling, ventilation, hot water supply, and lighting quality and levels as described in **Schedule U (Standards of Comfort)**. During the term of this Contract, ESCO and Institution will maintain, according to **Schedule BB (ESCO's Maintenance Responsibilities)** and **Schedule CC (Institution's Maintenance Responsibilities),** and operate the Equipment in a manner that will provide the standards of comfort and levels of operation as described in **Schedule U (Standards of Comfort)**.

ARTICLE 11: ENVIRONMENTAL REQUIREMENTS

Section 11.1. Excluded Material and Activities

Section 11.1. This section addresses hazardous materials and establishes that the ESCO may encounter such materials but is not responsible for identification, handling or any work. The Institution will be responsible for such handling at its expense. In the event the ESCO discovers such materials, the ESCO will stop work and the Institution will handle it. Neither the ESCO's stoppage of work nor the Institution's discovery are grounds for default. If work can commence, any lost time will be added to the time schedule. The ESCO is responsible for any hazardous materials related to equipment it brings to the site.

Institution recognizes that in connection with the installation and/or service or maintenance of Equipment at Institution's Project Site(s), ESCO may encounter, but is not responsible for, any work relating to (i) asbestos, materials containing asbestos, or the existence, use, detection, removal, containment or treatment thereof, (ii) fungus (any type of form of fungi, including mold or mildew, and myotoxins,

spores, scents or by-products produced or released by fungi), (iii) incomplete or damaged work or systems or code violations that may be discovered during or prior to the work of this agreement, or (iv) pollutants, hazardous wastes, hazardous materials, contaminants other than those described in this Section below (collectively "Hazardous Materials"), or the storage, handling, use, transportation, treatment, or the disposal, discharge, leakage, detection, removal, or containment thereof. The materials and activities listed in the foregoing sentence are referred to as "Excluded Materials and Activities". Institution agrees that if performance of work involves any Excluded Materials and Activities, Institution will perform or arrange for the performance of such work and shall bear the sole risk and responsibility therefore. In the event ESCO discovers Hazardous or Excluded Materials, ESCO shall immediately cease work, remove all ESCO personnel or subcontractors from the site, and notify the Institution. The Institution shall be responsible to handle such Materials at its expense. ESCO shall undertake no further work on the Project Site(s) except as authorized by the Institution in writing. Notwithstanding anything in this Contract to the contrary, any such event of discovery or remediation by the Institution shall not constitute a default by the Institution. In the event of such stoppage of work by ESCO, the Time for Completion of Work will be automatically extended by the amount of time of the work stoppage and any additional costs incurred by ESCO as a result will be added by Change Order.

ESCO shall be responsible for any hazardous or other materials, including, without limitation, those listed in this section that it may bring to the Project Site(s).

Section 11.2. Polychlorinated Biphenyl (PCB) Ballasts; Mercury Lamps

Section 11.2. The ESCO is required to have an agreement with an approved PCB ballast disposal company that will properly handle transport, recycling, and incineration, providing information for site handling and a Certificate of Destruction. Similarly the ESCO is required to have an agreement with an approved lamp disposal company. In both cases, the Institution will sign manifests of ownership.

ESCO will enter into an agreement with an approved PCB ballast disposal company that will provide an informational packet, packing receptacles and instructions, labels and shipping materials, transportation, and recycling or incineration services for PCB ballasts. All capacitors and asphalt potting compound materials removed from Institution's PCB ballasts will be incinerated in a federally approved facility. After proper disposal, a Certificate of Destruction will be provided by the approved facility to Institution. ESCO's responsibility shall be for the proper and legal management of any of Institution's PCB ballasts removed as a result of the installation of the Equipment and shall be limited only until said PCB ballasts are loaded onto an approved PCB ballast disposal ESCO's vehicle for transportation.

ESCO will enter into an agreement with an approved lamp disposal company who will provide approved containers, materials required to label, transportation, recycling or incineration in accordance with EPA requirements, and a copy of the manifest.

Institution agrees to sign manifests of ownership for all PCB ballasts and mercury lamps removed from the Project Site(s).

ARTICLE 12. TRAINING BY ESCO

Article 12: In many performance contracts the training of facility personnel is often conducted prior to acceptance by the Institution of the completed installation. There are occasions, however, where it may be necessary to conduct training after project acceptance, which can be noted and included in the appropriate schedule. If there are charges for unscheduled training, such charges should be noted in this section.

The ESCO shall conduct the training program described in **Schedule V (ESCO's Training Responsibilities)** hereto. The training specified in **Schedule V (ESCO's Training Responsibilities)** must be completed prior to acceptance of the Equipment installation. The ESCO shall provide ongoing training whenever needed with respect to updated or altered Equipment, including upgraded software. Such training shall be provided at no charge to the Institution and shall have no effect on prior acceptance of Equipment installation.

POST-CONSTRUCTION PHASE

ARTICLE 13. EQUIPMENT SERVICE

Section 13.1. Actions by ESCO

Section 13.1: This section refers to the maintenance and service responsibilities of each party as they are specified in **Schedule BB (ESCO's Maintenance Responsibilities)** and **Schedule CC (Institution's Maintenance Responsibilities)**. It also states that if the Institution is at fault for causing additional maintenance or repair to the equipment, then the Institution will be charged by the ESCO for the cost of the required maintenance or repair.

ESCO shall provide all service, repairs, and adjustments to the Equipment installed under terms of this Contract pursuant to **Schedule BB (ESCO's Maintenance Responsibilities)**. Institution shall incur no cost for Equipment service, repairs, and adjustments, except as set forth in **Schedule J (Compensation to ESCO for Annual Services)**, provided, however, that when the need for maintenance or repairs principally arises due to the negligence or willful misconduct of the Institution or any employee or other agent of Institution, and ESCO can so demonstrate such causal connection, ESCO may charge Institution for the actual cost of the maintenance or repair insofar as such cost is not covered by any warranty or insurance proceeds.

Section 13.2. Malfunctions and Emergencies

Section 13.2: This section requires the Institution to notify the ESCO within a specified number of hours of actually knowing about any situation that impacts the performance of the equipment. As described here, the impacts cover both pre-existing energy related equipment and the newly installed equipment. The impacts defined here include equipment malfunction or modification, interruption of power supply or any emergency situation which may affect the Energy and Cost Savings Guarantee. If such an impact is known by the Institution to have occurred and the Institution delays in notifying the ESCO and doesn't correct the situation, it will treated as a Material Change and the baseline will be adjusted accordingly. If the Institution makes an effort to assess the situation and incorrectly determines it doesn't have an impact, then the ESCO will not fault the Institution, although an adjustment to the baseline may still be warranted.

Institution shall use its best efforts to notify the ESCO or its designated subcontractors within 24 hours after the Institution's actual knowledge and occurrence of: (i) any malfunction in the operation of the Equipment or any preexisting energy related equipment that might materially impact upon the guaranteed energy savings, (ii) any interruption or alteration to the energy supply to the Project Site(s), or (iii) any alteration or modification in any energy-related equipment or its operation.

Where Institution exercises due diligence in attempting to assess the existence of a malfunction, interruption, or alteration it shall be deemed not at fault in failing to correctly identify such conditions as having a material impact upon the guaranteed energy savings. Institution shall notify ESCO within twenty-four (24) hours upon its having actual knowledge of any emergency condition affecting the

Equipment. ESCO shall respond or cause its designee(s) shall respond within ____hours and shall promptly proceed with corrective measures. Any telephonic notice of such conditions by Institution shall be followed within three business days by written notice to ESCO from Institution. If Institution unreasonably delays in so notifying ESCO of a malfunction or emergency, and the malfunction or emergency is not otherwise corrected or remedied, ESCO may charge Institution for its loss, due to the delay, associated with the guaranteed savings under this Contract for the particular time period, provided that ESCO is able to show the direct causal connection between the delay and the loss.

The ESCO will provide a written record of all service work performed. This record will indicate the reason for the service, description of the problem and the corrective action performed.

Section 13.3. Actions by Institution

Section 13.3: This section states the Institution may not make any changes to the operation and maintenance of the equipment without the prior written approval of the ESCO unless otherwise indicated in **Schedule CC (Institution's Maintenance Responsibilities)** or if there is an emergency and the ESCO can't be reasonably notified. In the case of such emergency, the Institution should follow instructions provided by the ESCO for emergency action.

Institution shall not move, remove, modify, alter, or change in any way the Equipment or any part thereof without the prior written approval of ESCO except as set forth in **Schedule CC (Institution's Maintenance Responsibilities)**. Notwithstanding the foregoing, Institution may take reasonable steps to protect the Equipment if, due to an emergency, it is not possible or reasonable to notify ESCO before taking any such actions. In the event of such an emergency, Institution shall take reasonable steps to protect the Equipment from damage or injury and shall follow instructions for emergency action provided in advance by ESCO. Institution agrees to maintain the Project Site(s) in good repair and to protect and preserve all portions thereof which may in any way affect the operation or maintenance of the Equipment.

ARTICLE 14. MODIFICATION, UPGRADE OR ALTERATION OF THE EQUIPMENT

Section 14.1. Modification of Equipment

During the Term of this Contract, Institution will not, without the prior written consent of ESCO, affix or install any accessory Equipment or device on any of the Equipment if such addition will change or impair the originally intended functions, value or use of the Equipment without ESCO's prior written approval, which shall not be unreasonably withheld.

Section 14.2. Upgrade or Alteration of Equipment

Section 14: This section describes the terms and conditions under which the ESCO may make changes to the equipment, operating procedures or take other energy savings actions. If such changes are implemented during any time during the contract they must be described in a supplemental schedule and be approved by the Institution. As well, any equipment replaced is required to be new and have the potential to produce at least as much or more savings. If computer software is updated, the licensing provisions of Section 17.1 still apply.

ESCO shall at all times have the right, subject to Institution's prior written approval, which approval shall not be unreasonably withheld, to change the Equipment, revise any procedures for the operation of the Equipment or implement other energy saving actions in the Project Site(s), provided that: (i) the ESCO complies with the standards of comfort and services set forth in **Schedule U (Standards of Comfort)** herein; (ii) such modifications or additions to, or replacement of the Equipment, and any operational

changes, or new procedures are necessary to enable the ESCO to achieve the guaranteed energy and cost savings at the Project Site(s) and; (iii) any cost incurred relative to such modifications, additions or replacement of the Equipment, or operational changes or new procedures shall be the responsibility of the ESCO.

All modifications, additions or replacements of the Equipment or revisions to operating or other procedures shall be described in a supplemental Schedule(s) to be provided to the Institution for approval, which shall not be unreasonably withheld, provided that any replacement of the Equipment shall, unless otherwise agreed, be new and have equal or better potential to reduce energy consumption at the Project Site(s) than the Equipment being replaced. The ESCO shall have the right to update any and all software to be used in connection with the Equipment in accordance with the provisions of **Section 17.1 (Ownership of Certain Proprietary Rights)** and **Schedule BB (ESCO's Maintenance Responsibilities)**. All replacements of and alterations or additions to the Equipment shall become part the Equipment described in **Schedule R (Equipment to be Installed by ESCO)** and shall be covered by the provisions and terms of **Article 8 (Construction Schedule and Equipment Installation; Approval)**.

ARTICLE 15. MATERIAL CHANGES

Article 15: This section defines the term "Material Change" which covers any condition other than weather that affects building energy use by more than the negotiated percentage (see above discussion). It is typical for the percent of deviation to be negotiated as a value ranging between 2% and 5% based on aggregate consumption costs. The lower value (2%) may be appropriate for large facilities (over $20,000/month utility bills) and the higher value (5%) may be appropriate for small facilities (less than $5,000/month utility bills).

Section 15.1. Material Change Defined

A Material Change shall include any change in or to the Project Site(s), whether structural, operational or otherwise in nature which reasonably could be expected, in the judgment of the Institution, to increase or decrease annual energy consumption in accordance with the provisions and procedures set forth in **Schedule B** (**Baseline Energy Consumption; Methodology to Adjust Baseline)** and **Schedule C** (**Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Report Requirements)** by at least __% after adjustments for climatic variations. Actions by the Institution which may result in a Material Change include but are not limited to the following:

(i) manner of use of the Project Site(s) by the Institution; or
(ii) hours of operation for the Project Site(s) or for any equipment or energy using systems operating at the Project Site(s); or
(iii) Permanent changes in the comfort and service parameters set forth in **Schedule U (Standards of Comfort)**; or
(iv) occupancy of the Project Site(s); or
(v) structure of the Project Site(s); or
(vi) types and quantities of equipment used at the Project Site(s) or
(vii) modification, renovation or construction at the Project Site(s); or
(viii) the Institution's failure to provide maintenance of and repairs to the Equipment in accordance with **Schedule CC (Institution's Maintenance Responsibilities)**; or
(ix) any other conditions other than climate affecting energy use at the Project Site(s) including but not limited to the replacement, addition or removal of energy and water consuming devices whether plug in or fixed assets,
(x) casualty or condemnation of the Project Site(s) or Equipment, or

(xi) changes in utility provider or utility rate classification, or
(xii) any other conditions other than climate affecting energy or water use at the Project Site(s).
(xiii) Modifications, alterations or overrides of the energy management system schedules or hours of operation, set back/start up or holiday schedules.

Section 15.2. Reported Material Changes; Notice by Institution

Section 15.2: This section requires the Institution to notify the ESCO in writing if there are any actual or planned changes to the facility which would effect energy consumption by more than the specified percentage. In the event of an emergency or situation that would prevent advance notification, the Institution has a specified number of hours to inform the ESCO that a Material Change has occurred.

The Institution shall use its best efforts to deliver to the ESCO a written notice describing all actual or proposed Material Changes in the Project Site(s) or in the operations of the Project Site(s) at least __ days before any actual or proposed Material Change is implemented or as soon as is practicable after an emergency or other unplanned event. Notice to the ESCO of Material Changes which result because of a bona fide emergency or other situation which precludes advance notification shall be deemed sufficient if given by the Institution within ____ hours after having actual knowledge that the event constituting the Material Change occurred or was discovered by the Institution to have occurred.

Section 15.3. Other Adjustments

Section 15.3: This section states that if all building conditions and operations stay the same, then energy consumption will not vary more than the negotiated percentage during any month when compared to the baseline use for that month and after adjustments for weather are made. See above discussion. In the event such a variation occurs, the ESCO will try to determine the cause of the deviation and report its findings tthe Institution. The ESCO and Institution will then determine what adjustments will be made to the baseline as described in **Schedule B (Baseline Energy Consumption; Methodology to Adjust Baseline**).

As agreed in **Section 15.1** Institution will alert ESCO of materials changes as known. Both parties have a vested interest in meeting the guaranteed savings of the Contract. As such, the ESCO will work with Institution to investigate, identify and correct any changes that prevent the guaranteed savings from being realized. As a result of such investigation, ESCO and Institution shall determine what, if any, adjustments to the baseline will be made in accordance with the provisions set forth in **Schedule C (Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Report Requirements)** and **Schedule B (Baseline Energy Consumption; Methodology to Adjust Baseline)**. Any disputes between the Institution and the ESCO concerning any such adjustment shall be resolved in accordance with the provisions of **Schedule JJ (Alternative Dispute Resolution Procedures)** hereto.

ARTICLE 16. PERFORMANCE BY ESCO

Section 16.1. Corrective Action; Accuracy of the Services

Section 16.1: This section directs the ESCO to protect the Project Site(s) and its contents to repair and restore to the original condition any damage caused by the ESCO in connection with this contract. Any costs incurred to correct such damage are to be paid by the ESCO. The ESCO is solely responsible for the technical professional accuracy of all work performed under this Contract including work done by subcontractors or others.

ESCO shall perform all tasks/phases under the Contract, including construction, and install the Equipment in such a manner so as not to harm the structural integrity of the buildings or their operating systems and

so as to conform to the standards set forth in **Schedule U (Standards of Comfort)** and the construction schedule specified in **Schedule S (Construction and Installation Schedule)**. ESCO shall repair and restore to its original condition any area of damage caused by ESCO's performance under this Contract. The Institution reserves the right to review the work performed by ESCO and to direct ESCO to take certain corrective action if, in the opinion of the Institution, the structural integrity of the Project Site(s) or its operating system is or will be harmed. All costs associated with such corrective action to damage caused by ESCO's performance of the work shall be borne by ESCO.

ESCO shall remain responsible for the professional and technical accuracy of all services performed, whether by the ESCO or its subcontractors or others on its behalf, throughout the term of this Contract.

Section 16.2. Annual Reporting Requirements; Annual ENERGY STAR Rating

At the end of each year during the guarantee period as specified in **Schedule A (Savings Guarantee)** and no later than ninety (90) days thereafter, the ESCO shall complete and submit the data required in **Schedule C (C.4 Annual M&V Reporting Requirements)** . The ESCO shall provide an ENERGY STAR rating for each eligible facility for each year of the guarantee period if applicable.

ADMINISTRATION

ARTICLE 17. OWNERSHIP OF CERTAIN PROPRIETARY RIGHTS; EXISTING EQUIPMENT

Section 17.1. Ownership of Certain Proprietary Property Rights

Section 17.1: This provision addresses the ESCO's proprietary rights over customized (or exclusive) software used in an energy management system which may control, manage and perform other functions in conjunction with the project (there may other technical designs, processes, formulas etc., which this provision would cover). Of particular importance is the stipulation that grants the Institution a continuing license (at no charge) to use and operate the project without violating any ESCO's proprietary rights.

Institution shall not, by virtue of this Contract, acquire any interest in any formulas, patterns, devices, secret inventions or processes, copyrights, patents, other intellectual or proprietary rights, or similar items of property which are or may be used in connection with the Equipment. The ESCO shall grant to the Institution a perpetual, irrevocable royalty-free license for any and all software or other intellectual property rights necessary for the Institution to continue to operate, maintain, and repair the Equipment in a manner that will yield guaranteed utility consumption reductions for the specified contract term. ESCO shall not be liable for providing new versions of software or other enhancements if or unless such new versions or enhancements are necessary to achieve the guaranteed utility consumption reductions.

Section 17.2. Ownership of Existing Equipment

Section 17.2: This provision states that the Institution has ownership of all existing equipment and that the ESCO shall notify the Institution in writing of what equipment and materials are to be replaced. If the Institution chooses to keep the equipment to be replaced, the ESCO will be notified and the Institution responsible for identifying the location of where the property is to be stored or relocated. The ESCO is responsible for all equipment and materials to be disposed. The exception to this is the treatment of any hazardous or environmentally sensitive materials.

Ownership of the equipment and materials presently existing at the Project Site(s) at the time of execution of this Contract shall remain the property of the Institution even if it is replaced or its operation made unnecessary by work performed by ESCO pursuant to this Contract. If applicable, ESCO shall advise the Institution in writing of all equipment and materials to be replaced at the Project Site(s) and the Institution shall within ____days designate in writing to the ESCO which equipment and materials that should not be disposed of off-site by the ESCO. It is understood and agreed to by both Parties that the Institution shall be responsible for and designate the location and storage for any equipment and materials that should not be disposed of off-site. The ESCO shall be responsible for the disposal of all equipment and materials designated by the Institution as disposable off-site in accordance with all applicable laws and regulations regarding such disposal.

ARTICLE 18. PROPERTY/CASUALTY/INSURANCE; INDEMNIFICATION

Article 18: This section needs to reflect the individual Institution's standard requirements with regard to insurance and indemnification.

Section 18.1 Insurances. At all times during the term of this Contract, ESCO shall maintain in full force and effect, at its expense: (1) Workmen's Compensation Insurance sufficient to cover all of the employees of (ESCO) working to fulfill this Contract, and (2) Casualty and Liability Insurance on the Equipment and Liability Insurance for its employees and the possession, operation, and service of the Equipment. The limits of such insurance shall be not less than $_____ for injury to or death of one person in a single occurrence and $_____ for injury to or death of more than one person in a single occurrence and $_____ for a single occurrence of property damage. Such policies shall name the Institution as an additional insured.

Prior to commencement of work under this Contract, ESCO will be required to provide Institution with current certificates of insurance specified above. These certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty (30) days' prior written notice has been given to Institution.

Section 18.2. Damages to Equipment or Property: ESCO shall be responsible for (i) any damage to the Equipment or other property on the Project Site(s) and (ii) any personal injury where such damage or injury occurs as a result of ESCO's performance under this Contract.

Section 18.3. Indemnification. ESCO shall save and hold harmless Institution and its officers, agents and employees or any of them from any and all claims, demands, actions or liability of any nature based upon or arising out of any services performed by ESCO, its agents or employees under this Contract.

Section 18.4. Liabilities. Neither party shall be liable for any special, incidental, indirect, punitive or consequential damages, arising out of or in connection with this Contract. Further, the liability of either party under this Contract shall not exceed the Contract Sum in the aggregate.

ARTICLE 19. CONDITIONS BEYOND CONTROL OF THE PARTIES

If a party ("performing party") shall be unable to reasonably perform any of its obligations under this Contract due to acts of God, insurrections or riots, or similar events, this Contract shall at the other party's option (i) remain in effect but said performing party's obligations shall be suspended until the said events

shall have ended; or, (ii) be terminated upon ten (10) days notice to the performing party, in which event neither party shall have any further liability to the other.

ARTICLE 20. EVENTS OF DEFAULT

Section 20.1. Events of Default by Institution

Each of the following events or conditions shall constitute an "Event of Default" by Institution:

(i) any failure by Institution to pay ESCO any sum due for a service and maintenance period of more than ___ days after written notification by ESCO that Institution is delinquent in making payment and provided that ESCO is not in default in its performance under the terms of this Contract; or

(ii) any other material failure by Institution to perform or comply with the terms and conditions of this Contract, including breach of any covenant contained herein, provided that such failure continues for _____ days after notice to Institution demanding that such failures to perform be cured or if such cure cannot be effected in _____ days, Institution shall be deemed to have cured default upon the commencement of a cure within _____ days and diligent subsequent completion thereof;

(iii) any representation or warranty furnished by Institution in this Contract which was false or misleading in any material respect when made.

Section 20.2. Events of Default by ESCO

Each of the following events or conditions shall constitute an "Event of Default" by ESCO:

(iv) the standards of comfort and service set forth in **Schedule U (Standards of Comfort)** are not provided due to failure of ESCO to properly design, install, maintain, repair or adjust the Equipment except that such failure, if corrected or cured within __ days after written notice by Institution to ESCO demanding that such failure be cured, shall be deemed cured for purposed of this Contract.

(v) any representation or warranty furnished by ESCO in this Contract is false or misleading in any material respect when made;

(vi) failure to furnish and install the Equipment and make it ready for use within the time specified by this Contract as set forth in **Schedule R (Equipment to be Installed by ESCO)** and **Schedule S (Construction and Installation Schedule)**;

(vii) provided that the operation of the facility is not adversely affected and provided that the standards of comfort in **Schedule U (Standards of Comfort)** are maintained, any failure by ESCO to perform or comply with the terms and conditions of this Contract, including breach of any covenant contained herein except that such failure, if corrected or cured within __ days after written notice by the Institution to ESCO demanding that such failure to perform be cured, shall be deemed cured for purposes of this Contract;

(viii) any lien or encumbrance upon the equipment by any subcontractor, laborer or materialman of ESCO;

(ix) the filing of a bankruptcy petition whether by ESCO or its creditors against ESCO which proceeding shall not have been dismissed within_____ days of its filing, or an involuntary assignment for the benefit of all creditors or the liquidation of ESCO.

(x) failure by the ESCO to pay any amount due the Institution or perform any obligation under the terms of this Contract or the Energy and Cost Savings Guarantee as set forth in **Schedule A (Savings Guarantee)**.

ARTICLE 21. REMEDIES UPON DEFAULT

Section 21.1. Remedies upon Default by Institution

If an Event of Default by Institution occurs, ESCO may, without a waiver of other remedies which exist in law or equity, elect one of the following remedies:

(i) exercise all remedies available at law or in equity or other appropriate proceedings including bringing an action or actions from time to time for recovery of amounts due and unpaid by Institution, and/or for damages which shall include all costs and expenses reasonably incurred in exercise of its remedy;

Section 21.2. Remedies Upon Default by ESCO

In the Event of Default by ESCO, Institution shall have the choice of either one of the following remedies in law or equity:

(i) exercise and any all remedies at law or equity, or institute other proceedings, including, without limitation, bringing an action or actions from time to time for specific performance, and/or for the recovery of amounts due and unpaid and/or for damages, which shall include all costs and expenses reasonably incurred, including attorney's fees;

ARTICLE 22. ASSIGNMENT

The ESCO acknowledges that the Institution is induced to enter into this Contract by, among other things, the professional qualifications of the ESCO. The ESCO agrees that neither this Contract nor any right or obligations hereunder may be assigned in whole or in part to another firm, without the prior written approval of the Institution.

Section 22.1. Assignment by ESCO

Section 22.1: This assignment provision first acknowledges that the Institution selected the ESCO for its unique expertise and qualifications to perform the services specified in the contract. The ESCO may not assign this contract to another ESCO without the written approval of the Institution and any ESCO assigned this contract must fully comply with all terms and conditions. In addition, the ESCO and any assignee remain contractually liable to the Institution for fulfilling all of the ESCO's obligations as specified in the contract.

The ESCO may, with prior written approval of the Institution, which consent shall not be unreasonably withheld, delegate its duties and performance under this Contract, and/or utilize ESCOs, provided that any assignee(s), delegee(s), or ESCO(s) shall fully comply with the terms of this Contract. Notwithstanding the provisions of this paragraph, the ESCO shall remain jointly and severally liable with its assignees(s), or transferee(s) to the Institution for all of its obligations under this Contract.

Section 22.2. Assignment by Institution

Section 22.2: In turn, this provision allows the Institution to transfer or assign this contract to a new building owner or occupant. The Institution and its assignee, however, still remain responsible to the ESCO for the Institution's obligations as specified in the contract.

Institution may transfer or assign this Contract and its rights and obligations herein to a successor or purchaser of the Buildings or an interest therein. The Institution shall remain jointly and severally liable with its assignees or transferees to the ESCO for all of its obligations under this Contract.

ARTICLE 23. REPRESENTATIONS AND WARRANTIES

Article 23: This boilerplate provision states that each party has the requisite authority and ability to enter into this contract.

Each party warrants and represents to the other that:

(i) it has all requisite power, authority, licenses, permits, and franchises, corporate or otherwise, to execute and deliver this Contract and perform its obligations hereunder;
(ii) its execution, delivery, and performance of this Contract have been duly authorized by, or are in accordance with, its organic instruments, and this Contract has been duly executed and delivered for it by the signatories so authorized, and it constitutes its legal, valid, and binding obligation;
(iii) its execution, delivery, and performance of this Contract will not breach or violate, or constitute a default under any Contract, lease or instrument to which it is a party or by which it or its properties may be bound or affected; or
(iv) it has not received any notice, nor to the best of its knowledge is there pending or threatened any notice, of any violation of any applicable laws, ordinances, regulations, rules, decrees, awards, permits or orders which would materially and adversely affect its ability to perform hereunder.

ARTICLE 24. ADDITIONAL REPRESENTATIONS OF THE PARTIES

Article 24: These additional representations address several areas specific to the performance contract. The Institution certifies it has or will provide the ESCO will all energy and energy-related records and all future records to be provided will be truthful and accurate. The Institution also declares it has not entered into any leases or service contracts relating to energy equipment or servicing of pre-existing equipment and will notify the ESCO within a specified period of time if it does so.

In addition, the ESCO certifies that before beginning work under this contract it will: have become licensed to business in the state; provide proof of required insurance and bonds; give Institution access to all document relating to the project (including all contracts and subcontracts) upon request; use licensed and qualified subcontractors; and is financially able to complete the project and perform under the terms of this contract. In addition, the ESCO certifies that the equipment will meet or exceed the functional design tests performed prior to Institution acceptance and the installed equipment with be compatible with existing equipment and building systems.

Institution hereby warrants, represents and promises that:

(i) it has provided or shall provide timely to ESCO, all records relating to energy usage and energy-related maintenance of Project Site(s) requested by ESCO and the information set forth therein is,

and all information in other records to be subsequently provided pursuant to this Contract will be true and accurate in all material respects; and

(ii) it has not entered into any leases, contracts or Contracts with other persons or entities regarding the leasing of energy efficiency equipment or the provision of energy management services for the Project Site(s) or with regard to servicing any of the energy related equipment located in the Project Site(s). Institution shall provide ESCO with copies of any successor or additional leases of energy efficiency equipment and contracts for management or servicing of preexisting equipment at Project Site(s) which may be executed from time to time hereafter within ____ days after execution thereof.

ESCO hereby warrants, represents and promises that:

(i) before commencing performance of this Contract:

(a) it shall have become licensed or otherwise permitted to do business in the State of _____

(b) it shall have provided proof and documentation of required insurance and bonds pursuant to this Contract;

(ii) it shall make available, upon reasonable request, all documents relating to its performance under this Contract, including all contracts and subcontracts entered into;

(iii) it shall use qualified subcontractors who are qualified, licensed and bonded in this state to perform the work so subcontracted pursuant to the terms hereof;

(iv) The Equipment will meet or exceed the provisions set forth in **Section 8.2 (Systems Start Up and Equipment Commissioning)** and in **Schedule T (Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment)**.

(v) The Equipment is or will be compatible with all other Project Site(s) mechanical and electrical systems, subsystems, or components with which the Equipment interacts, and that, as installed, neither the Equipment nor such other systems, subsystems, or components will materially adversely affect each other as a direct or indirect result of Equipment installation or operation;

(v) that it is financially solvent, able to pay its debts as they mature and possessed of sufficient working capital to complete the Work and perform its obligations under this Contract.

ARTICLE 25. MICELLANEOUS DOCUMENTATION PROVISIONS

Section 25.1. Waiver of Liens, Construction Performance and Payment Bonds, Labor and Material Payment Bonds

Such executed bonds are incorporated herein by reference as **Exhibit I (Performance Bond)** and **Exhibit II (Labor and Material Payment Bond, if applicable).**

Section 25.2. Further Documents

The parties shall execute and deliver all documents and perform all further acts that may be reasonably necessary to effectuate the provisions of this Contract**.**

Section 25.3 Institution's Responsibilities

This provision protects both the ESCO and the Institution by establishing a method for the ESCO to supervise the Institution's compliance with the scheduled routine and preventative maintenance activities to be performed by the Institution (either by in-house personnel or existing maintenance contract). This checklist should be developed for both the newly installed and pre-existing energy-related equipment.

(a) Methods of Operation by Institution

The parties acknowledge and agree that said Energy and Cost Savings would not likely be obtained unless certain procedures and methods of operation designed for energy and water conservation shall be implemented, and followed by Institution on a regular and continuous basis.

(b) Institution Maintenance Responsibilities

Institution agrees that it shall adhere to, follow and implement the energy conservation procedures and methods of operation to be set forth on **Schedule CC (Institution's Maintenance Responsibilities)**, to be attached hereto and made a part hereof after Institution's approval, such approval not to be unreasonably withheld, conditioned or delayed.

(c) Inspection of Project Site(s)

Institution agrees that ESCO shall have the right once a month, with prior notice, to inspect Project Site(s) to determine if Institution is complying, and shall have complied with its obligations as set forth in **Section 25.3(b).** For the purpose of determining Institution's said compliance, the checklist to be set forth at **Schedule DD (Facility Maintenance Checklist)** as completed and recorded by ESCO during its monthly inspections, shall be used to measure and record Institution's said compliance. Institution shall make the Project Site(s) available to ESCO for and during each monthly inspection, and shall have the right to witness each inspection and ESCO's recordation on the checklist. Institution may complete its own checklist at the same time. ESCO agrees to not interfere with the Institution operations during any monthly inspection.

Section 25.4. Waiver Of Liens

ESCO will obtain and furnish to Institution a Waiver of Liens from each vendor, material manufacturer and laborer in the supply, installation and servicing of each piece of Equipment.

ARTICLE 26: CONFLICTS OF INTEREST

Section 26.1 Conflicts of Interest

Conflicts of interest relating to this Contract are strictly prohibited. Except as otherwise expressly provided herein, neither party hereto nor any director, employee or agent of any party hereto shall give to or receive from any director, employee or agent of any other party hereto any gift, entertainment or other favor of significant value, or any commission, fee or rebate in connection with this Contract. Likewise, neither party hereto nor any director, employee or agent of either party hereto, shall without prior notification thereof to the other party enter into any business relationship with any director, employee or agent of the other party or of any affiliate of the other party, unless such person is acting for and on behalf of the other party or any such affiliate. A party shall promptly notify the other party of any violation of

this section and any consideration received as a result of such violation shall be paid over or credited to the party against whom it was charged. Any representative of any party, authorized by that party, may audit the records of the other party related to this Contract, upon reasonable notice and during regular business hours including the expense records of the party's employees involved in this Contract, upon reasonable notice and during regular business hours, for the sole purpose of determining whether there has been compliance with this section.

ARTICLE 27. COMPLETE CONTRACT

This Contract, when executed, together with all Schedules attached hereto or to be attached hereto, as provided for by this Contract shall constitute the entire Contract between both parties and this Contract may not be amended, modified, or terminated except by a written Contract signed by the parties.

ARTICLE 28. APPLICABLE LAW

This Contract and the construction and enforceability thereof shall be interpreted under the laws of the State of _____.

ARTICLE 29. INTERPRETATION OF CONTRACT

The Institution shall have the authority to determine questions of fact that arise in relation to the interpretation of this Contract and the ESCO'S performance hereunder. However, such determinations are subject to the Alternative Dispute Resolution procedures as described in **Schedule JJ (Alternative Dispute Resolution Procedures)**. Unless the Parties agree otherwise, or the Work cannot be continued without a resolution of the question of fact, such determinations and Alternative Dispute Resolution procedures shall not be cause for delay of the Work. The ESCO shall proceed diligently with the performance of this Contract and in accordance with the Institution's decision whether or not the ESCO or anyone else has an active claim pending. Continuation of the Work shall not be construed as a waiver of any rights accruing to the ESCO.

ARTICLE 30. NOTICE

Any notice required or permitted hereunder shall be deemed sufficient if given in writing and delivered personally or sent by registered or certified mail, return receipt requested, postage prepaid, or delivered to a nationally recognized express mail service, charges prepaid, receipt obtained, to the address shown below or to such other persons or addresses as are specified by similar notice.

TO ESCO: ***ESCO Name, Attention:, Complete address.***
Include COPY TO: information for ESCO, if applicable.

TO INSTITUTION: ***Institution Name, Attention: Complete address.***
Include COPY TO: information for INSTITUTION, if applicable.

IN WITNESS WHEREOF, and intending to be legally bound, the parties hereto subscribe their names to this Contract by their duly authorized representatives on the date first above written.

(Corporate Seal)

ATTEST:

(INSTITUTION)

_____ By_____

(ESCO)
_____ By: _____

CONTRACT ATTACHMENT I: Schedules, Exhibits, and Appendices

Under a separate file, see detailed descriptions, required tables and examples.

Schedules

Savings Guarantee

Schedule A	Savings Guarantee
Schedule B	Baseline Energy Consumption; Methodology to Adjust Baseline
Schedule C	Savings Measurement and Verification Plan; Post-Retrofit M&V Plan; Annual M&V Reporting Requirements
Schedule D-G	Left blank for optional schedules

Payments and Schedule

Schedule H	Final Project Cost & Project Cash Flow Analysis
Schedule I	Financing Agreement and Payment Schedule
Schedule J	Compensation to ESCO for Annual Services
Schedule K	Rebates, Incentives and Grants
Schedule L-P	Left blank for optional schedules

Design and Construction Phase

Schedule Q	Description of Project Site(s)
Schedule R	Equipment to be Installed by ESCO
Schedule S	Construction and Installation Schedule
Schedule T	Systems Start-Up and Commissioning; Operating Parameters of Installed Equipment
Schedule U	Standards of Comfort
Schedule V	ESCO's Training Responsibilities
Schedule W-AA	Left blank for optional schedules

Post-Construction

Schedule BB	ESCO's Maintenance Responsibilities
Schedule CC	Institution's Maintenance Responsibilities
Schedule DD	Facility Maintenance Checklist
Schedules EE – II	Left blank for optional schedules

Administration

Schedule JJ	Alternative Dispute Resolution Procedures
Schedule KK – OO	Left blank for optional schedules

Optional Schedules

Pre-Existing Service Contracts
Energy Savings Projections
Facility Changes Checklist
Current and Known Capital Projects at Facility

Exhibits

Exhibit I	Performance Bond
Exhibit II	Labor and Material Payment Bond ***if required***
Exhibit III (i)	Certificate of Acceptance—Investment Grade Audit Report
Exhibit III (ii)	Certificate of Acceptance—Installed Equipment
Exhibit IV	Equipment Warranties

Optional Exhibits

Manifest of Ownership
Minority and Woman-Owned Business Certification
Certification that Financing Term is no Longer than the Aggregated Equipment Lifetime
Notice of Substantial Completion

Notice to Proceed with Construction Phase
Record of Reviews by Institution

Appendices

Appendix A	RFP for ESCO Solicitation (Pre-qualification Phase; Final Selection Phase)
Appendix B	ESCO Proposal (Pre-qualification Phase; Final Selection Phase)
Appendix C	Investment Grade Audit and Project Development Contract
Appendix D	Investment Grade Audit Report

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CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

October 19, 2011

Darien Crimmin
Vice President of Energy and Sustainability
WinnDevelopment
6 Faneuil Hall Marketplace,
Boston, MA 02109

RE: HUD NOFA - Energy Innovation Fund for a Multifamily Energy Pilot

Dear Mr. Crimmin:

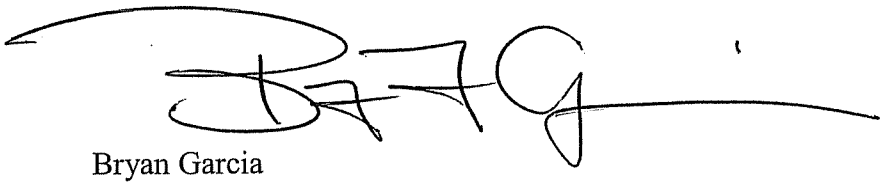
This letter certifies the intent of the Connecticut Clean Energy Finance and Investment Authority (CEFIA) to support WinnDevelopment's proposal to create an innovative fund for attracting performance contractors to the multifamily housing market in Connecticut, for the purpose of installing cost-effective energy efficiency (EE) and renewable energy (RE) measures in multifamily housing developments. Subject to CEFIA's Board of Directors and the State of Connecticut's bond commission approvals, we anticipate providing a loan guaranty covering up to $2,500,000 to enable privately-financed energy efficiency projects to secure low-interest debt capital. The capital will be used in Connecticut limited income multifamily households to permit a number of smaller performance contractors to offer financially attractive projects to this underserved market.

CEFIA was created by Public Act 11-80 in July, 2011 to function as a "green bank" for RE and EE programs in Connecticut. In addition to approximately $28 million in funding received each year through the legislatively-mandated Combined Public Benefits Charge on the electric utility bills, CEFIA is also authorized to secure other funding sources, and provide green loan guarantees for residential ratepayers per Section 124 of Public Act 11-80. We anticipate the establishment of several funding programs similar to the instant case, as we expand our efforts to encourage energy efficiency and renewable energy in homes, businesses and institutions in Connecticut.

The establishment of the fund contemplated in the WinnDevelopment proposal is consistent with the purposes of CEFIA, and we intend to support this fund as described above for the duration of the demonstration period. Terms and conditions will be negotiated with WinnDevelopment to protect our mutual interests, and to insure the proper application of the loan guaranty funds.

It is understood that this Letter of Intent does not create any binding obligations among any of the parties to the HUD NOFA application. Only a definitive loan guaranty agreement executed by all affected parties shall establish the obligations of each party to the others. If a grant is awarded to the WinnDevelopment proposal under the HUD pilot program, CEFIA agrees to enter into good faith negotiations to achieve a mutually satisfactory loan guaranty agreement for the purposes stated above.

Respectfully submitted,



Bryan Garcia
President

Cc: David Ljungquist

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CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Deployment Committee

From: Bryan Garcia and Dale Hedman

Date: April 26, 2012

Re: Proposal to Modify Incentive and Increase Funding for Step 2 of the Residential Solar Investment Program

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We propose to modify Step 2 of the Residential Solar Investment Program in two ways:

1. **Race to the Solar Rooftop** – separate the two competing business models (i.e. rebate and PBI) so as to have the firms participating within each model aimed for fixed volumes of installations (i.e. MW) by a certain date (i.e. April 1, 2013), whichever is reached first, will define the end of the step.

2. **Extend the Runway** – we would like to extend the subsidies for about one year in order to bring more firms into the marketplace. We have done well so far, but not well enough in attracting the level of business participation we would like to see in the market.

3. **Loan Program** – by June of this year we intend to begin discussions with all of the firms about introducing a loan product to complement the incentives.

BACKGROUND

On March 2, 2012, CEFIA launched the residential solar investment program (the Program). The Program offers rebates and performance-based incentives (PBI) to support homeowners install solar photovoltaic systems. Through nearly two months of the Program, CEFIA has approved 188 projects that will lead to the installation of 1,250 kW of clean energy (see Table 1). Projects underneath the Program have thus far sought approximately $2.2 million in incentives leveraged by an additional $4.4 million of private investment – a leverage ratio improvement above the CCEF's historical performance of 1:1 meaning more installations and jobs per ratepayer incentives provided.

Table 1. Program Data as of April 26, 2012

	Rebate	PBI	Total
# Projects	176	12	188
Total Cost	$6,120,792	$472,770	$6,593,562
Total Incentive Amount	$2,034,850	$172,177	$2,207,027
Incentive/kW	$1,770	$1,744	$1,768

This data also shows the following:

- **Customer Acquisition** – strong demand from households interested in installing solar PV systems, nearly 25 households per week or 5 per business day.

- **Lower Average Incentive Level** – the average incentive level per kW installed is about $1,750 – as opposed to the rebate amount of $2,450, nearly 30% less. This is due to primarily to the average size installations being greater than 5 kW; the incremental incentive above 5 kW receives a lower rebate ($1,250 per kW versus $2,450 per kW).

- **Limited PBI Participation** – only until recently have third party financiers (i.e. lease providers) been participating in the incentive program.

The Board of Directors approved a $7.5 million funding allocation and the Department of Energy and Environmental Protection approved of a Schedule of Incentives for Step 1 and Step 2 incentives (see Table 2).

Table 2. Incentives Offered in Step 1 and Step 2 of the Residential Solar Investment Program

Step	Rebate Budget ($MM)	PBI Budget ($MM)	Total Budget ($MM)	Estimated Installed Capacity (kW)	Estimated Systems Installed
1	1.25	1.25	$2.50	1,261	204
2	2.50	2.50	$5.00	3,036	491
Total	**$3.75**	**$3.75**	**$7.50**	**4,297**	**695**

With only 10% of funds remaining, the Step 1 allocation is nearly complete, and the Program will then transition to Step 2.

PROPOSAL

CEFIA's goal is to create a robust market for residential solar PV systems in Connecticut that:

- Maximizes the installation of systems and generation of clean energy per dollar of ratepayer incentive

- Supports local installers in building a business and becoming more competitive in the market

- Builds a base of third party financing companies to help serve the low and middle income markets, which lease products do.

- Transitions the market over time to a financing model instead of a subsidy-driven model

With these goals in mind, we propose revising the Step 2 incentive so that it is not as steep of a decline as originally proposed for the rebate and maintaining the PBI at the Step 1 level (see Table 3).

Table 3. Proposed Revision to Step 2 Incentives

	Rebate		PBI	Estimated MW
	≤5 kW	10 kW ≥ x x > 5 kW	10 kW ≥ x	
Current Step 2	$2.100/W	$0.900/W	$0.2430/kWh	6.1
Proposed Step 2	$2.275/W	$1.075/W	$0.300/kWh	5.6

We propose reducing the Step 2 incentives by 7 percent instead of 14 percent for the rebate (from $2.450/W to $2.275/W instead of $2.100/W) and not reducing the PBI.

We also propose establishing the following goals for Step 2:

- **Rebate Incentive** – a rebate will be provided in the amount of $2.275/W for systems up to 5 kW and $1.075/W for systems 5-10kW until collectively installed 2.8 MW or by April 1, 2013, whichever comes first.

- **Performance Based Incentive** – Performance based incentive in the amount of $0.300/kWh for systems up to 10 kW until collectively installed 2.8 MW or by April 1, 2013, whichever comes first.

As installers and third party financiers approach either the date or the installed capacity volume, CEFIA will solicit their views about the next step. In June of 2012, CEFIA will begin discussions about adding a loan component to Step 3.

If approved by the Deployment Committee, this proposal will require the Deployment Committee to:

1. Recommend approval by the Board of Directors and the Department of Energy and Environmental Protection of the revised Schedule of Incentives

2. Recommend approval by the Board of Directors of a Step 2 budget increase of $6 million to a total of $11 million.

We believe that with these program revisions, the Program will be improved.

RESOLUTION

WHEREAS, Section 106 of Public Act 11-80 “An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut’s Energy

Future" (the Act) requires CEFIA to design and implement a Residential Solar Photovoltaic Investment Program (Program Plan) that results in a minimum of thirty (30) megawatts of new residential PV installation in Connecticut before December 31, 2022.

WHEREAS, pursuant to Section 106 of the Act, CEFIA has prepared a Program Plan to offer direct financial incentives, in the form of performance-based incentives or expected performance-based buydowns, for the purchase or lease of qualifying residential solar photovoltaic systems.

WHEREAS, CEFIA has prepared a declining incentive block schedule ("Schedule") that: (1) provides for a series of solar capacity blocks the combined total of which shall be a minimum of thirty megawatts and projected incentive levels for each such block, (2) provides incentives that are sufficient to meet reasonable payback expectations of the residential consumer, (3) provides incentives that decline over time and will foster the sustained, orderly development of a state-based solar industry, (4) automatically adjusts to the next block, and (5) provides comparable economic incentives for the purchase or lease of qualifying residential solar photovoltaic systems.

WHEREAS, the Deployment Committee seeks to revise the Schedule to (1) address the findings from the program data obtained since approval of the original incentive schedule,(2) address changes in the solar market ascertained since approval of the original incentive schedule which would affect the expected return on investment for a typical residential solar photovoltaic system under the performance based incentive model by twenty percent or more, and (3) ensure that third party financing companies enter the market to help serve the low and middle income markets.

NOW, therefore be it:

RESOLVED, that the Deployment Committee hereby recommends to the Board of Directors for approval the revised Schedule of Incentives.

RESOLVED, that the Deployment Committee hereby recommends to the Board of Directors a Step 2 budget increase of six million dollars to a total of $11 million dollars.

RESOLVED, that this Board action is consistent with Section 106 of the Act.

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Residential Solar Investment Program Market Watch Report

Solar photovoltaic (PV) systems are now more affordable than ever for Connecticut residents. You can make a smart investment and save money on your electric bills by adding a proven, reliable, pollution-free technology to your home.

The Clean Energy Finance and Investment Authority now offers two different incentive models to help customers. The first model (EPBB Rebate) supports residential consumers who seek to purchase a solar PV system. The second model (PBI) is a leasing model designed to allow consumers access to solar PV systems with no or limited upfront costs.

Executive Summary

- To date, we have approved applications for 163 EPBBs (Rebates) and 4 PBIs;
- The average system size is 7 kW STC
- The total amount of approved incentives is $1,951,186;
- Of these approved applications, the average system cost is 5,314 / kW;
- The average incentive per kW STC is $1,757

Program Data as of April 20, 2012

	Rebate	PBI	Total
# Projects	163	4	167
Total Cost	$5,729,096	$170,055	$5,899,151
Total kW STC	1,078	33	1,110
Average Total Cost	$35,148	$42,514	$35,324
Total Incentive Amount	$1,898,167	$53,019	$1,951,186
Incentive / kW STC	$1,762	$1,624	$1,757
ZREC Equivalent Incentive Price	$0.116	$0.098	

Environmental Factors

Lifetime CO_2 Reduction	Lifetime NO_x Reduction	Lifetime SO_2 Reduction	Annual Cars off the Road	Equivalent Acres of Trees Planted
27,356,349 lbs.	12,399 lbs.	11,344 lbs.	91	182

Learn more at: www.ctcleanenergy.com/solarhome

About the Clean Energy Finance and Investment Authority

CEFIA was established by Connecticut's General Assembly on July 1, 2011 as a part of Public Act 11-80. This new quasi-public agency supersedes the former Connecticut Clean Energy Fund. CEFIA's mission is to help ensure Connecticut's energy security and community prosperity by realizing its environmental and economic opportunities through clean energy finance and investments. As the nation's first full-scale clean energy finance authority, CEFIA will leverage public and private funds to drive investment and scale-up clean energy deployment in Connecticut.

The Authority invests its resources in an array of enterprises, initiatives and projects aimed to:

- Attract and deploy capital to finance the clean energy goals of Connecticut
    - Help Connecticut become the most energy efficient state in the nation
    - Help scale-up the deployment of renewable energy in the state
    - Provide support for the infrastructure needed to lead the clean energy economy
- Develop and implement strategies that bring down the cost of clean energy in order to make it more accessible and affordable to consumers
- Reduce reliance on grants, rebate and other subsidies and move towards innovative low-cost financing of clean energy deployment

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

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