845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

December 12, 2014

Dear Connecticut Green Bank Board of Directors:

We have a regular meeting of the Board of Directors scheduled for Friday, December 19, 2014 from 9:00 to 11:00 a.m. in the Colonel Albert Pope Board Room of the Connecticut Green Bank at 845 Brook Street, Rocky Hill, CT 06067.

On the agenda we have the following items:

- **President's Update** – I will quickly report out our public comment filing to the EPA on the Clean Air Act Section 111(d) process. We have included a copy of our comments, as well as those submitted by the Coalition for Green Capital and DEEP. I will also report on a proposal we are submitting in partnership with the Coalition for Green Capital and Sustainable Real Estate Solutions to the U.S. Department of Energy to support C-PACE.

- **Consent Agenda** – We have two (2) items, including the meeting minutes for December 2, 2014 (which will be sent to you on Tuesday, December 16, 2014), and transactions under $300,000 and no more in aggregate than $1,000,000 (which will also be sent to you on Tuesday, December 16, 2014). My apologies in advance for not having these materials ready.

- **Commercial and Industrial Sector Programs** – we are bringing forth several C-PACE transactions for your review and approval. As you will see, our partnership with the auto dealers continues to generate more and more projects.

- **Executive Session** – we will take-up personnel related matters in executive session.

- **Role of a Green Bank** – as we retake-up the strategy discussion from our October 17, 2014 meeting, we wanted to have a conversation on the progress we have made with the organization and the evolving definition of a green bank. Within the context of this discussion, we will provide two (2) case in point programs – C-PACE and low income solar PV – where they stand and the challenges ahead. My hope is to offer you the staff perspective and to elicit your feedback and guidance as we wrestle with these tasks. You will find in your materials a set of updated financial statements as well as background memos on the programs we hope to discuss with you.

- **Statutory and Infrastructure Sector Programs** – the Residential Solar Investment Program (RSIP) continues to make progress. We anticipate meeting with the Deployment Committee this coming week before the Board of Directors meeting to bring forth a recommendation. We are continuing to make progress increasing demand for solar PV, reducing subsidies, and transitioning to financing. We believe that this will put

us in a strong position to have a constructive debate on the public policy we are advancing this legislative session – the Solar Home and Jobs Opportunity Act. We will send out a memo on the recommendation next week.

If you have any questions, comments or concerns, please feel free to contact me at any time.

We look forward to seeing you next week. Until then, enjoy the weekend.

Sincerely,

Bryan Garcia
President and CEO

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

AGENDA

Board of Directors of the
Connecticut Green Bank
845 Brook Street, Rocky Hill, CT 06067

Friday, December 19, 2014
9:00– 11:00 a.m.

Staff Invited: Jessica Bailey, George Bellas, Andy Brydges, Craig Connolly, Mackey Dykes, Brian Farnen, Bryan Garcia, Dale Hedman, Bert Hunter, and Kerry O'Neill

1. Call to order

2. Public Comments – 5 minutes

3. Update from the President – 5 minutes

4. Consent Agenda* – 5 minutes

    a. Approval of Meeting Minutes for December 2, 2014*
    b. Under $300,000 and No More in Aggregate of $1,000,000 (Memo coming on Tuesday, December 16, 2014)

5. Commercial and Industrial Sector Program Updates and Recommendations* – 15 minutes

    a. C-PACE Transactions*

        i. Hartford – C-PACE Transaction*
        ii. North Stonington – C-PACE Transaction*
        iii. Watertown – C-PACE Transaction*

6. Executive Session – Personnel Related Matters* – 15 minutes

7. Role of a Green Bank – 60 minutes

    a. From Start-Up to Growth – FY 2012 through FY 2014
    b. Green Bank Model – What Does Success Look Like?
    c. Cases in Point

        i. Commercial and Industrial Sector – C-PACE (Version 2.0)
        ii. Residential Sector – Low Income Solar Strategy

8. Statutory and Infrastructure Sector Program Updates and Recommendations – 15 minutes*

   a. Residential Solar Investment Program – Step 6 and Step 7*

9. Adjourn

*Denotes item requiring Board action

Join the meeting online at https://www4.gotomeeting.com/join/903264479

Dial +1 (773) 897-3016 Access Code: 903-264-479

Next Regular Meeting: Friday, January 23, 2015 from 9:00-11:00 a.m.
Colonel Albert Pope Board Room at the
Clean Energy Finance and Investment Authority, 845 Brook Street, Rocky Hill, CT

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

RESOLUTIONS (Revised)

Board of Directors of the
Connecticut Green Bank
845 Brook Street, Rocky Hill, CT 06067

Friday, December 19, 2014
9:00 – 11:00 a.m.

Staff Invited: Jessica Bailey, George Bellas, Andy Brydges, Craig Connolly, Mackey Dykes, Brian Farnen, Bryan Garcia, Dale Hedman, Bert Hunter, and Kerry O'Neill

1. Call to order

2. Public Comments – 5 minutes

3. Update from the President – 5 minutes

4. Consent Agenda* – 5 minutes

   a. Approval of Meeting Minutes for December 2, 2014*

Resolution #1

Motion to approve the minutes of the Board of Directors Special Meeting for December 2, 2014. Second. Discussion. Vote.

   b. Under $300,000 and No More in Aggregate of $1,000,000 (Memo coming on Tuesday, December 16, 2014)*

Resolution #2

WHEREAS, on January 18, 2013, the Connecticut Green Bank (the "Green Bank") Board of Directors (the "Board") authorized the Green Bank staff to evaluate and approve funding requests less than $300,000 which are pursuant to an established formal approval process requiring the signature of a Green Bank officer, consistent with the Green Bank Comprehensive Plan, approved within Green Bank's fiscal budget and in an aggregate amount not to exceed $500,000 from the date of the last Deployment Committee meeting, on July 18, 2014 the Board increase the aggregate not to exceed limit to $1,000,000 ("Staff Approval Policy for Projects Under $300,000");

WHEREAS, Green Bank staff seeks Board review and approval of the funding requests listed in the Memo to the Board dated December 19, 2014 which were approved by Green Bank staff since the last Deployment Committee meeting and which are consistent with the Staff Approval Policy for Projects Under $300,000;

NOW, therefore be it:

RESOLVED, that the Board approves the funding requests listed in the Memo to the Board dated December 19, 2014 which were approved by Green Bank staff since the last Deployment Committee meeting. The Board authorizes Green Bank staff to approve funding requests in accordance with the Staff Approval Policy for Projects Under $300,000 in an aggregate amount to exceed $1,000,000 from the date of this December 19, 2014 Board meeting until the next Deployment Committee meeting.

5. Commercial and Industrial Sector Program Updates and Recommendations* – 15 minutes

a. C-PACE Transactions*

i. Hartford – C-PACE Transaction*

Resolution #3

WHEREAS, Pursuant to Section 157 of Public Act No. 12-2 of the June 12, 2012 Special Session of the Connecticut General Assembly and as amended (the "Act"), the Connecticut Green Bank (Green Bank) is directed to, amongst other things, establish a commercial sustainable energy program for Connecticut, known as Commercial Property Assessed Clean Energy ("C-PACE");

WHEREAS, the Green Bank Board of Directors (the "Board") has approved a $40,000,000 C-PACE construction and term loan program; and

WHEREAS, the Green Bank seeks to provide $495,143 construction and (potentially) term loan under the C-PACE program to VAG Development, LLC, the property owner of 77 Leibert Road, Hartford, CT (the "Loan"), to finance the construction of specified clean energy measures in line with the State's Comprehensive Energy Strategy and the Green Bank's Strategic Plan;

WHEREAS, the Green Bank may also provide a short-term unsecured loan (the "Feasibility Study Loan") from a portion of the Loan amount, to finance the feasibility study or energy audit required by the C-PACE authorizing statute, and such Feasibility Study Loan would become part of the Loan and be repaid to the Green Bank upon the execution of the Loan documents;

NOW, therefore be it:

RESOLVED, that the President of the Green Bank and any other duly authorized officer of the Green Bank, is authorized to execute and deliver the Loan and, if applicable, a Feasibility Study Loan in a total amount not to be greater than one hundred ten percent of the Loan amount with terms and conditions consistent with the memorandum submitted to the Board dated December 12, 2014, and as he or she shall deem to be in the interests of the Green Bank and the ratepayers no later than 120 days from December 19, 2014;

RESOLVED, that before executing the Loan, the President of the Green Bank and any other duly authorized officer of the Green Bank shall receive confirmation that

the C-PACE transaction meets the statutory obligations of the Act, including but not limited to the savings to investment ratio and lender consent requirements; and

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

ii. North Stonington – C-PACE Transaction*

Resolution #4

WHEREAS, Pursuant to Section 157 of Public Act No. 12-2 of the June 12, 2012 Special Session of the Connecticut General Assembly and as amended (the "Act"), the Connecticut Green Bank (Green Bank) is directed to, amongst other things, establish a commercial sustainable energy program for Connecticut, known as Commercial Property Assessed Clean Energy ("C-PACE");

WHEREAS, the Green Bank Board of Directors (the "Board") has approved a $40,000,000 C-PACE construction and term loan program;

WHEREAS, the Green Bank seeks to provide $307,561 construction and (potentially) term loan under the C-PACE program to David Babcock Lewis, LLC, the property owner of 273 Boombridge Road, North Stonington (the "Loan"), to finance the construction of specified clean energy measures in line with the State's Comprehensive Energy Strategy and the Green Bank's Strategic Plan; and

WHEREAS, the Green Bank may also provide a short-term unsecured loan (the "Feasibility Study Loan") from a portion of the Loan amount, to finance the feasibility study or energy audit required by the C-PACE authorizing statute, and such Feasibility Study Loan would become part of the Loan and be repaid to the Green Bank upon the execution of the Loan documents;

NOW, therefore be it:

RESOLVED, that the President of the Green Bank and any other duly authorized officer of the Green Bank, is authorized to execute and deliver the Loan and, if applicable, a Feasibility Study Loan in a total amount not to be greater than one hundred ten percent of the Loan amount with terms and conditions consistent with the memorandum submitted to the Board dated December 12, 2014, and as he or she shall deem to be in the interests of the Green Bank and the ratepayers no later than 120 days from December 19, 2014;

RESOLVED, that before executing the Loan, the President of the Green Bank and any other duly authorized officer of the Green Bank shall receive confirmation that the C-PACE transaction meets the statutory obligations of the Act, including but not limited to the savings to investment ratio and lender consent requirements; and

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

iii. Watertown – C-PACE Transaction*

Resolution #5

WHEREAS, Pursuant to Section 157 of Public Act No. 12-2 of the June 12, 2012 Special Session of the Connecticut General Assembly and as amended (the "Act"), the Connecticut Green Bank (Green Bank) is directed to, amongst other things, establish a commercial sustainable energy program for Connecticut, known as Commercial Property Assessed Clean Energy ("C-PACE");

WHEREAS, the Green Bank Board of Directors (the "Board") has approved a $40,000,000 C-PACE construction and term loan program;

WHEREAS, the Green Bank seeks to provide a $399,406 construction and (potentially) term loan under the C-PACE program to Fred M. Valenti, the building owner of 600 Straits Turnpike, Watertown, Connecticut (the "Loan"), to finance the construction of specified clean energy measures in line with the State's Comprehensive Energy Strategy and the Green Bank's Strategic Plan; and

WHEREAS, the Green Bank may also provide a short-term unsecured loan (the "Feasibility Study Loan") from a portion of the Loan amount, to finance the feasibility study or energy audit required by the C-PACE authorizing statute, and such Feasibility Study Loan would become part of the Loan and be repaid to the Green Bank upon the execution of the Loan documents.

NOW, therefore be it:

RESOLVED, that the President of the Green Bank and any other duly authorized officer of the Green Bank, is authorized to execute and deliver the Loan and, if applicable, a Feasibility Study Loan in a total amount not to be greater than one hundred ten percent of the Loan amount with terms and conditions consistent with the memorandum submitted to the Board dated December 12, 2014, and as he or she shall deem to be in the interests of the Green Bank and the ratepayers no later than 120 days from December 19, 2014;

RESOLVED, that before executing the Loan, the President of the Green Bank and any other duly authorized officer of the Green Bank shall receive confirmation that the C-PACE transaction meets the statutory obligations of the Act, including but not limited to the savings to investment ratio and lender consent requirements, and that the lease on the property does not impact the Green Bank's ability to foreclose on the building; and

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

6. Executive Session – Personnel Related Matters* – 15 minutes

Resolution #6

Compensation resolution to be provided at Board Meeting.

7. Role of a Green Bank – 60 minutes

   a. From Start-Up to Growth – FY 2012 through FY 2014
   b. Green Bank Model – What Does Success Look Like?
   c. Cases in Point
      i. Commercial and Industrial Sector – C-PACE (Version 2.0)
      ii. Residential Sector – Low Income Solar Strategy

8. Statutory and Infrastructure Sector Program Updates and Recommendations – 15 minutes*

   a. Residential Solar Investment Program – Step 6 and Step 7*

Resolution #7

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 Connecticut Green Bank ("Green Bank") to design and implement a Residential Solar Photovoltaic ("PV") Investment Program ("Program") that results in a minimum of thirty (30) megawatts of new residential PV installation in Connecticut before December 31, 2022;

WHEREAS, as of December 12, 2014, the Program has thus far resulted in approximately fifty-two megawatts of new residential PV installation application approvals in Connecticut, and when complete and commissioned will achieve the minimum target of thirty megawatts established by Section 106 of Public Act 11-80;

WHEREAS, pursuant to Conn. Gen Stat. 16-245a, a renewable portfolio standard was established that requires that Connecticut Electric Suppliers and Electric Distribution Company Wholesale Suppliers obtain a minimum percentage of their retail load by using renewable energy.

WHEREAS, the Green Bank has been assigned by New England Power Pool Generation Information System an Identification Number NON36589 for the residential solar PV projects it supports through the Program, and subsequently the Public Utility Regulatory Authority assigned a Registration No. CT 00534-13 to the behind-the-meter facilities supported by the Program;

WHEREAS, real-time revenue quality meters are included as part of solar PV systems being installed through the Program that determine the amount of clean energy production from such systems as well as the associated renewable energy credits ("RECs") which, in accordance with Program guidelines, become the property of the Green Bank to hold, manage and sell in the Green Bank's sole discretion;

WHEREAS, the Green Bank Board of Directors (the "Board") approved Guidelines and Procedures for the Green Bank Management of Class I REC Asset Portfolio on December 11, 2013; and

WHEREAS, pursuant to Section 106 of the Act, the Green Bank has prepared a Program plan with a declining incentive block schedule ("Schedule") that offer direct

financial incentives, in the form of homeowner performance-based incentives ("HOPBI") or performance-based incentives ("PBI"), for the purchase or lease of qualifying residential solar photovoltaic systems, respectively.

NOW, therefore be it:

RESOLVED, that Board approves of the Schedule of Incentives as set forth in Table 2 of the memo dated December 16, 2014 to achieve 20.0 MW of solar PV deployment – 10.0 MW from Step 6 and 10.0 from Step 7;

RESOLVED, that the Board hereby directs Green Bank staff to assess the tax, marketing, and administrative implications of (1) providing a performance incentive upfront (i.e., HOPBI-EPBB), (2) providing a performance incentive over time (i.e., PBI), (3) proving a performance incentive at a future point in time (i.e., all incentive goes directly to the homeowner as opposed to the contractor, and (4) transferring the REC to the homeowner in lieu of the RSIP by the end of the Fiscal Year 2015.

RESOLVED, that the Board hereby directs Green Bank staff to develop a proposal to address the sustainability of the Program in light of the growing market demand while increasing deployment of clean energy sources in Connecticut and minimizing the cost to the ratepayers by giving consideration to the aggregation and sale of RECs acquired through the Program.

9. Adjourn

*Denotes item requiring Board action

Join the meeting online at https://www4.gotomeeting.com/join/903264479

Dial +1 (773) 897-3016 Access Code: 903-264-479

Next Regular Meeting: Friday, January 23, 2015 from 9:00-11:00 a.m.
Colonel Albert Pope Board Room at the
Clean Energy Finance and Investment Authority, 845 Brook Street, Rocky Hill, CT

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Board of Directors of the Connecticut Green Bank

Agenda Item #5

Commercial and Industrial Programs

December 19, 2014

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Board of Directors of the Connecticut Green Bank

Agenda Item #5ai

Commercial and Industrial Programs

Hartford – C-PACE Transaction

December 19, 2014

77 Leibert Road (Hartford)
Ratepayer Payback

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$495,143** to install 170kW solar PV system
- Projected savings are **10,111 MMBtu** versus **$495,143** of ratepayer funds at risk.

PHOTO REDACTED

- Ratepayer funds will be paid back in one of the following ways
  - (a) through a take-out by a private capital provider at the end of construction (project completion);
  - (b) subsequently, when the loan is sold down to a private capital provider; or
  - (c) through receipt of funds from the City of Hartford as it collects the C-PACE benefit assessment from the property owner.

77 Leibert Road (Hartford)
Terms and Conditions

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$495,143** construction loan at 5% and term loan set at a fixed 6% over the 20-year term
- **$495,143** loan against the property
  - Property valued at **REDACTED**
  - Loan-to-value ratio equals **REDACTED**
  - Lien-to-value ratio equals **REDACTED**
- DSCR > **REDACTED**

77 Leibert Road (Hartford)
The Five W's

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **What?** Receive approval for a **$495,143** construction and (potentially) term loan under the C-PACE program to VAG Development, LLC to finance the construction of specified energy upgrade
- **When?** Project to commence 2015
- **Why?** Allow Green Bank to finance this C-PACE transaction, continue to build momentum in the market, and potentially provide term financing for this project until Green Bank sells it along with its other loan positions in C-PACE transactions.
- **Who?** VAG Development, LLC , the property owner of 77 Leibert Road, Hartford CT
- **Where?** 77 Leibert Road, Hartford CT

REDACTED

Anticipated Green Bank cash flow

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

CEFIA Pro Forma

Project Basics		*Cash Flows*	
Amount Financed	$307,561	Date	CEFIA $
Construction Period (years)	0.50	Jan 2015	$307,561
Term (years)	20	Jul 2015	$7,689
		Jan 2016	$26,612
Construction Financing Rate	5.00%	Jan 2017	$26,612
Term Financing Rate	6.00%	Jan 2018	$26,612
		Jan 2019	$26,612
Construction Interest Payment (bullet)	$7,689	Jan 2020	$26,612
Yearly Debt Service Payments (made semi-annually)	$26,612	Jan 2021	$26,612
		Jan 2022	$26,612
		Jan 2023	$26,612
		Jan 2024	$26,612
		Jan 2025	$26,612
		Jan 2026	$26,612
		Jan 2027	$26,612
		Jan 2028	$26,612
		Jan 2029	$26,612
		Jan 2030	$26,612
		Jan 2031	$26,612
		Jan 2032	$26,612
		Jan 2033	$26,612
		Jan 2034	$26,612
		Jan 2035	$26,612

REDACTED

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Board of Directors of the Connecticut Green Bank

Agenda Item #5aii

Commercial and Industrial Programs

North Stonington – C-PACE Transaction

December 19, 2014

929 Connecticut Ave (Bridgeport)
Ratepayer Payback

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$621,575** to install 153 kW solar PV system and LED lighting
- Projected savings are **13,310 MMBtu** versus **$621,575** of ratepayer funds at risk.

PHOTO REDACTED

- Ratepayer funds will be paid back in one of the following ways
  - (a) through a take-out by a private capital provider at the end of construction (project completion);
  - (b) subsequently, when the loan is sold down to a private capital provider; or
  - (c) through receipt of funds from the City of Bridgeport as it collects the C-PACE benefit assessment from the property owner.

929 Connecticut Ave (Bridgeport)
Terms and Conditions

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$621,575** construction loan at 5% and term loan set at a fixed 6% over the 20-year term
- **$ 621,575** loan against the property
  - Property valued at **REDACTED**
  - Loan-to-value ratio equals **REDACTED**; Lien-to-value ratio equals **REDACTED**
  - DSCR > **REDACTED**

929 Connecticut Ave (Bridgeport)
The Five W's

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **What?** Receive approval for a **$ 621,575** construction and (potentially) term loan under the C-PACE program to Incubator Associates Limited Partnership to finance the construction of specified energy upgrade
- **When?** Project to commence 2014
- **Why?** Allow Green Bank to finance this C-PACE transaction, continue to build momentum in the market, and potentially provide term financing for this project until Green Bank sells it along with its other loan positions in C-PACE transactions.
- **Who?** Incubator Associates Limited Partnership, the property owner of 929 Connecticut Ave, Bridgeport
- **Where?** 929 Connecticut Ave, Bridgeport, CT

REDACTED

Anticipated Green Bank cash flow

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

CT Green Bank Pro Forma

Project Basics		*Cash Flows*	
Amount Financed	$671,525	Date	CEFIA $
Construction Period (years)	0.67	Dec 2014	$671,525
Term (years)	20	Aug 2015	$22,384
		Jan 2016	$58,104
Construction Financing Rate	5.00%	Jan 2017	$58,104
Term Financing Rate	6.00%	Jan 2018	$58,104
		Jan 2019	$58,104
Construction Interest Payment (bullet)	$22,384	Jan 2020	$58,104
Yearly Debt Service Payments (made semi-annually)	$58,104	Jan 2021	$58,104
		Jan 2022	$58,104
		Jan 2023	$58,104
		Jan 2024	$58,104
		Jan 2025	$58,104
		Jan 2026	$58,104
		Jan 2027	$58,104
		Jan 2028	$58,104
		Jan 2029	$58,104
		Jan 2030	$58,104
		Jan 2031	$58,104
		Jan 2032	$58,104
		Jan 2033	$58,104
		Jan 2034	$58,104
		Jan 2035	$58,104

REDACTED

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Board of Directors of the Connecticut Green Bank

Agenda Item #5aiii

Commercial and Industrial Programs

Watertown – C-PACE Transaction

December 19, 2014

929 Connecticut Ave (Bridgeport)
Ratepayer Payback

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$621,575** to install 153 kW solar PV system and LED lighting
- Projected savings are **13,310 MMBtu** versus **$621,575** of ratepayer funds at risk.

PHOTO REDACTED

- Ratepayer funds will be paid back in one of the following ways
  - (a) through a take-out by a private capital provider at the end of construction (project completion);
  - (b) subsequently, when the loan is sold down to a private capital provider; or
  - (c) through receipt of funds from the City of Bridgeport as it collects the C-PACE benefit assessment from the property owner.

929 Connecticut Ave (Bridgeport)
Terms and Conditions

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **$621,575** construction loan at 5% and term loan set at a fixed 6% over the 20-year term
- **$ 621,575** loan against the property
  - Property valued at **REDACTED**
  - Loan-to-value ratio equals **REDACTED**; Lien-to-value ratio equals **REDACTED**
- DSCR > **REDACTED**

929 Connecticut Ave (Bridgeport)
The Five W's

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

- **What?** Receive approval for a **$ 621,575** construction and (potentially) term loan under the C-PACE program to Incubator Associates Limited Partnership to finance the construction of specified energy upgrade
- **When?** Project to commence 2014
- **Why?** Allow Green Bank to finance this C-PACE transaction, continue to build momentum in the market, and potentially provide term financing for this project until Green Bank sells it along with its other loan positions in C-PACE transactions.
- **Who?** Incubator Associates Limited Partnership, the property owner of 929 Connecticut Ave, Bridgeport
- **Where?** 929 Connecticut Ave, Bridgeport, CT

REDACTED

Anticipated Green Bank cash flow

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

CT Green Bank Pro Forma

Project Basics		*Cash Flows*	
Amount Financed	$671,525	Date	CEFIA $
Construction Period (years)	0.67	Dec 2014	$671,525
Term (years)	20	Aug 2015	$22,384
		Jan 2016	$58,104
Construction Financing Rate	5.00%	Jan 2017	$58,104
Term Financing Rate	6.00%	Jan 2018	$58,104
		Jan 2019	$58,104
Construction Interest Payment (bullet)	$22,384	Jan 2020	$58,104
Yearly Debt Service Payments (made semi-annually)	$58,104	Jan 2021	$58,104
		Jan 2022	$58,104
		Jan 2023	$58,104
		Jan 2024	$58,104
		Jan 2025	$58,104
		Jan 2026	$58,104
		Jan 2027	$58,104
		Jan 2028	$58,104
		Jan 2029	$58,104
		Jan 2030	$58,104
		Jan 2031	$58,104
		Jan 2032	$58,104
		Jan 2033	$58,104
		Jan 2034	$58,104
		Jan 2035	$58,104

REDACTED

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

December 1, 2014

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mailcode 28221T
Attention Docket ID No. OAR-2013-0602
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Public Comments on EPA-HQ-OAR-2013-0602 Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units

Dear Administrator McCarthy:

On behalf of the Connecticut Green Bank (formerly known as the Clean Energy Finance and Investment Authority), I am submitting the following public comments pertaining to EPA-HQ-OAR-2013-0602 "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units".

The proposed EPA rule would establish guidelines under section 111(d) of the Clean Air Act ("CAA") for developing state performance standards that reduce greenhouse gas ("GHG") emissions from existing fossil fuel-fired electric generating units. These power plants are the nation's largest contributor to rising GHG concentrations in the atmosphere, which are linked to climate change and the increased frequency of extreme weather. The EPA proposal targets a thirty percent reduction in power plant GHG emissions from 2005 levels by 2030.

The State of Connecticut supports continued progress in reducing the harmful GHG emissions that are causing global climate change. It has taken several major actions to address climate risks. As required by the Global Warming Solutions Act of 2008 and Governor Malloy's 2013 Comprehensive Energy Strategy, the State succeeded in reducing GHG emissions to 1990 levels by 2010 and is making good progress toward a further 10 percent reduction below these levels by 2020.[1] .A major driver for these reductions is significantly lower power sector emissions, achieved through Connecticut's Renewable Portfolio Standard ("RPS") and participation in the Regional Greenhouse Gas Initiative ("RGGI"), a groundbreaking cap-and-trade program for power plant emissions in the Northeast states.

The EPA proposal is a critically important step to complement the State's actions and drive down power sector emissions on a nationwide basis. The Green Bank joins with the State and the Connecticut Department of Energy and Environmental Protection in supporting the proposal, with adjustments to make it fairer and more workable and strengthen its emission reduction goals.

[1] Connecticut Department of Energy and Environmental Protection, *Taking Action on Climate Change 2014 Progress Report*, June 6, 2014.

We note that adoption and implementation of strong and ambitious 111(d) rules is particularly important in light of the U.S/ China climate agreement announced on November 11. With the President's commitment to reducing U.S. GHG emissions by 26-28 percent by 2025, it will be imperative to move toward a low-carbon energy sector as rapidly as possible.

As states adopt strategies to meet emission reduction goals under EPA's rules, there will be strong drivers to invest in low cost, innovative sources of zero-emitting (e.g., wind and solar) or low-emitting (e.g., fuel cells) electricity. Wind and solar power and energy efficiency are central to the design of the EPA's proposal and increasing their market penetration will be a top priority.

State-level green banks are a valuable tool for scaling-up clean energy and will play an essential role in reducing the costs of clean energy investment, increasing private capital investment, lowering costs to consumers, and creating jobs. The success of the Connecticut Green Bank – the first in the nation – is strong evidence of the benefits of green banks in accelerating the transformation of the energy sector that the EPA rule envisions and provides a promising model for other states as they prepare to implement that rule.

These comments will:

- Describe the need for low-cost capital investment to achieve the clean energy goals of the EPA rule;
- Explain how the green bank model can meet that need;
- Provide background on the Connecticut Green Bank – its creation, mission and goals; and
- Highlight the Connecticut Green Bank's accomplishments to date in promoting low-cost renewable energy and energy efficiency (i.e., clean energy) in Connecticut.

I. The Importance of Low-cost Clean Energy Investment in Reducing GHG Emissions under EPA's Rule

The proposed 111(d) rule is based on EPA's determination of the "best system of emission reduction" for lowering carbon pollution from fossil-fueled power plants. EPA has defined this system by identifying four reduction strategies, or "building blocks", that are feasible and cost-effective. Since the states are responsible for implementing 111(d) requirements, EPA has then set individual state goals based on an analysis of the state's power generation mix and ability to reduce emissions. Each state's overall reduction goal equals the sum of the reductions the EPA has estimated each state can realistically achieve through each of the four building blocks.

Once a final rule is in place, states will then need to develop implementation plans that provide a roadmap for meeting their emission reduction goals. States will consider all four Building Blocks in designing these plans, along with other demonstrated tools for reducing emissions. All states will have a strong interest in taking advantage of innovative clean energy technologies and deployment strategies and delivering clean energy to consumers at the lowest possible price.

Building Blocks 3 and 4 call for increased usage of renewable power and the implementation of energy efficiency measures to reduce overall demand for electricity from carbon-emitting power

plants. These strategies will, to a significant extent, fall outside of the traditional utility-financing arena and in many instances will be spearheaded by independent project developers dependent on access to private capital. While utilities have been investing in wind and solar power and energy efficiency and demand reduction programs and will continue to do so, much of the growth and innovation in these areas has come from outside the utility sector.

The prime example is roof-top (or distributed) solar where decentralized entrepreneurs interfacing directly with consumers are reshaping retail power markets and delivering low-cost electricity. Expanding these projects to serve a larger population of power users will be critically important to the success of 111(d) implementation plans. This expansion will require innovative financing approaches that increase the availability and lower the cost of capital and offer electricity to consumers at competitive prices.

II. How Green Banks Can Support Implementation of Building Blocks 3 and 4

A green bank typically takes the form of a state chartered financing authority that leverages private capital with public dollars to grow clean energy markets quickly. Green banks increase total clean energy investment through innovative financing mechanisms and stimulate demand by creating new market structures that increase consumer access to clean energy solutions. Green banks lower the price of clean energy through better financing terms and have minimum long-term costs to taxpayers, as public dollars are returned and recycled. States can authorize green banks to use a wide range of financing tools and apply them to a variety of clean energy technologies and strategies.

Green banks drive efficient and rapid deployment of clean energy by focusing on four main objectives:

1) *Accelerate market growth by delivering consumers low-cost capital for cheaper and cleaner energy* – Green banks can significantly lower the price of clean energy with low-cost and long-term financing, allowing states to increase their renewable power portfolios or reliance on other clean energy tools with no additional cost. A recent study by Lazard found that reducing the cost of capital by just 3.8 percentage points for a residential solar project would reduce the end-price of solar power by 26%.[2] Green banks lower the cost of capital for clean energy through direct, low-cost debt investments, through credit enhancements like loan loss reserves, and through other market-supporting activities that increase the scale and lower the cost of capital.

2) *Fill gaps in commercial investment and maximize private: public leverage* –The vast majority of the investment to build a U.S. clean energy platform must come from the private sector, but clean energy projects can have difficulty accessing private capital in the required amounts or at reasonable borrowing costs. Green banks help draw in the needed private investment through a host of techniques. This includes the use of credit enhancements, direct co-investment (e.g., subordinated debt), and warehousing (i.e., origination, aggregation, and selling down of loan transactions). These activities help de-risk projects and build a bridge to large sources of cheaper private capital. These techniques can also achieve tremendous leverage, where a single public dollar invested by the green bank can yield five to ten dollars of private investment.

[2] Lazard, Levelized Cost of Energy Analysis - Version 8.0., September 2014. http://www.lazard.com/pdf/levelized%20cost%20of%20energy%20-%20version%208.0.pdf

3) *Maximize consumer demand for clean energy by facilitating up-front financing and market transparency* –The two greatest barriers preventing consumer adoption of clean energy are the upfront cost and lack of information. Green banks remove both of these barriers through financing and by implementing new market behaviors. Green banks ensure that a consumer can put solar on the roof or perform an efficiency upgrade without any out-of-pocket cost, allowing the consumer to begin saving money on day one. In addition, green banks build platforms that give consumers greater access to information about the level of savings they can achieve, financing options available, and the prices offered by different contractors. Increasing information transparency and providing attractive financing eliminate the primary barriers to clean energy adoption.

4) *Build self-sustaining loan programs to maximize efficiency of public dollars while holding taxpayers harmless* – Many states offer generous subsidies or cash grants to consumers for adopting solar. This approach has helped with initial uptake and is suitable for an early stage developing market, but cannot allow the market to reach scale. Green bank activity combined with declining technology costs, particularly in solar PV, allows consumers to adopt cheap renewable power without a significant subsidy. Transitioning from subsidies to debt financing allows the state to build a self-sustaining funding mechanism for clean energy adoption. Grants are one-time expenses that require new appropriations every year, and the dollars are permanently spent once the grant is given. Green banks, however, recycle the initial public dollars, reinvest in more clean energy projects, and are ultimately able to return the public investment to the taxpayers or ratepayers. Therefore, green banks allow state governments to expand clean energy markets at little or no long-term cost to the taxpayer.

III. Background and Goals of the Connecticut Green Bank

The Connecticut Green Bank was introduced by Governor Daniel P. Malloy and adopted by the Connecticut General Assembly with bipartisan support as an integral part 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 rationale for the Connecticut Green Bank is to:

- Create a flexible portfolio approach to clean energy in which the marketplace (not the government) picks winners and losers;
- Focus on deployment of commercially available technologies at scale to lower costs;
- Drive "all cost effective" energy efficiency in government, institutional, residential, and commercial and industrial sectors;
- Push for "deeper" energy efficiency – covering not just the low-hanging fruit of lighting, but also heating, air conditioning, insulation, building envelope improvements, machinery, and appliances; and
- Move away from traditional "subsidy" spending approaches to a "finance" model – using limited public resources to leverage and attract private capital investment.

In short, the Connecticut Green Bank model was established to deploy more clean energy, at a faster rate, while using public resources responsibly.

As the nation's first state-level "green bank," our mission is to support the Governor's and Legislature's energy strategies to achieve cheaper, cleaner, and more reliable sources of energy while creating jobs and supporting local economic development. The goals of the Connecticut Green Bank are:

1. Attract and deploy capital to finance the clean energy[3] goals[4] of Connecticut, including:

    a. Helping Connecticut become the most energy efficient state in the nation;
    b. Scaling up the deployment of renewable energy in the state; and
    c. Providing support for the infrastructure needed to foster the clean energy economy.

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

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

The Connecticut Green Bank's current balance sheet is $120 million of current and non-current assets. We are supported on an ongoing basis by a $0.001 per kilowatt-hour surcharge on electric ratepayer bills that provides approximately $27 million a year without a sunset date, as well as allowance proceeds from RGGI for renewable energy and energy efficiency financing.

IV. Green Bank Renewable Energy and Energy Efficiency Accomplishments

Deploying More Clean Energy, Creating Jobs, and Reducing Greenhouse Gas Emissions

Since the inception of the Connecticut Green Bank in July of 2011, our efforts have focused on supporting the state's energy policy by using limited public resources to attract more private investment in clean energy in Connecticut. To that end, as a result of the efforts undertaken over the past three years, we are deploying more clean energy in our state than ever before – 66.3 MW in new anaerobic digester, combined heat and power, fuel cell, solar PV, and wind resources – nearly double the renewable energy than what was deployed in the prior decade. Connecticut's residents, businesses and institutions now have easier access to affordable capital to finance clean energy projects than ever before – making clean energy cheaper, cleaner, and more reliable than other energy sources.

---

[3] It should be noted that for the purposes of CEFIA, "clean energy" has the meaning as provided in Connecticut General Statutes Section 16-245n(a), as amended from time to time. This includes, but is not limited to renewable energy, financing energy efficiency projects, storage, distribution, alternative fuel vehicle infrastructure, and manufacturing.

[4] Goals are inclusive of Connecticut's clean energy policies (i.e. PA 98-28, PA 05-01, PA 07-242, PA 11-80, PA 13-298, etc.), including, but not limited to, the Integrated Resources Plan (§89 of PA 11-80), Comprehensive Energy Strategy (§51 of PA 11-80), Climate Change Action Plan of 2005, and other clean energy public policies.

By using $100 million of ratepayer funds, we have attracted over $250 million of private investment in clean energy for a total of $350 million to support clean energy projects creating nearly 2,500 jobs and reducing carbon emissions by over 580,000 tons.[5] More importantly, by more responsibly managing public funds through loans, the Connecticut Green Bank has transitioned from providing nearly 100 percent of its resources as grants and subsidies to using only 40 percent of its resources in this manner, thereby deploying public dollars more efficiently to support the sustainable growth and development of a thriving clean energy market in Connecticut. This has enabled the Bank and its partners to stimulate more clean energy at a faster pace while reducing the drain of public funds.

Delivering on the Promise – No Money Down and Immediate Positive Cash Flow Energy Improvements

In only three years, the Connecticut Green Bank has demonstrated how public resources can be better invested in ways that attract private investment, lead to the deployment of more clean energy, and most importantly provide positive value to consumers.[6] Our financing programs that offer no money down, lower interest rates, and longer term maturities are enabling consumers to immediately receive positive economic benefits from clean energy because the energy savings exceed the debt service payments. For example:

- C-PACE and RGGI. Connecticut is the first state to use its cap-and-trade revenues from RGGI to successfully securitize a pool of commercial and industrial energy efficiency and renewable energy transactions through C-PACE.[7] By using greenhouse gas allowance revenues through RGGI to support a $40,000,000 internal warehouse – source of funds to originate, aggregate, and then sell-off C-PACE transactions – for construction and term financings of C-PACE projects, the Connecticut Green Bank was able to be a market catalyst for commercial and industrial energy efficiency and renewable energy financing, which then attracted private capital investors who then wanted to purchase those transactions. These C-PACE projects not only offer no money down and immediate positive cash flow for property owners, but they are delivering 40 to 50 percent energy savings in buildings – thus improving the value of the buildings, making businesses more competitive, and lowering energy costs.

- Solar Loan and ARRA. The Connecticut Green Bank graduated one of its earliest partners, Sungage Financial, from a solar loan pilot program in Connecticut into a regional partnership with Digital Federal Credit Union to expand the specialized residential solar loan offering into Massachusetts, New Jersey, and New York.[8] The specialized loan product is designed for financing solar projects because it reamortizes the loan principle after the household pays back no less than eighty percent of the value of the federal investment tax credit within 18 months of the start of the loan. This

[5] Comprehensive Annual Financial Report of the Connecticut Green Bank (June 30, 2014)
[6] "Renewable and Clean Energy Surges in Connecticut," by Jan Ellen Spiegel of the CT Mirror (January 6, 2014)
[7] "In a 'Watershed' Deal, Securitization Comes to Commercial Efficiency," by Nick Lombardi of Greentech Media (May 19, 2014). And "The Inside Story of How Connecticut Became So Influential in Energy Efficiency Finance" by Nick Lombardi of Greentech Media (July 8, 2014).
[8] "CT Solar Loan Partner Graduates from Connecticut Green Bank," in the Providence Journal (October 29, 2014).

reamortization causes the solar loan to deliver more energy savings value than debt service costs. This graduation marks the first time that a Connecticut Green Bank product has fully transitioned from using public resources from $5,000,000 of credit enhancement and other investments to using no public funds to attract $100,000,000 of private capital.

- Solar Lease and ARRA. As a follow-up to our ground-breaking residential solar lease offering with U.S. Bank in 2007, the Connecticut Green Bank advanced the market's solar lease offerings by lowering the cost of capital for such transactions through the inclusion of a syndicate of debt providers.[9] The new $60,000,000 lease structure – which offers households and businesses access to cheaper and cleaner energy – lowers direct state investment and dramatically increases the total private capital available to invest because the state has reduced default risk. The structure includes local lenders led by First Niagara Bank with Webster Bank, Liberty Bank, and People's United Bank – and comprehensive insurance and warranty management.

These are a few of the products developed by the Connecticut Green Bank that are providing households and businesses with easy access to affordable capital – no money down and immediate positive cash flow – for clean energy projects. As the deployment of clean energy continues to grow with support by the Connecticut Green Bank, more jobs will be created and GHG emissions will be further reduced.

Sharing Lessons with Other States. The Connecticut Green Bank is not only setting an example for how more clean energy can be deployed at a faster pace while using public resources responsibly through its products, but it is also sharing lessons learned with other states. In partnership with the Coalition for Green Capital and the Brookings Institution, the Connecticut Green Bank co-hosted the "Green Bank Academy" in Washington, D.C. in February of 2014. The academy brought together 10 states to discuss the merits of the green bank model. Green banks have been launched in New Jersey (i.e., New Jersey Energy Resilience Bank) and New York (i.e., New York Green Bank) – and are being created in other states like California, Hawaii, Minnesota, Nevada, Rhode Island, and Vermont. Federal legislation called the "Green Bank Act of 2014" was also introduced in the House by Congressman Van Hollen[10] and the Senate[11] by Senators Murphy and Blumenthal. And President Obama even called out the leadership of the Connecticut Green Bank.[12]

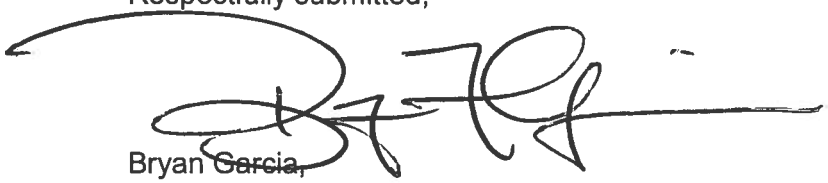
Conclusion

The green bank model works – its successful implementation across the country will attract more private investment and increase the deployment of energy efficiency measures and renewable energy technologies at low costs to consumers. Thus, green banks can perform

[9] "Connecticut's Green Bank: A Model for Public-Private Renewables Partnerships?" by Conway Irwin of Greentech Media (July 8, 2013).
[10] H.R. 4522
[11] S. 2271
[12] "Goldman's Cleantech Activities Receive a Presidential Shout Out" in the Wall Street Journal (May 9, 2014)

a unique function in accelerating the transition to clean energy that will be required to meet the state emission reduction goals in EPA's 111(d) rule. Following and building on the Connecticut experience, states should consider creating green banks as an essential tool to support smart, cost-effective implementation of state plans developed in response to EPA's final rule.

Respectfully submitted,



Bryan Garcia,
President and CEO
Connecticut Green Bank

December 1, 2014

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mailcode 28221T
Attention Docket ID No. OAR-2013-0602
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Public Comments on EPA-HQ-OAR-2013-0602 Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units

Dear Administrator McCarthy:

On behalf of the Coalition for Green Capital (CGC), I am submitting the following public comments pertaining to EPA-HQ-OAR-2013-0602 "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units". CGC asserts that any state can comply with the proposed regulations and simultaneously lower monthly energy bills to consumers, create jobs and hold taxpayers harmless if state implementation plans are coupled with state green bank activities.

The Coalition for Green Capital (CGC) is a 501(c)(3) nonprofit that works at the state, federal and international levels to develop and create clean energy finance initiatives, or "green banks", that will accelerate the growth of clean energy markets. CGC is the nation's leading consultant on green banks, which use limited public dollars to leverage greater private investment in renewable energy and energy efficiency. CGC partners with government, non-profits and key stakeholders to build a roadmap to implement new policy strategies and identify specific financial tools to overcome barriers to clean energy deployment. These tools include both financing solutions and new market behaviors that increase consumer engagement and demand.

The proposed EPA rule would establish guidelines under section 111(d) of the Clean Air Act ("CAA") for developing state performance standards that reduce greenhouse gas ("GHG") emissions from existing fossil fuel-fired electric generating units. These power plants are the nation's largest contributor to rising GHG concentrations in the atmosphere, which are linked to climate change and its consequences, including drought, extreme weather events, rising global temperatures, seawater rise and melting of polar ice-caps. The EPA proposal targets a thirty percent reduction in power plant GHG emissions from 2005 levels by 2030.

CGC strongly supports the proposed regulations, and believes that green banks are a critical tool for states to comply with these regulations while creating economic benefits for consumers, creating jobs, and holding taxpayers harmless through fiscally neutral financing. Green banks are state chartered financing authorities that leverage private capital with public dollars to grow clean energy markets.

Green banks are designed to reduce the permanent expense of subsidies for clean energy that is often borne by ratepayers, and to grow clean energy markets quickly through private investment.

Connecticut created the first official state green bank in the nation in 2011, capitalizing the institution with approximately $40 million per year of public funds. New York soon followed suit, announcing the creation of a $1 billion green bank in 2013. The Hawaii Green Energy Infrastructure Authority, the California Clean Energy Center and the New Jersey Energy Resilience Bank are three more state clean energy finance institutions formed in only the last two years. Momentum behind green banks is rising quickly, with states around the country working with CGC to explore green bank creation. Minnesota, Vermont, Maryland, Delaware, Rhode Island and Nevada are all at varying stages of green bank consideration and development. As green banks can increase investment for any mature clean energy technology, the green bank model is broadly applicable to all states looking for strategies to achieve GHG reductions cost-effectively.

The EPA and Obama administration can help educate states on the benefits of green banks to facilitate further adoption of this powerful investment tool. CGC has spent years educating states on the role and state-specific benefits of green banks. With administration support, even more states can understand how to create green banks as part of the implementation process for the 111(d) rule.

With promulgation of the EPA regulations, increased reliance on low and non-emitting energy sources will be a priority for states looking for tools to meet their emission reduction goals. Green banks address the numerous market failures that prevent consumer demand from reaching the supply of clean energy and capital, allowing markets to grow and increasing consumer welfare. The cost of renewable energy is quickly becoming competitive with fossil-fuel power, and energy efficiency allows all consumers to reduce the cost of energy.[i] However, consumer markets for clean energy are nascent, and capital is often unable to reach end-projects. Green banks help build the market mechanisms that connect investment with projects that allow consumers to save money while adopting cleaner energy.

No matter the policy a state adopts to increase the deployment of renewables and energy efficiency, a green bank can help the state implement that policy with ample and reasonably-priced capital. And with green banks, this capital will come through public-private partnerships that maximize the efficiency of each public dollar while stimulating private investment.

These comments will:

- Explain why more and cheaper capital must be drawn into energy markets in order to meet state clean energy targets;
- Describe how green banks meet that need without harming consumers;
- Explain how green banks finance clean energy markets without subsidy; and
- Highlight the green bank activities and success already achieved around the country.

The Need for Low-Cost Investment in Clean Energy to Reduce GHG Emissions

The EPA 111(d) rule was proposed in June 2014 and is expected to be finalized in June 2015. Central to the rule's design is EPA's determination of the "best system of emission reduction" for lowering carbon pollution from fossil-fueled power plants. EPA has defined this system by identifying four reduction strategies, or "building blocks", that are feasible and cost-effective. Since the states are responsible for implementing 111(d) requirements, EPA has then set individual state goals based on an analysis of the state's power generation mix and ability to reduce emissions. Each state's overall reduction goal equals the sum of the reductions the EPA has estimated each state can realistically achieve through each of the four building blocks.

Assuming a final rule is in place in June 2015, states will then need to develop implementation plans that provide a roadmap for meeting their emission reduction goals. States will consider all four Building Blocks in designing these plans, along with other demonstrated tools for reducing emissions. All states will have a strong interest in taking advantage of innovative clean energy technologies and deployment strategies and delivering clean energy to consumers at the lowest possible price.

Blocks 1 and 2 focus on lowering the carbon footprint of existing fossil-fueled power plants by increasing the efficient operation of coal plants and shifting power generation from coal plants to lower-emitting natural gas plants. Implementation of these strategies largely falls to regulated utilities and independent power producers, which will likely turn to traditional financing methods for power plant upgrades, transmission and pipeline improvements and new plant construction.

By contrast, Blocks 3 and 4 call for increased usage of renewable power and the implementation of energy efficiency measures to reduce overall demand for electricity from carbon-emitting power plants. These strategies will, to a significant extent, fall outside of the traditional utility-financing arena and in many instances will be spearheaded by independent project developers dependent on access to private capital. A significant amount of wind power has been installed in New York State, for instance, with independent financing and development by non-utility companies. While utilities have been investing in wind and solar power and demand reduction programs and will continue to do so, much of the growth and innovation in these areas has come from outside the utility sector. The prime example is roof-top (or distributed) solar where entrepreneurs interfacing directly with consumers are reshaping retail power markets and delivering low-cost electricity. Expanding these projects to serve a larger population of power users will be critically important to the success of 111(d) implementation plans. This expansion will require innovative financing approaches that increase the availability and lower the cost of capital and offer electricity to consumers at competitive prices.

Green Banks Increase Investment in Clean Energy and Accelerate Market Growth

A green bank is a state charted financing authority that leverages private capital with public dollars to grow clean energy markets very quickly. Green banks increase total clean energy investment through

innovative financing mechanisms and stimulate demand by creating new market structures for consumer adoption. Green banks lower the price of clean energy through better financing terms and have no long-term costs to taxpayers, as public dollars are returned and recycled. Green banks may be authorized to use a range of financing tools and address all mature clean energy markets. Green banks can optimally scale up the amount of clean energy in a state, efficiently using public dollars and reducing harm to consumers.

Green banks drive efficient and rapid deployment of clean energy in four ways:

1) *Lowering the price of clean energy to allow for a higher market penetration* – Consumers can adopt clean energy at prices equal to or less than fossil fuel-based power by using green bank financing. Green banks directly address the primary argument against greater reliance on clean energy, that it will harm consumers through increased electricity prices. Green banks can significantly lower the price of clean energy with low-cost and long-term financing, allowing states to increase their renewable portfolio standards or the reliance on clean energy with no additional cost.

   The price of renewable power is particularly sensitive to the cost and term of financing because the entire cost of the power is found in the equipment. There are no fuel costs for renewables. Therefore a decrease in the interest rate or extension of the term of financing offered for renewables can greatly reduce the overall price the end-user pays for that clean power. A recent study by Lazard found that reducing the cost of capital by just 3.8 percentage points would reduce the end-price of solar power by 26%.[ii] Green banks directly address this by lowering the cost of capital for clean energy. They do this through direct, low-cost debt investments, through credit enhancements like loan loss reserves, and through other market activities that increase the scale and lower the cost of capital.

   Green banks also reduce the price of clean energy by aggregating renewable energy credits (RECs) and selling them to utilities at scale. This can significantly reduce the price utilities pay to procure RECs, which means a lower cost is ultimately passed on to the consumer. The Connecticut Green Bank is able to procure RECs for approximately $50/REC, while the utility run program has a cost of $100/REC. This green bank activity produces large savings for consumers, reduces RPS compliance costs, allows greater clean energy adoption, and supports local economic development.

2) *Reducing subsidies and offering taxpayer-neutral support for clean energy* – Many states offer generous subsidies or cash grants to consumers for adopting clean energy technology. This technique has helped draw initial uptake, but this support structure cannot allow the market to reach scale. In Connecticut, for example, if all homeowners who were economically viable for solar today actually installed the technology and took the state's grant, the cost to the state

would be over $2 billion. Clearly a self-sustaining mechanism for public support is required to reach meaningful penetration.

Green banks eliminate upfront costs of adopting clean energy by offering financing. And they lower the price of the clean power by offering that financing at a low-cost. This green bank activity combined with declining technology costs, particularly in solar PV, allows consumers to adopt cheap renewable power without a significant subsidy. The Connecticut Green Bank has reduced solar subsidies in the state by 68% while increasing annual solar market adoption by 15x. Many states offer expensive subsidies that are far more generous than needed when combined with green bank financing. Therefore states can lower grants and still grow the market by more responsibly using public resources.

Transitioning from subsidies to financing allows the state to build a self-sustaining funding mechanism for clean energy adoption. Grants are one-time expenses that require new appropriations every year, and the dollars are permanently spent once the grant is given. A green bank only requires an upfront investment of public funds and those funds are retained and increased as loans are paid back. Green banks recycle the initial public dollars, reinvest in more clean energy projects, and are ultimately able to return the public investment to the taxpayers or ratepayers. Therefore green banks allow state governments to expand clean energy markets at no long-term cost to the taxpayer.

3) *Providing increased security for energy efficiency investment* – Green banks are ideally suited to implement and manage state PACE programs. PACE, which stands for property-assessed clean energy, is an innovative financing structure in which a borrower repays a clean energy loan through a property tax assessment. This provides far greater security for an investor, particularly for energy efficiency, than that investor would otherwise have. Investors, in turn, offer better financing terms to borrowers. This new structure has been legally authorized in over 30 states, but few have achieved meaningful program participation because of the initial capital required and high administrative burden.

   Green banks are perfectly positioned to administer state PACE programs. Through optimal legislation they can be granted statewide authority to administer the program, and they also have the capital on hand to spark initial program participation. After initially finding no private investors interested in early participation, the Connecticut Green Bank invested public funds directly to kick-start the program. These funds were revenues from the RGGI cap-and-trade program. In a short period the Green Bank built a portfolio of over $20 million in loans, 80% of which were then sold to a private investor. This demonstrates both how green banks can achieve the required scale to attract private investors and how green banks can implement PACE effectively unlike dozens of other states without green banks.

4) *Coordinating and aggregating small projects to attract investors* – Green banks overcome a significant barrier to private investment in clean energy by originating and/or aggregating small projects that would otherwise not receive private financing. By their nature, many clean energy projects, particularly building efficiency and distribution generation, are small and physically scattered. The projects might technically vary. This kind of project variation and small scale prevent large providers of cheap capital from issuing loans because the cost of underwriting such a small loan is relatively high. Institutional investors often say that the minimum investment size that is worth the cost of making the investment is at least $20 million.

   Green banks solve this problem by aggregating these small projects into a warehouse of loans. Once the warehouse reaches a certain threshold in size, the green bank can sell the warehouse to an institutional investor who otherwise would not have invested in this market. By engaging with numerous disaggregated customers and ensuring financial and technical consistency across the loans, green banks provide a critical bridge between small clean energy projects and large private investors. The Connecticut Green Bank successfully executed this approach with both their residential solar loan product and their commercial energy efficiency PACE product.

Green Banks Do Not Need to Rely on Subsidy to Grow Clean Energy Markets

Green banks allow states to grow clean energy markets while preserving taxpayer or ratepayer dollars. Specifically, green banks crowd-in, rather than replace private investment activity with commercially attractive financing. Green banks use precise techniques and set interest rates to ensure clean energy is both affordable to consumers and attractive for private investment partners. Green banks not only avoid offering subsidized financing, they also can replace state grants, which truly are subsidies. Green banks avoid subsidizing clean energy markets in two ways:

1) *Green banks loan at reasonable and for-profit rates commensurate with risk* – Green banks loan at rates and terms that commercial banks eventually will offer. Commercial banks do not now loan at green bank terms because they misprice risk out of unfamiliarity with clean energy and because the loans are below banks' required scale. In part, commercial banks have increased their minimum required investment size in reaction to the excessive lending to households that led to the Great Recession. (The average American household debt doubled from 2000 to 2007, and reached an average of $140,000 per household. This debt comprised mortgages, home equity loans, and credit card debt. This small scale debt is what the financial industry has been eschewing since 2007. However, revenue-producing energy investing has been an accidental victim of this commercial lending move into large scale lending only.)

   One way green banks assure that they are lending at commercially practical rates is to co-invest with commercial banks. This is demonstrated by the Connecticut Green Bank's ability to attract into its projects ten times more private capital than it contributes in public capital. New York offered public capital in a bidding process that led to $600 million of private capital.

Another way for green banks to be more confident that they are not subsidizing clean energy is to raise private capital in the form of warehouses of money that can be drawn down on demand. Warehouse financiers will want to be sure that the eventual retail financing is commercially sustainable. In addition, green banks can avoid subsidizing clean energy by securitizing – packaging and reselling – loans. The purchasers of the securitized loans would not buy loans made at rates below what risk should require or made to borrowers who cannot pay.

2) *Green bank lending only finances projects that are net present value positive at reasonable discount rates* – Green banks do not loan at the wholesale or retail level unless they are assured that the project creates value in either or both of two ways: (i) a generation project must produce clean electricity at a price consumers will pay, or (ii) an efficiency project must produce savings for consumers. More simply, the projects financed by green banks produce energy solutions that are both cleaner and cheaper than the pre-existing energy consumption by the end-users.

   Green Banks are prudent about their lending. In the case of Connecticut's C-PACE program, for example, the Green Bank will not loan into a project unless the savings-to-investment ratio is greater than 1.0 and the end user is credit-worthy. In the case of distributed energy, the end user signs an agreement to pay for the energy before the project is built.

Green Bank Accomplishments Highlight Methods for Cost-Effective Compliance

The Connecticut Green Bank has shown tremendous early success in deploying clean energy, and the New York Green Bank recently announced nearly one billion dollars in investment. Many other states are also considering green banks and similar programs, demonstrating that states have already recognized the value of offering clean energy financing.

The Connecticut Green Bank has been in operation for three years, and has already proven that public dollars can create more clean energy when used to provide financing with private investors, rather than through traditional grants or subsidies. In 11 years of operation, the Connecticut Clean Energy Fund (CT's predecessor grant-making entity) facilitated $349.2 million of total clean energy investments. 48% of this came from ratepayers. The Connecticut Green Bank has now facilitated the same amount of total clean energy investment, but in only 3 years of activity. In addition, now only 29% of those dollars come from ratepayers. (*See* Table 1 below.) The $100 million of ratepayer dollars also created more clean energy, and dollars will be recycled and re-invested when they are returned as loan repayments. The $168 million previously invested by the Clean Energy Fund were all grants, and therefore were permanently expended. Critically, the green bank has produced measurable GHG reductions. In FY 2013 Connecticut Green Bank investments yielded 250,000 tons of avoided CO2 emissions over the lifetime of the projects.[iii]

Table 1: Connecticut Grant-Making Authority versus Connecticut Green Bank

	Connecticut Clean Energy Fund FY 2000 – FY 2011	Connecticut Green Bank FY 2012 – FY 2014
Years in Operation	11	3
Renewable Energy (MW / GWh)	43.1/2,299	65.3/3,189
Total Investment ($ MM)	$349.2	$350.2
Ratepayer Investment ($ MM)	$168.1	$100.00
Ratepayer Investment as Loans versus Grants	9% / 73%	57% / 43%

New York State created its own green bank in 2013. Today the banks has over $200 million in public funds with an expected full capitalization of $1 billion. Though the bank has only operated for 9 months, it has significantly increased clean energy investment in the state. The New York Green Bank recently announced seven transactions across a range of clean energy markets and technologies, which will combine $200 million in public dollars with $600 million private dollars.[iv] This new investment will allow customers to adopt clean energy with no upfront cost and reduce their total energy bills.

Conclusions

Green banks are a proven tool to grow clean energy markets and reduce GHG without punishing consumers. Green banks use limited public dollars to leverage the large amounts of private investment needed to achieve the EPA's proposed GHG reduction targets. And because public dollars are used for finance rather than grants, public funds invested in green banks are preserved and can be returned to taxpayer and/or ratepayers. This cost-effective and scalable approach to clean energy market growth makes green banks an ideal tool for state implementation of the proposed EPA rules. State interest in green banks is rising rapidly, and the EPA and Obama Administration can support the proliferation of this successful tool by promoting green banks as part of state implementation plans.

Respectfully submitted,

Reed Hundt, CEO
Coalition for Green Capital

[i] Cardwell, Diane, "Solar and Wind Energy Start to Win on Price vs. Conventional Fuels," New York Times, November 23, 2014.
[ii] Lazard, "Lazard's Levelized Cost of Energy Analysis, Version 8.0," September 2014.
[iii] "Connecticut's Green Bank, Energizing Clean Energy Finance," 2013 Annual Report, Connecticut Clean Energy Finance and Investment Authority.
[iv] New York Green Bank Press Release, "Governor Cuomo Announces First Green Bank Transactions," October 22, 2014.

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

November 28, 2014

Gina McCarthy, Administrator
U.S. Environmental Protection Agency
Air and Radiation Docket and Information Center
Mail Code: 2822T
1200 Pennsylvania Ave., NW
Washington, DC, 20460
Attn: Docket ID No. EPA-HQ-OAR-2013-0602

Re: Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (79 Fed. Reg. 34830, June 18, 2014)

Dear Administrator McCarthy:
The State of Connecticut ("Connecticut"), through its Department of Energy and Environmental Protection, is pleased to offer the following general and attached detailed comments in support of the U.S. Environmental Protection Agency's ("EPA") proposed emissions guidelines for states to follow in developing plans to address greenhouse gas ("GHG") emissions from existing fossil fuel-fired electric generating units ("EGUs") (79 Fed. Reg. 34830, June 18, 2014 ("Clean Power Plan" or "CPP").

The need to reduce GHG emissions in order to avert the most severe economic, environmental and human harm from climate change is clear. Connecticut is already experiencing the impacts of climate change. These impacts are directly harming the health and welfare of Connecticut residents and causing significant economic damage. Heavy rainfall events, flooding, and hurricane activity have increased in frequency and intensity in recent years and are expected to continue to increase. In August 2011, Tropical Storm Irene left 800,000 Connecticut customers without power for up to nine days. This record outage was surpassed only six weeks later when an October snowstorm took out power for 880,000 customers. And in October 2012, Superstorm Sandy hit many of the areas still recovering from Irene and knocked out power for much of a week to more than 625,000 customers. Sandy was termed a superstorm because of the confluence of several severe weather systems, but also due to a warming climate. Rising sea levels increase the prospect that states will be more vulnerable to these types of storms in the years ahead. The estimated cost to Connecticut for the 2011 storms will exceed $750 million dollars. That figure does not include uninsured losses which could push the losses over $1 billion dollars. The impact from these storms is not limited to Connecticut.[1]
In Connecticut, we have proven that states can achieve significant, cost-effective GHG reductions while creating jobs and growing a clean energy economy. Between 2005 and 2012, we reduced the carbon intensity of our state's economy by 34%, while increasing our gross domestic product by 16%.

[1] http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf

Connecticut is one of a handful of leadership states that have taken early action to achieve substantial economy-wide reductions in emissions of carbon dioxide and other greenhouse gases. Through Connecticut's participation in the path-breaking Regional Greenhouse Gas Initiative ("RGGI"), the nation's first interstate, carbon dioxide cap-and-trade program, we have reduced emissions from our state's electricity generating sector while funding investments of more than $104 million in complementary energy efficiency, renewable energy, and other carbon emissions mitigation measures.

I am proud of the progress we have made in Connecticut. Our successes clearly prove that EPA's approach to the Best System of Emission Reduction ("BSER") of the Clean Power Plan is feasible and cost-effective. Between 2005 and 2012, we reduced gross CO_2 emissions from the power sector by 23%, and per capita emissions by 25%. We achieved these reductions by displacing coal and oil generation with high efficiency, low emitting natural gas combined cycle generating technology, safely maintaining and operating significant nuclear generation capacity, and ramping up investments to deploy renewable energy and energy efficiency. Other highlights of our clean energy transition include:

- Our emissions of harmful criteria pollutants have dropped precipitously: emissions of nitrogen oxides (NOx) and sulfur oxides (SOx) decreased by 80% and 91% between 2005 and 2011.[2]
- Thanks to our investments in energy efficiency, Connecticut families and businesses are using less electricity. Between 2005 and 2012, electricity consumption in Connecticut decreased by 11% on a per capita basis and 13% on a gross basis.[3] Connecticut has ranked among the top 10 states on the American Council for an Energy-Efficient Economy Energy Efficiency Score Card for eight consecutive years.[4]
- By reinvesting RGGI proceeds and other funds in clean energy, between 2010 and 2013, we achieved a tenfold increase the amount of renewable energy generation deployed in our state, including solar photovoltaics and fuel cells.

This progress has occurred concurrent with a 6.4% increase in electricity generation from Connecticut's generating units, as dispatch of Connecticut's extremely low carbon generation fleet increases to meet regional electricity demand.[5]

Under the leadership of Governor Dannel P. Malloy, proactive energy and environmental policies are keeping Connecticut on track to further reduce GHG emissions by pursuing a cheaper, cleaner, more reliable energy future. In 2011, Connecticut established the nation's first Green Bank, to attract private investment in the deployment of clean energy in Connecticut. Over the past two years, each $1 of public funds invested via the Green Bank, attracted

[2] 2011 National Emissions Inventory, http://www.epa.gov/ttn/chief/net/2011inventory.html

[3] Gross and per-capita electricity consumption derived from EIA Retail Sales of Electricity by State by Sector by Provider http://www.eia.gov/electricity/data/state/ and U. S. Census 2005 & 2012 American Community Survey (ACS) http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

[4] ACEEE 2006-2013 State Energy Efficiency Scorecards, http://www.aceee.org/state-policy/scorecard

[5] EIA Net Generation by State by Type of Producer by Energy, http://www.eia.gov/electricity/data/state/

approximately $5-$10 of investment from private sources.[6] Connecticut's continuing efforts are laying a foundation to achieve the dramatic reductions in carbon emissions necessary by mid-century to fight climate change while creating jobs and generating savings and revenue that flow back into our local economy. In 2013, we issued a Comprehensive Energy Strategy that identified further opportunities to achieve cuts in carbon emissions by ramping up investment in energy efficiency and renewable energy.[7] We expect to meet the 2020 emissions mandates of our state's Global Warming Solutions Act well in advance of 2020.[8]

In 2011, Connecticut consolidated its public utilities regulation, energy planning, and environmental protection agencies into a unified Department of Energy and Environmental Protection. Our experience has been that environmental protection and energy policy goals are more effective when integrated, and we strongly encourage EPA to coordinate and collaborate with the Department of Energy, the Federal Energy Regulatory Commission, and state public utility regulators as well as state environmental agencies in the refinement and implementation of the Clean Power Plan. Close, thoughtful coordination and cooperation among federal agencies with environmental and energy regulatory authority is imperative to achieving the carbon reductions, affordable, reliable energy, and prosperous economic future envisioned in the Clean Power Plan.

Our nation needs a comprehensive framework for addressing climate change, to ensure that all states—not just a proactive few—do their part to make cost-effective reductions in carbon pollution. The Connecticut experience demonstrates the fact that states can dramatically reduce carbon emissions, improve air quality, and protect public health while stimulating economic growth and prosperity. We believe that EPA's proposed approach to BSER replicates what Connecticut and a handful of other states found to be a successful and universally applicable framework for emissions reductions across the country.

While working within the legal framework of Clean Air Act (CAA) Section 111, EPA has leveraged system-wide strategies that are already being used to achieve carbon pollution reductions from fossil-fuel fired EGUs and drive technological improvements in the electricity system. By including energy efficiency and renewable energy strategies in the approach to BSER, EPA recognizes that states have the flexibility of basing their plans on proven strategies that already are providing cost-effective CO_2 emissions reductions. Connecticut is pleased that the Clean Power Plan recognizes that states may choose to work cooperatively to comply with the emissions guidelines by developing multistate plans. Connecticut also acknowledges the desirable environmental multi-pollutant benefits that could assist ongoing efforts to attain and maintain several national ambient air quality standards and help address the air quality related public health concerns arising from such traditional pollutants as ground level ozone.

In the attachment to this letter, we offer a number of detailed comments on the Clean Power Plan intended to capitalize on the positive points of the proposal while avoiding certain less desirable outcomes. Our attached comments are focused on preserving and, where feasible, improving the

---

[6] *Connecticut's Green Bank: Energizing Clean Energy Finance*, http://www.ctcleanenergy.com/annualreport/

[7] http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf

[8] http://www.cga.ct.gov/current/pub/chap_446c.htm#sec_22a-200a

national stringency of the proposal; balancing flexibility and accountability in state plan requirements; and ensuring that the responsibility of achieving reductions is equitably distributed among the states.

Connecticut applauds EPA's unprecedented outreach efforts in the development of the proposal and EPA's thoughtful consideration of the feedback it received prior to releasing the proposal. We strongly encourage EPA to maintain this level of interaction with states in finalizing the rule and providing guidance on implementation. Connecticut staff's expertise in air quality and energy planning are at your service should we be able to assist you as you finalize Clean Power Plan on the aggressive schedule established by the President's Climate Change Action Plan.

Sincerely,

Robert J. Klee
Commissioner

Comments from the State of Connecticut on
Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (79 Fed. Reg. 34830, June 18, 2014)

Connecticut supports the comments on the proposed Clean Power Plan ("CPP") prepared by the Regional Greenhouse Gas Initiative (RGGI), the Northeast States for Coordinated Air Use Management (NESCAUM), the Georgetown Climate Center, the Connecticut Green Bank, and the Northeast Energy Efficiency Partnerships (NEEP)[9]. Specifically, Connecticut supports the general building block framework as the Best System of Emission Reduction ("BSER") and EPA's proposal to begin program implementation in 2020 with emissions declining through 2030. Connecticut provides additional comments and recommendations below.

1) Maintain 2012 Baseline Year for Goal Setting

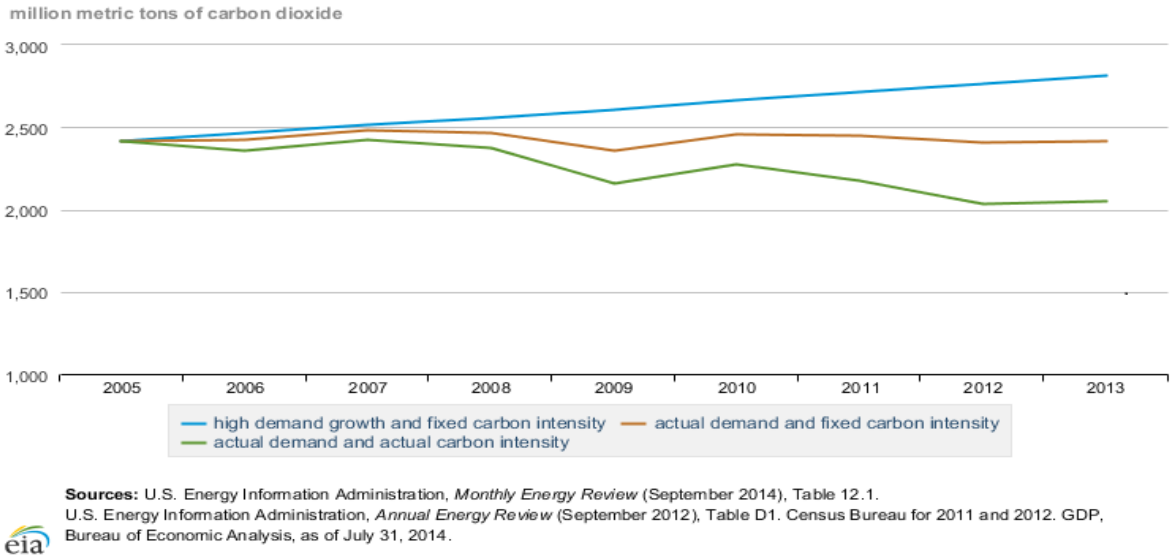
In its original proposal and the subsequent Notice of Data Availability ("NODA"), EPA request comment on whether or not to premise the building blocks on emissions from just one calendar year, 2012. EPA notes that some stakeholders contend that 2012 may not have been representative of normal operations and that it may be more reasonable to use 2010, 2011, or some average of multiple years between 2010 and 2011.

Connecticut strongly supports the use of 2012 as the base year for the Clean Power Plan building block methodology. Figure 1 shows actual emissions of CO_2 from the nation's electric power system from 2005 through 2013. Emissions of CO_2 were lower in 2012 than in any year after 2005. Use of any other calendar year or average of multiple years for the baseline would weaken the national stringency of the Clean Power Plan proposal, all else remaining equal. If the nation is to meet the goals for carbon pollution articulated in President Obama's 2013 Climate Action Plan, and the level of reduction that science indicates is necessary to stabilize global surface temperatures, then we have a moral and ethical obligation to use our best year to date as the baseline for additional action.

[9] NEEP comment signatories: Acadia Center, Alliance to Save Energy, American Council for an Energy Efficient Economy, Connecticut Department of Energy and Environmental Protection, Conservation Services Group, Home Performance Coalition, Massachusetts Executive Office of Environmental Affairs, Natural Resources Defense Council, Northeast Energy Efficiency Partnerships, Northwest Regional Technical Forum, Rhode Island Office of Energy Resources, Southeast Energy Efficiency Alliance, South-central Partnership for Energy Efficiency as a Resource, Southern Alliance for Clean Energy, Vermont Energy Investment Corporation,

Figure 1[10]

Carbon dioxide emissions from the electric power sector actual versus two hypothetical cases, 2005-13



Sources: U.S. Energy Information Administration, *Monthly Energy Review* (September 2014), Table 12.1.
U.S. Energy Information Administration, *Annual Energy Review* (September 2012), Table D1. Census Bureau for 2011 and 2012. GDP, Bureau of Economic Analysis, as of July 31, 2014.

2) Building Block Implementation

Connecticut supports the methodology for applying EPA's building blocks as described in the original proposal. In Connecticut, energy efficiency ("EE") and renewable energy ("RE") measures play a key role in reducing the rate of demand growth, supporting sustained economic dispatch of clean sources of generation before oil and coal, and minimizing the impacts of seasonal peak demand and constraints on New England's natural gas transmission system. These complementary effects of EE and RE have helped Connecticut to significantly reduce annual emissions of carbon pollution, NOx, and SOx from its electricity generating system since 2005, while the amount of electricity generated actually increased resulting in a net decrease in emissions intensity.

In the NODA, EPA discusses some stakeholders' desire to have EPA set state goals by requiring 100 % of the EE and RE building blocks to replace existing fossil generation. In the NODA, EPA acknowledges that this methodology will be significantly more stringent and less cost effective than the original proposal.[11]

Connecticut's experience does not demonstrate that 100% of EE and RE measures are displacing existing fossil generation. Significantly, Connecticut is a net exporter of electricity in a deregulated regional power market. Accordingly, market forces and energy demand *outside* of Connecticut determine the amount of generation—including fossil generation—that operates in Connecticut. In 2012, approximately 17% of Connecticut's generation served load outside the

[10] http://www.eia.gov/environment/emissions/carbon/

[11] 79 FR 64553

state's borders.[12] Conceivably, Connecticut could reduce its in-state demand to zero but its generation fleet could still run to serve load in other states.

Requiring 100% of EE and RE to displace existing generation would necessarily require states like Connecticut to deploy greater amounts of EE and RE than contemplated in the rule. The two methods proposed to establish RE targets are based upon state potential and regional RPS requirements. Proposed EE goals were developed based on the level of efficiency achieved by leading states. Requiring all states to implement RE and EE to 100% offset existing fossil generation would necessarily require states to go beyond what has been adequately demonstrated. This is particularly true for leading states such as Connecticut. For these reasons, Connecticut believes that the presumption that 100% of EE and RE directly replace existing fossil generation has not been adequately demonstrated and should not be the basis for state goal setting as discussed in the NODA.[13] To the extent that EPA includes a requirement that EE and RE displace existing fossil generation, EPA must work with the states to accurately reflect the extent such replacement actually occurs in that state and consider factors such as growth in energy demand and net imports and exports.

In the original proposal, EPA requests comment on whether or not state goals should be revisited post 2030. If the legal authority and resources exist to revisit state goals post 2030, Connecticut recommends that EPA evaluate the nationwide deployment of RE and EE, and then determine the appropriateness of state goal setting methodologies based on RE and EE measures displacing existing fossil generation.

3) Support for Currently Proposed Interim Compliance Period

EPA's original proposal and the NODA seek comment on the interim compliance period from 2020-2029. Some stakeholders assert that in 2020 the sudden onset of the heat rate improvements from Building Block 1 and the re-dispatch to natural gas requirements from Building Block 2 create a "cliff" and the ten-year averaging period in the proposal may not be sufficient for states to achieve compliance with interim goals. In the NODA, EPA expresses two potential ways to address this: (1) phase in the requirements of Building Blocks 1 and 2 over the ten year period; and/or (2) devise a scheme for issuance of early reduction credit for actions taken prior to 2020 that can be used to facilitate compliance with interim goals.

Connecticut opposes phasing in the requirements over the ten year period, because it will reduce the national stringency of the proposal. Additionally, Connecticut notes that 2020 is still six years away. As discussed below with respect to Building Block 2, in the six-year time period between 1999 and 2005, Connecticut added significant quantities of new natural gas fired, combined cycle and simple cycle generation to its generation fleet. In that time period, natural

[12] Comparison of Retail Sales of Electricity by State by Sector by Provider vs. Net Generation by State by Type of Producer by Energy 2005-2012, EIA, http://www.eia.gov/electricity/data/state/http://www.eia.gov/electricity/data/state/

[13] Connecticut also objects to this assumption being included in the rate to mass conversion as it was in the technical support document released on November 6, 2014.

gas fired generation rose from 27% to 55% of Connecticut's fossil generation.[14] By 2010, natural gas accounted for approximately 96% of fossil generation in Connecticut. Based on this experience, Connecticut has demonstrated that the redispatch envisioned in the CPP is reasonable and can be achieved in the allowed time frame.[15] Additionally, the Clean Power Plan proposal is not prescriptive. It offers flexibility for states to use additional EE and RE to compensate for the inability to fully satisfy the heat rate improvements and redispatch to natural gas required in Building Blocks 1 and 2. Therefore states have options to avoid the perceived "cliff" discussed in the NODA.

Additionally, Connecticut opposes any glide path that allows a state plan to backload its reductions in the end of the compliance period. Connecticut has serious concerns that in such a circumstance, if the state is not achieving the emission reductions expected in the state plan, EPA would not be able to enforce a sufficient change to the state compliance plan to achieve the shortfall in emission reductions without compromising grid reliability.

Connecticut does not oppose EPA's suggestion to devise a scheme of early reduction credit for states that take early action. Early reduction credits could provide an incentive for states to begin more concerted efforts to reduce carbon pollution sooner rather than later. Early reduction credit could also eliminate the apparent disparities between the emissions goals set for early acting states and the goals set for states that have been less proactive. Connecticut believes that any early reduction credit scheme adopted by EPA should abide by the following principles:

- Use of early reduction credit should be limited to the state that created the credit;
- Early reduction credit should expire at the close of the Interim Compliance period to preserve national stringency post 2030;
- Credit for RE should promote renewable sources with minimal criteria and hazardous air pollutant emissions; and
- Credit for early and surplus redispatch to natural gas should only be based on measures that are federally enforceable and permanent and replace high carbon fuels with natural gas (e.g., burner replacement memorialized in a federally enforceable operating permit, unit retirement and/or replacement with new natural gas fired unit subject to a federally enforceable operating permit, federally enforceable operating permit requirements to co-fire gas up to a specified percentage of load at all times that a unit is operating; or a federally enforceable annual capacity factor limit on amount of coal and/or oil that can be burned in a unit that converts to interchangeably fire natural gas).

Finally, EPA offers the opportunity for states to adopt mass based plans and multi-state plans as compliance vehicles. Single and multi-state mass based plans, like RGGI, can provide a means to mitigate the impacts of the perceived "cliff" in the Interim Compliance Period. Connecticut

[14] Comparison of Net Generation by State by Type of Producer by Energy 2005-2012, EIA, http://www.eia.gov/electricity/data/state/

[15] To the extent that the phase in is off-set by other measures that increase the stringency of the CPP, Connecticut does not object. However, Connecticut does object to state plans that delay implementation to late in the compliance period because, at that point, if states are lagging behind their goals, the emission reductions will likely be unable to be achieved without significant risk to system reliability.

suggests that EPA develop guidance and provide assistance to states seeking to create mass based plans with a particular focus on preserving the stringency of Interim Targets and ensuring compliance with them. Should the Clean Power Plan become subject to protracted legal challenges that delay implementation, EPA should apply enforcement discretion with respect to compliance with Interim Targets.

4) Rate to Mass Conversion

Connecticut appreciates EPA's recent Rate to Mass Technical Support Document released on November 6, 2014, on converting the rate based targets to annual mass equivalents. Connecticut encourages EPA to be receptive to alternative methods — as EPA has indicated in the guidance that it would be – provided that such methods provide adequate justification and support for the data and assumptions used to develop states' mass based targets. Additionally, Connecticut requests that guidance be provided to the regional EPA offices to ensure that approved mass based targets are adequately protective, equitable, reflect the realities of an integrated electric power grid,[16] and achieve at least an equivalent reduction from 2005 emissions from affected sources as modeling indicates would be achieved by the proposed rates.[17]

As discussed previously in section 2, *supra*, Connecticut objects to the assumption found in the Rate to Mass Technical Support Document, that100% of incremental RE and EE will supplant existing fossil fuel generation. Connecticut does not believe that this has been adequately demonstrated and notes that such a requirement does not recognize the substantial reductions of CO_2 emissions Connecticut has achieved since 2005.

5) Building Block-Specific Technical Comments

a) Building Block 1: Coal Unit Heat Rate Improvements:

Following an economic and technical feasibility assessment, EPA found that heat rate improvement ("HRI") is an available low-cost approach to CO_2 reduction for existing coal-fired EGUs and subsequently proposed a 6 percent heat rate improvement in each state's coal fleet.[18] Connecticut supports the 6 percent coal fleet heat rate improvement assumption and recommends that it be maintained.

Many stakeholders have and will continue to comment on the achievability of a 6 percent HRI, especially in the context of whether it is appropriate to apply such an assumption uniformly given HRIs accomplished by some coal-fired EGUs prior to the 2012 baseline and given the

[16] Whatever method for converting rate to mass EPA approves must be able to account for reductions of emissions in one state may drive emissions up in another state within the same RTO. For example, if a coal plant in one state is retired, an existing natural gas EGU may replace that generation. This effect is encouraged by Building Block Two of the CPP, but if the states are not in a multi-state plan such a result would be discouraged by the state in which the existing natural gas generation facility resides.

[17] Connecticut recommends that whatever changes EPA makes in the final rule does not reduce the national stringency of the rule below the 30% reduction from 2005 in carbon emissions achieved by the proposed rule.

[18] *Technical Support Document: GHG Abatement Measures*, U.S. Environmental Protection Agency Office of Air and Radiation (June 10, 2014), at 2-40.

remaining useful life of such plants. Specifically, in a November 2013 resolution with regard to this proposal, the National Association of Regulatory Utility Commissioners ("NARUC") noted that Section 111(d)(1)(B) requires the Administrator to permit a state, in applying such standards of performance, "to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies."[19]

In regard to the remaining useful life of existing coal-fired sources, according to a recent Southwest Power Pool market study, the national average retirement age of coal-fired generation is 48 years.[20] According to the same market study, these coal generation units could be retrofitted with emission controls, including efficiency investments that "could significantly extend the economic useful life of the plants well beyond the normal retirement point."[21]

Independent experts have concluded that EPA's goal is technically feasible.[22] Additionally, the proposal does not mandate that every state or every coal-fired EGU engage the 6 percent HRI as a compliance strategy. Indeed, the flexibility afforded by the proposal allows the states to forgo this building block altogether; should a state elect HRI as a compliance strategy, the proposal expressly anticipates fleet-wide averaging, thereby facilitating greater opportunities at a lower cost compared to the treatment of plants on an individual basis.[23]

Therefore, to the extent that the 6 percent HRI assumption is perceived as presenting a near-term challenge with respect to the achievability of individual state goals, Connecticut reiterates the suggestions of the RGGI states with respect to several important factors that show that this perception is incorrect. First, the range of relative in-service dates of the nation's coal fleet indicates that many of these units may face potential retirement in the coming decade due to age alone, thereby resulting in significant emission reductions during the 111(d) compliance timeframe. Second, should these aging coal units elect to invest in HRI efficiency measures as part of a larger strategy for emission reductions in a state, such investments will also serve to increase the lifespan of these units. Third, the flexibility afforded to states by the CPP provides an opportunity for a state to demonstrate compliance through any number of pathways, which may not even include an HRI investment strategy. Therefore, the 6 percent HRI assumption should be retained in the final CPP.

b) Building Block 2: Redispatch to Natural Gas

Building Block 2 focuses on opportunities to reduce emissions intensity by increasing the utilization of existing natural gas combined cycle ("NGCC") units. EPA invites comment on

---

[19] *Resolution on Increased Flexibility with Regard to the EPA's Regulation of Greenhouse Gas Emissions from Existing Power Plants*, NARUC (Nov. 20, 2013).

[20] *2012 State of the Market*, Southwest Power Pool (May 17, 2013) at 19, a*vailable at:* http://spp.org/publications/2012-State-of-the-Market-Report.pdf.

[21] *2012 State of the Market*, Southwest Power Pool (May 17, 2013) at 19, *available at:* http://spp.org/publications/2012-State-of-the-Market-Report.pdf.

[22] Dallas Burtraw, *How can coal power plants reduce emissions and be made more efficient—and at what cost (building block #1)?*, Resources for the Future (Oct. 7, 2014), http://www.rff.org/centers/climate_and_electricity_policy/Pages/6-Increasing-Efficiency-at-Coal-Plants.aspx#A1.

[23] *Id.*

whether it should consider options for a target utilization rate for existing NGCC units greater than the proposed 70 percent target utilization rate.[24] EPA also seeks comment on the inclusion of new NGCC and co-firing natural gas at existing fossil steam generating units as a means of reducing carbon intensity.[25] Connecticut reiterates the comments of the RGGI States in recommending a broader strategy to deploy natural gas fired generation to reduce the carbon intensity of the nation's generating fleet. Specifically, Connecticut suggests a goal setting strategy that represents the BSER should include: redispatch to new NGCC; consideration of the ability to co-fire or interchangeably burn natural gas at existing steam generating units; and redispatch of remaining coal and oil generation to existing NGCC, up to a 75 percent capacity factor, based on average annual capacity.

This package of recommendations: (1) optimizes the emissions reduction potential of this building block while limiting the potential for unintended outcomes; (2) capitalizes on the increase in new NGCC capacity nationwide that will occur through market forces irrespective of the proposed rule; (3) respects the thermodynamic limitations of NGCC units and (4) highlights the opportunity of make greater use of natural gas in existing steam generating units. It is important that these suggestions be implemented together so as to preserve the overall stringency of this building block. The combination of the recommendations results in a demonstrated level of achievable emission reductions, accountability, and flexibility consistent with states' requests and Congress's intent in section 111(d) of the Clean Air Act.

Incidentally, according to EIA data, the top 5 natural gas producing states in 2012 consumed less 55% of the gas they produced and marketed, yet all have CPP state goals that are significantly less stringent than Connecticut's.[26] Furthermore, Connecticut does not produce any natural gas. These facts clearly demonstrate that there are additional, cost-effective opportunities to redispatch to and/or co-fire natural gas in greater amounts.

EPA's NODA requests comment on the benefits of co-firing and redispatch to new NGCC. As noted above, in the 6-year timespan between 1999 and 2005, Connecticut installed more than 1000 MWs of new NGCC capacity. Immediately prior to that-period, several CPP subject steam generating units in Connecticut were retrofitted to co-fire and/or interchangeably fire natural gas with other fossil fuels. The retrofits provided the benefit of significantly reducing NOx and SOx emissions. For example, an EGU known as "Middletown Unit 3" added natural gas firing capability in 1997. Using 1997 as a baseline for emissions, the unit operated for 9 out of 16 years with NOx, SOx and CO_2 emission rates below those of 1997. In fact, in 2012, the unit's emissions rates for NOx, SOx, and CO_2 were 41%, 91%, and 14% lower than 1997 levels.[27]

Greater utilization of natural gas has the co-benefit of significantly reducing emissions of NOx and SOx from the power sector, reduces the frequency of maintenance operations like soot blowing and boiler tube cleaning, can reduce the amount of ash that must be disposed of, supports national efforts to reduce the transport of air pollutants, and facilitates compliance with

[24] 79 FR 34866

[25] 79 FR 34875-34877

[26] http://www.eia.gov/tools/faqs/faq.cfm?id=46&t=8

[27] See EPA's Clean Air Market Division database

the Cross State Air Pollution Control Rule and possibly the forthcoming Transport Rule and Regional Haze State Implementation Plan development. The Connecticut experience demonstrates that BSER should go beyond redispatch to existing NGCC and include redispatch to new NGCC and co-firing/interchangeably firing natural gas in existing steam generating units.

c) Building Block 3: Renewable Energy and Nuclear

Building Block 3 focuses on the use of no/low emission RE sources and nuclear energy as part of the BSER for reducing emissions of CO_2 from affected units.

i) Remove the "At-Risk" nuclear generation from the goal setting methodology

The overall experience of Connecticut (and the other RGGI states) demonstrates that a mass-based approach to emission reductions can incentivize economic otherwise viable nuclear resources to remain online by increasing the competitiveness of legacy nuclear resources with fossil fuel-fired EGUs (which should increasingly reflect a carbon price in their offerings). However, experience in the RGGI region also suggests that financial and other issues need to be taken into consideration when evaluating or forecasting the contribution of nuclear resources, particularly in light of the transformation of the natural gas market in recent years. In the rate-based goal-setting methodology at issue here, EPA's proposal attempts to incentivize states to retain existing nuclear generation through the inclusion of an at-risk assumption in the goal computation methodology.

While additional incentives may be necessary (especially at the federal level) EPA should remove the at-risk assumption from the goal computation methodology since its design neglects to account for the full range of possible circumstances—including safety (e.g. safety upgrades such as those required in response to the Fukoshima flooding and reactor meltdown) and environmental concerns (e.g. effluent limits and cooling water intake structure requirements under Clean Water Act Sections 316(a) and 316(b), respectively)—in which a nuclear resource may be pressed into retirement. If EPA, however, opts to retain its proposed approach, then EPA should consider providing an "off-ramp" by which the nuclear generation component would be removed from a state's goal computation upon expiration of an existing license or following an accident that translates into cost-prohibitive repairs.

Although a significant portion of Connecticut's generation comes from nuclear generation, Connecticut objects to crediting existing or under-construction nuclear generation as an off-set to exiting fossil generation. Such a proposal would significantly reduce the stringency of the CPP and is unnecessary.

ii) Connecticut supports the inclusion of RE in the BSER and offers recommendations to improve the equity and effectiveness of Building Block 3

Connecticut strongly urges EPA to define and utilize consistent renewable energy technologies for both the goal computation process and for state compliance purposes. The current proposal creates ambiguity and implies that certain types of generation that were included in goal setting

as zero carbon will be discounted or disqualified from use in demonstrating compliance. Successful implementation of the CPP will rely on clear and consistent definitions.

Subject to the limitations described below in Crediting of EE and RE for Compliance with the Rule, EPA must allow for the crediting of RE generation located in one state but financially supported by ratepayers residing in another state. Such credit should follow the renewable funding source (e.g., energy certificates (RECs) obtained from those resources and/or power purchase instruments that directly led to the development or continued operation of those resources.)

For a variety of reasons discussed in greater detail below, rather than using a Renewable Portfolio Standard based methodology, Connecticut recommends that EPA should establish in-state renewable generation targets based on the technical and economic potential for the siting of renewable generation within the boundaries of the individual state. In fact, Connecticut strongly urges EPA to adopt as its Building Block 3 methodology the alternative approach to the quantification of renewable energy generation as described in the proposal and accompanying technical support documents[28] with some modifications. Specifically, Connecticut observes that the application of the "top 16 state benchmark" is unduly limiting with respect to the technical potential of renewable technologies in each state—particularly in regard to the development of utility-scale solar. Rather than averaging the development rates of the top 16 states, EPA should rely on an average of the top 5 states for each technology. As described in EPA's alternative approach, adding a development cost ceiling in terms of $/MWH to this suggested modification to the benchmark development rate would ensure that only the cost-effective renewable generation in each state is targeted.

iii) Concerns with the use of RPS requirements to establish RE targets[29]

Connecticut believes the use of RPS requirements to establish RE targets is inappropriate for several reasons. At the time Connecticut's RPS was enacted, in 1998, it was not intended to address climate change. Rather, it was designed to achieve several objectives: diversify the state's energy resource mix to promote reliability, provide a hedge against volatile fossil fuel prices, improve environmental conditions by reducing air emissions, create clean energy jobs, and enhance the quality of life in the state.[30] Accordingly, while many RPS-eligible RE technologies can improve environmental conditions by reducing air emissions and creating clean energy jobs, ultimately technical and economic feasibility dictate which RE technologies are brought to market to satisfy RPS targets. These technical and economic circumstances are not necessarily aligned with the CPP goal of reducing CO_2 emissions.

Second, many RPS targets are predicated on a state's efforts to deploy RE across a group of states within a particular region. Through a regional RPS market structure, renewable resources

[28] Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34829, 34869 (proposed June 2, 2014) (to be codified at 40 C.F.R. pt. 60); *Alternative RE Approach Technical Support Document*, U.S. Environmental Protection Agency Office of Air and Radiation (June 10, 2014).

[29] For a detailed look at Connecticut's RE experience, see Appendix A.

[30] Restructuring Connecticut's Renewable Portfolio Standard (April 26, 2013), available at http://www.ct.gov/deep/lib/deep/energy/rps/rps_final.pdf at p. 1.

are built at the most economically and technically feasible location within the borders of the defined RPS market—borders that generally correspond to the regional grid in which the state operates (or often neighboring regions with sufficient transmission ties) rather than aligning with individual state boundaries.[31] In establishing aggressive RPS policies, Connecticut, as did other New England states[32], considered the potential for the market to fulfill the demand created by the state policy, and did not anticipate siting all stimulated renewable energy within its borders; to do so would be to ignore the benefits and realities of regional transmission. Accordingly, EPA's proposal to rely on state RPS goals to yield in-state renewable generation targets ignores the regional interdependency implied in a given state's RPS target. Connecticut did not intend, and technically cannot, meet its RPS requirements exclusively through in-state generation.

Third, although the CPP proposal contemplates the possibility of allowing states to credit out-of-state RE that they fund and support, EPA must recognize that a state does not have control over the permitting, siting, and regulation of facilities located outside its borders. State RPSs contain necessary options and flexibility with regard to this fact. Such flexibility, however, may be lost if a state's RPS becomes a part of the federally enforceable CPP.

Fourth, many RPS targets—including Connecticut's—include the possibility of alternative compliance payments, which can be paid in lieu of acquiring RE generation and protect against significant ratepayer impacts if the market cost of RE generation exceeds certain levels.

Fifth, the RPS methodology involves some inherent inconsistencies in how RPS are implemented. Specifically, several states' RPS requirements are particularly ambitious because they include the contributions of existing hydroelectric resources, biomass, waste-to-energy, and fuel cells. The RPS methodology holds these states accountable for achieving levels of RE generation derived from the inclusion of these technologies, but expressly excludes existing hydroelectric generation from use for compliance purposes and implies that biomass, waste-to-energy, and fuel cell contributions could be severely discounted in or disqualified from compliance demonstrations. Furthermore, the methodology does not have a concrete definition of what technologies are considered renewable energy sources for the purposes of the rule.

Should EPA promulgate a final rule that relies on the RPS methodology for Building Block 3, Connecticut suggests the following improvements to resolve inconsistencies inherent in the treatment of hydroelectric power, biomass and waste-to-energy generation, and fuel cells:

With respect to the treatment of hydroelectric power, Connecticut recommends that EPA remove hydroelectric power from the goal computation methodology both from the state baseline of existing renewable generation and the portion of a state's RPS that is expected to be met from existing hydropower.[33] EPA should continue to only credit new or incremental hydroelectric

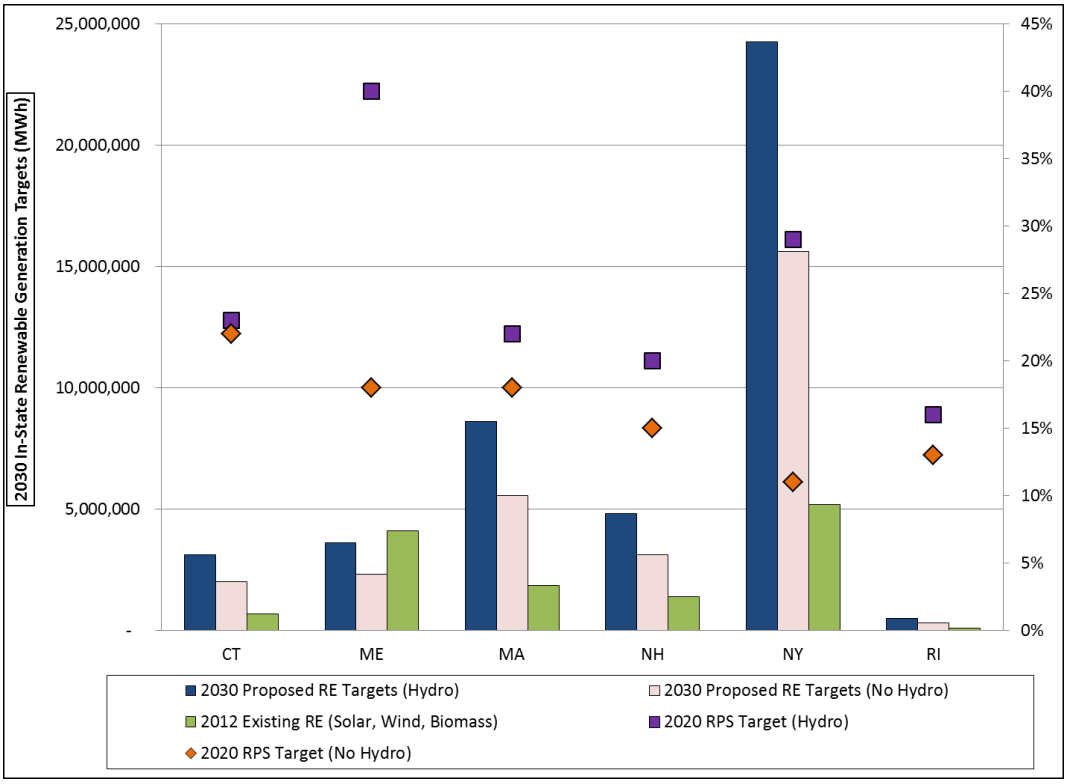
[31] Several ISO-NE states allow RE from New York and Canada be certified as RPS eligible in their states. In Connecticut, as of October 2013, 6 wind and 2 landfill gas facilities from Canada and 6 wind, 1 biomass, 19 landfill gas, and 2 run of river hydro facilities from New York were certified as RPS eligible. In 2010, Six percent and one percent of Connecticut's Class I RPS came from New York and Canada respectfully. *See* Restructuring Connecticut's Renewable Portfolio Standard (April 26, 2013), available at http://www.ct.gov/deep/lib/deep/energy/rps/rps_final.pdf at p. 10.

[32] See Figurer 4, below, to see the regional nature of PPAs in New England.

[33] As proposed, EPA has removed existing hydroelectric generation only from the states' existing RE baselines.

renewable resources for purposes of compliance. Connecticut further recommends that if the EPA is unable to calculate the amount of existing hydro included in individual state RPS, states with RPS requirements that are clearly distorted by inclusion of existing hydro be removed from the northeast average. As Figure 2 indicates, Maine and New York's RPS are heavily influenced by existing hydro.

Figure 2: Impact of Including Hydroelectric Resources in the Renewable Energy Generation Goal Computation for the Northeast Region



Alternatively EPA could adopt a uniform 20% target for the nation. The regional targets bear no relationship to the techno-economic ability of states to meet the regional targets and therefore are arbitrary. A uniform 20% target, however, is consistent with the Best System of Emission Reduction by requiring all regions to meet the standards set by the leading states/regions. The top three regions, northeast[34] (20%), south central (20%), and west (21%), all essentially have the recommended 20% target. The other regions can reasonably be expected to achieve the same target as the leading regions.[35]

With respect to biomass and waste-to-energy generation, Connecticut recommends that existing biomass and waste-to-energy generation should be credited as zero carbon emissions for the purpose of *interim* state goals. In so doing, EPA would facilitate compliance with the interim

[34] The northeast would have a 20% target after Maine and New York's existing hydro distortion is removed.

[35] If the EPA declines to remove Maine and New York from the northeast region's target, the EPA should require a uniform 25% target (the current northeast target) as BSER. If the northeast, with the lowest potential for renewable energy, can achieve a 25% target, the rest of the nation can as well.

state goals, avoiding exacerbating the "cliff" feared by many states, acknowledging the decline in feedstock to waste-to-energy plants,[36] and allowing states the time needed to deploy replacement RE that would have less negative air quality impacts. Additionally, this method avoids disruption to existing state RPS markets that could be caused by discounting or disqualifying these technologies from compliance with the CPP.

With respect to fuel cells, the proposed rule does not indicate how fuel cell generation will be credited. Connecticut recommends that fuel cells be treated as a renewable regardless of fuel source. Accordingly, fuel cells should be creditable in a state plan regardless of when installed. Connecticut has limited capacity to build renewable generation in state. Accordingly, Connecticut has made significant investment in encouraging fuel cell generation as an economically viable option for reducing air pollutant emissions from in-state generation. EPA has indicated that it intends on treating fuel cells powered by natural gas as fossil fueled generation in the final rule.[37] Connecticut believes this is an inappropriate treatment of fuel cell technology and does not properly recognize the potential for this clean technology to reduce CO_2 emissions from existing fossil fuel generation. Excluding natural gas fuel cells from the renewable energy generation definition would exclude existing units from compliance and, therefore, would not properly recognize the contributions of leading states like Connecticut in advancing this technology.

i) Support for the establishment of state RE targets based on in-state techno-economic potential

Connecticut believes that a methodology based on each state's technical and economic potential for RE development, such as the NREL GIS-based analysis discussed in EPA's GHG Abatement TSD, is a more equitable approach to establishing RE targets than an RPS-based methodology. This is because the proposed RPS methodology requires less of states in regions with relatively lower RPS requirements than of those in states in regions with ambitious RPS requirements, irrespective of available technical and economic potential.[38]

Connecticut recognizes that the technical and economic potential of RE development is not evenly distributed among the states. To address that issue, EPA requested comment on ways to address disparities in the technical and economic potential among states. We suggest that there may be ways to build "caps" and "floors" into the assignment of technical and economic potential. Such upper and lower bounds could acknowledge the practical limitations of development in certain high potential states while also preventing other states with lower potential from backsliding to a level of RE generation that is less than what they have achieved in 2012. However, Connecticut is opposed to any modification to the technical and economic potential that would result in a reduction in the national stringency of the rule as proposed.

---

[36] The decline in feedstock is the anticipated result from increased diversion, reuse, and recycling. For example, Connecticut has set a goal of doubling its diversion from landfill or waste-to-energy plants from~30% to 60% by 2024. *See Conn. Gen. Stat. Sec. 22a-241a.*

[37] Such intention was conveyed in telephonic conferences on September 25, 2014 and October 14, 2014 during which EPA requested comment on this issue.

[38] For example, the Southeast regional renewable energy generation target corresponds to only 10% as proposed by the EPA since only 1 of the 8 states in the identified region previously adopted a renewable portfolio standard. This is in stark contrast to the 25% regional renewable energy generation target proposed for states in the Northeast.

ii) Concerns with the use of a regionalized approach state RE targets based on techno-economic potential

EPA is seeking comment on an "approach [that] adjusts each state's RE target based on the RE potential available across a multi-state region in which the state is located. Under this approach, a state's goal would be informed by the opportunity to develop out-of-state RE resources as part of its state plan, and thus better align RE targets with the proposal to allow the use of certain out-of-state renewables for compliance . . . ."[39] The NODA suggests that under this approach, each state's renewable energy target would be allocated proportionally to each state in its region "by a chosen criterion, such as each state's share of total electricity sales within that region in 2012." Connecticut does not support this third variant of the Building Block 3 approach.[40]

Although Connecticut currently has an ambitious RPS target with expectations of significant development of renewable generation out-of-state, the Connecticut RPS target is established under state authority, and includes certain ratepayer protections such as the possibility of alternative compliance payments. As discussed above, Connecticut has very limited renewable generation potential within its borders. Connecticut does not have control over the permitting, siting, and regulation of facilities located outside its borders. To the extent that the EPA establishes a federally-enforced RE target for Connecticut, compliance with which requires Connecticut to develop resources in other states, we are concerned about the feasibility of complying with such a mandate. Notwithstanding the inherent ability to overcompensate in some building blocks to make up for deficiencies in others, given state sovereignty issues, a mandated requirement to build out-of-state renewables is not appropriate.

As stated above, we prefer a method that sets in-state RE goals based on in-state technical and economic potential. However, should EPA determine that such a method cannot be implemented, then Connecticut strongly prefers an approach based on regionalized technical and economic potential over the proposed RPS approach.

d) Building Block 4: Energy Efficiency (EE)[41]

Building Block 4 focuses on energy efficiency as a means of meeting electricity demand and reducing emissions from CPP affected sources. Connecticut has significant experience in administering EE programs to the benefit of rate payers and the environment. Connecticut fully supports the inclusion of EE in the BSER for reducing CO_2 emissions from existing power plants. Connecticut's wealth of experience implementing EE programs demonstrates that other states — especially those that have not yet seized the opportunity to invest in such programs — possess largely untapped and substantial potential to achieve energy savings through energy efficiency measures. Furthermore, these states should embrace this opportunity to invest in energy efficiency programs that empower their ratepayers with tools that will lower their

[39] *Notice of Data Availability*, U.S. Environmental Protection Agency Office of Air and Radiation (October 2014).

[40] Connecticut strongly objects to any allocation of RE based upon electric generation as outside of a state's control in a deregulated market and not reflective of CO2 emissions. Connecticut is a net exporter of electricity but also has a relatively clean generation fleet with significant generation from nuclear and natural gas facilities.

[41] For a detailed look at Connecticut's EE experience, see Appendix B

monthly bills by reducing energy consumption. With respect to promoting and strengthening the use of EE in the context of the CPP, Connecticut reiterates the comments of the RGGI states.

One mechanism to maximize the potential emission reductions contemplated by Building Block 4 would be to assign an increased ramp-up rate to those states which by year-end 2012 had not met or exceeded either the average U.S. total incremental savings as a percentage of retail sales (2012) or the average U.S. total cumulative savings as a percentage of retail sales (2012).[42] Specifically, the goal computation for these states should reflect a targeted 0.38 percent rate of improvement of incremental annual savings per year, as opposed to the 0.20 percent per year ramp-up schedule identified by the EPA in the current proposed goal computation. This heightened ramp-up rate of 0.38 percent per year is supported by data and analysis included in the EPA's technical support documents,[43] and is consistent with the demonstrated concept that "lower-hanging fruit" is ripe for the picking.

Certain energy efficiency measures can be undertaken quickly, cost effectively, and as part of a wider range of reduction strategies. This is supported by energy efficiency supply curves, such as the McKinsey Curve, which depict a number of efficiency measures by category and sector according to the average cost of the efficiency measure and the value of direct energy savings that the measure is expected to provide over its lifetime.[44] States that are just starting to implement energy efficiency measures likely have a wide variety of inexpensive strategies to choose from, while states that are already undertaking aggressive efforts to achieve their economic energy efficiency potential may be targeting measures further up the supply curve, which requires a greater investment of resources and effort. These circumstances affecting states that are already exceeding the national average for incremental or cumulative savings (calculated as a percentage of 2012 retail sales) should be recognized by maintaining the 0.20 percent ramp-up rate as proposed by the EPA.

Additionally, EPA should recognize savings accruing in the compliance period regardless of when implemented so long as the state plan can demonstrate sufficient EM&V was in place. EPA set Building Block 4 goals by requiring states to ramp-up current efficiency programs. This structure requires states that have already take action to do more than states that have been less aggressive or have not taken any actions. Additionally, the underlying assumption in EPA's goal calculation is that state programs in 2012 were robust enough to receive credit in compliance demonstrations. The proposed rule, however, only allows energy efficiency savings installed starting in June of 2014 to be credited in state compliance plans.[45] Connecticut recommends that the rule provide credit for any efficiency measure that is achieving energy savings within the compliance period so long as the state plan can demonstrate that the savings are real and quantifiable. A state can make this demonstration if it can show that sufficient EM&V was in place at the time the efficiency measures were implemented. Connecticut is <u>not</u> recommending a

[42] This methodology would increase the stringency of this building block for 24 of the states using data included in Table 5-4 of the GHG Abatement Measures TSD.

[43] *Id.* at 5-35 and Appendix 5-3.

[44] Hannah Choi Granade et al., *Unlocking Energy Efficiency in the U.S. Economy*, McKinsey & Company (July 2009), at 15.

[45] Connecticut recognizes that energy efficiency measures taken in 2014 will only receive credit in compliance demonstrations to the extent that savings are being achieved in within the compliance period of 2020 through 2030.

banking of energy efficiency measures.[46] Rather, the recommendation is a modest recognition of the fact that states have already taken aggressive steps to implement energy efficiency programs and invested in a robust EM&V program to ensure that real savings are achieved. This recommendation, like the previous recommendation, recognizes that leading states, like Connecticut, have already picked the low-hanging fruit and that efforts to achieve further energy efficiency will be further up the supply curve, requiring a greater investment of resources and effort.

6) EE Evaluation, Measurement and Verification ("EM&V")

In its Technical Support Document, EPA requests comments regarding the adoption of existing and new EM&V protocols.[47] Connecticut notes, that to the extent a state intends to comply by establishing a mass based target, the state's EE program, including its EM&V protocols should not be subject to approval in a state plan or federally enforceable. That being said, as a general principle, Connecticut supports EPA's adoption of EM&V that provide states transparency and clarity. EPA's rules should allow states flexibility and provide for equitable treatment of EE savings for states, which have varied levels of experience with EE. EM&V rules should provide explicit definitions. Connecticut recommends that EPA provide for transparent and comparable definitions and documentation of EE impacts and supporting practices across states. Consistent with these principles, Connecticut offers the following specific recommendations on EPA's requirements and guidance.

EPA should adopt EM&V practices that have been successfully in use for well over a decade in Connecticut. Connecticut makes use of rigorous and well-established protocols and methodologies used to measure savings in EE programs.[48] Connecticut compiles and documents methodologies for measuring EE savings in a Technical Reference Manual (TRM),[49] which is reviewed and approved by Connecticut's Department of Energy and Environmental Protection. Connecticut EE programs undergo rigorous evaluation studies conducted by independent third party evaluators and overseen by an independent evaluation contractor. The results of these studies are presented publicly. Connecticut and other stakeholders review and provide input to evaluation study work plans and draft evaluation studies. In addition to Connecticut's practices, ISO-NE has established rigorous EM&V protocols to measure and verify reductions in electric demand from state EE programs. Since ISO-NE allows EE and demand-side resources to count toward meeting regional capacity needs, ISO-NE requires a rigorous protocol to ensure grid reliability.

EPA should promote standardized EE data collection, reporting, and EM&V practices. We recommend the use of the glossary that has already been developed by DOE/EPA State and

[46] Connecticut could support a banking of EE credits if such credits are implemented or off-set by other measures so as to not reduce the stringency of the CPP.

[47] Technical Support Document for Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, State Plan Considerations, pp. 56-59.

[48] E.g., International Performance Measurement and Verification Protocol (IPMVP), used to determine measured savings. http://www.o-world.org/

[49] In Connecticut, this is document is referred to as the Program Savings Document.

Local Energy Efficiency Action Network in its publication, Energy Efficiency Program Impact Evaluation Guide," Appendix A.[50] This glossary would serve as a useful starting point in EPA's effort to develop a common terminology among states.

The northeast has already undertaken efforts to improve and standardize reporting practices. NEEP's Model EM&V Methods Standardized Reporting Forms provides a template for standardizing EE reporting practices.[51] In addition, northeast states have developed resources on cost-effectiveness measures, data collection protocols, statewide EE reporting guidelines, EM&V methods and savings assumptions, as well as empirical studies on measure lives, load shapes and other measures used in TRMs. These processes and protocols, vetted through multiple states, will be useful for states that are embarking on statewide programs and that need guidance on EM&V procedures. In addition, New England states have had TRMs in use for many years. These documents contain useful data on equipment and installation descriptions, savings methodology, and measure lives and can provide templates for states that are embarking on large scale EE programs.

Connecticut supports NEEP's recommendation that EPA engage DOE to convene states and EM&V professionals in early 2015 to develop protocols. DOE, with the participation of states and industry experts, would identify generally accepted methods and protocols for states to use in EE measurement and reporting. DOE should work with states and experts to develop a list of generally accepted protocols to be completed by publication of EPA's final rule. These protocols would include, but not be limited to, determining baselines, methods of verifying installations, measure persistence, and statistical confidence levels for measuring program savings. The goal would be to establish EM&V standards as states start to prepare their plans. DOE should also identify gaps in protocols and common practices, and develop a schedule for their development. DOE should further be engaged to help develop protocols to include a definition of baseline as "business as usual," or "common practice baseline" consistent with baseline definitions provided in DOE's SEE Action Impact Evaluation Guide.[52] These baselines should include federal standards, naturally occurring efficiency and compliance practices with current building codes (to the extent that building code compliance is demonstrated), and state and federal appliance standards.

Connecticut supports NEEP's recommendation for the EPA to engage DOE to design and develop a rating system (with stakeholder input) that assesses the rigor and precision of EM&V methods used, and that discounts credit for EE savings when less rigorous or less statistically accurate methods are used. Connecticut also supports NEEP's recommendation that the EPA should promote appropriate evaluator training and experience to ensure qualified professionals to conduct EM&V with required minimum levels of training and expertise.

---

[50]Glossary of Terms, Version 2.1, A project of the Regional Evaluation, Measurement and Verification Forum, Prepared by Paul Horowitz PAH Associates, Facilitated by Northeast Energy Efficiency Partnerships.
https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

[51] http://23.99.21.98/fmi/webd#NEEP_EMV_REPORTS&lay=CoverPage&viewstyle=form&record=1&mode=browse

[52]The State and Local Energy Efficiency Action Network, Evaluation, Measurement, and Verification Working Group. Energy Efficiency Program Impact Evaluation Guide, December 2012
https://www4.eere.energy.gov/seeaction/sites/default/files/pdfs/emv_ee_program_impact_guide_1.pdf

Connecticut concurs with NEEP's recommendation that EPA develop an EM&V Plan template with specific plan components to guide states on what needs to be in plans. EPA should designate DOE to be the lead agency in developing reporting templates. Connecticut believes that the following components should be included in state plans:

1) Name of organization that will prepare evaluated energy savings reports
2) Relationship of organization preparing the report to the subject EE program(s) and program administrator(s)
3) Schedule of when the reports will be prepared and time period they will cover
4) Name of the state or regional entity that will review and certify the evaluated savings
5) Manner in which evaluated energy savings reports will be made publicly available
6) Multi-year evaluation plan, with timing of evaluation efforts and processes including planning, implementation, reporting, and updating

In addition, EPA should provide guidance on reporting, such as including interim reporting, and should offer to review state EM&V plans prior to submission and provide interim comments to give states greater assurance that their plans will be accepted by EPA.

EPA solicits comment on whether to account for avoided T&D losses and how to do so in a consistent manner across states.[53] Connecticut supports allowing states to include T&D loss factors. Since emissions reductions are measured from the location of electric generating plants, energy savings from EE should not only include end-use savings but also avoided T&D losses. Specifically, states should be allowed to use their own T&D loss factors where state-specific data are available. Where state-specific data are not available, states should use a regional T&D loss factor such as RTO data, or EIA data.

EPA is considering whether to adopt time differentiated data on energy savings from energy efficiency programs for use in states' implementation plans.[54] Connecticut believes that states should not be required to submit time differentiated savings from their EE programs. However, the impact of EE programs on CO_2 emissions can vary greatly according to the time of day and by season. Connecticut recommends that states that can demonstrate that they have high quality load shape data be given the option to include time differentiated energy savings in their implementation plans. EPA is considering whether to use gross or net savings as a measure of energy reductions from states' EE programs.[55] This question has been discussed among New England states. Connecticut agrees with NEEP's position that energy efficiency savings estimates should be based on "adjusted gross savings" rather than net or gross savings. Adjusted gross savings measures EE savings beyond "business as usual" and is updated to include the most recent impact evaluations. Adjusted gross savings are EE savings resulting from actions taken by participants in an EE program, but not adjusted for spillover and free ridership effects.

[53] Technical Support Document for Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, State Plan Considerations, pp. 50-51. Docket ID No. EPA-HQ-OAR-2103-0602.

[54] Technical Support Document for Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, State Plan Considerations, pp. 52-53. Docket ID No. EPA-HQ-OAR-2103-0602.

[55] *Id.*

Adjustments are made for data errors, installation and persistence rates, and hours of use.[56] EPA seeks to measure EE savings related to the actions of EE program participants, but not necessarily directly attributable to the efforts of Program Administrators. Therefore, it is not necessary to conduct detailed estimates of spillover and free ridership. Moreover, methodologies can differ in the estimation of spillover and free ridership effects; inclusion of these adjustments will not necessarily result in more accurate EE savings estimates. Connecticut notes that ISO-NE uses adjusted gross savings in measuring and crediting EE resources in regional Forward Capacity Market. Care should be taken in the use of adjusted gross savings that no double counting of EE savings across at state's different types of program activities, i.e., municipal versus EDC ratepayer funded programs.

EPA has indicated that it supports a broad range of EE programs, provided that their savings are measured and verified by rigorous protocols, and the EE program evaluations are complete and consistent with EPA requirements. EPA has identified general education programs as having less well established EM&V protocols.[57] Connecticut supports implementation of general education programs as an effective tool in raising awareness in the general public and in building related professions. However, we recognize that the impact of education programs on reducing a state's energy cannot be measured directly. As part of its EM&V protocol, EPA should identify the major components of an effective general education plan. For general education programs to be credited for energy reductions, states should be required to include a description of the major components of their general education program in their plan. Connecticut cautions against excessive credit for general education programs. A state should be able to credit energy savings from its general education program, up to a maximum level, e.g., 5 percent of total savings from its EE programs.

EPA has also identified targeted consumer behavior programs as EE programs with less established EM&V protocols.[58] Customer behavior programs generally rely on econometric analysis to estimate the differences between large numbers of participants versus non-participant customers. Connecticut cautions EPA to accept savings only from customer behavior programs with EM&V protocols in which the data selection and econometric analysis performed are demonstrated to have been completely independent of the vendor or program administrator that implements the behavioral program.

7) Crediting of EE and RE for Compliance with the Rule

Connecticut recommends that, for purposes of rate-based compliance plans, EPA require that "avoided emissions" that result from EE and RE be "credited" by adding the total avoided generation to the denominator of the BSER emission rate equation. This method ensures consistency between EPA's goal setting and goal compliance as well as equity between states. If

[56] NEEP Glossary of Terms, Version 2.1, 2011, p. 7.
http://www.neep.org/sites/default/files/products/EMV_Glossary_Version_2.1.pdf

[57] Technical Support Document for Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, State Plan Considerations, pp. 48-49. Docket ID No. EPA-HQ-OAR-2103-0602

[58] Technical Support Document for Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, State Plan Considerations, pp. 49. Docket ID No. EPA-HQ-OAR-2103-0602

EPA does not adopt Connecticut's primary recommendation, EPA should credit the "avoided emissions" using the appropriate RTO marginal emission rate.[59] The marginal rate is appropriate because incremental EE and RE have historically avoided generation from the marginal EGU. The average RTO emission rate is inappropriate because incremental RE and EE often reduce the rate of demand growth rather than displacing generation from the average unit. The generation that would be required to meet demand growth is typically supplied by the marginal unit. Connecticut and the other states in ISO-NE have significantly reduced CO_2 emissions by displacing coal and oil with cleaner sources to serve base load. Figure 3 depicts the installed generating capacity within New England by fuel type and the proportion of generation actually supplied by fuel type. More than 85% of generation in 2013 came from no/low carbon emission sources, resulting in a lower average CO_2 emission rate than the marginal unit. Accordingly, crediting based on the average RTO emission rate would significantly undervalue the CO_2 emissions avoided by incremental EE and RE measures. Further, use of the average emission rate would cause a diminishing value of incremental EE as the nation's generation fleet becomes cleaner over the compliance period. Thus, the incentive to implement EE measures diminishes at the same time that greater investment of resources are required to achieve savings as the lowest hanging fruit gets picked.

Figure 3: New England Regional Electric Generating Capacity and Energy Production by Fuel Type

New England Generation by Fuel Type	% Total Capacity 2013	% of Electric Energy 2013
Natural Gas	43%	46%
Oil	22%	<1%
Coal	7%	6%
Hydro	4%	6%
Nuclear	15%	33%
Pumped Storage	5%	1%
Other Renewables	3%	8%

8) Avoiding Double Counting and Interstate Effects

EPA notes the complexity of accounting for interstate effects associated with measures in a state plan, to allow states to take into account CO_2 emission reductions resulting from programs while minimizing the possibility of double counting. EPA seeks comment on how to avoid double counting emission reductions using EPA's proposed approach.[60] This complexity overshadows a simpler matter, namely ensuring that there is a one-to-one relationship between RE and EE credits and credit users.

[59] ISO-NE has been calculating the marginal emission rate for its generation fleet since 1994 for the specific purpose of understanding the effect of demand side management and renewable generation on EGU emission for NOx, SO2, and CO_2 within the RTO. *See 2012 ISO New England Electric Generator Air Emissions Report*, available at, http://www.iso-ne.com/genrtion_resrcs/reports/emission/2012_emissions_report_final_v2.pdf

[60] 79 FR 34921-34922

Connecticut suggests that, as a starting point, EPA should look to its January 2001 Improving Air Quality Through Economic Incentive Programs ("EIP") draft guidance to provide clarity for states adopting rate-based plans to memorialize the creation of and transactions involving EE and RE credits. The EIP has been relied upon for describing how market-based discretionary economic incentive programs can meet EPA state implementation plan approvability requirements.

There are four elements to ensure the integrity of EIPs: (1) surplus, (2) quantifiable, (3) enforceable, and (4) permanent. These four elements have been the cornerstones of state emissions credit trading programs, including Connecticut's emission credit trading program for nitrogen oxides (NOx) emissions from stationary sources. Connecticut's NOx emissions trading program resulted in significant decreases in NOx emissions at a lower societal cost than would have been achieved by traditional command and control regulations. As EIPs are approved into a State Implementation Plan, an EIP necessarily includes adequate monitoring, record keeping and reporting procedures to provide for compliance determinations and enforcement.

Along with the four integrity elements, the EIP recommends tracking mechanisms for the emissions credits such as unique serial numbers and a state registry. Such provisions will work to preserve the integrity of EE/RE credits and prevent simple double counting (i.e., the use of the same EE/RE credit by more than one compliance entity). However, with regard to the use of EE and RE measures for compliance with the state goals, the EIP principles should be amended or clarified, particularly the principles of surplus and permanent. For example, renewable generation used by a state to satisfy its RPS should not be disqualified from use to satisfy CPP requirements just because it was used for RPS compliance. Similarly the concept of permanence may need to be customized to recognize that EE and RE measures have a finite life, and thus create a discrete stream of energy savings or clean generation over that finite time period.

EPA also solicits comment on a more complex double counting issue associated with the interstate effects of EE and RE.[61] Generally speaking, EE and RE investments made in one state may impact the emissions profile of another state and raise concerns about who gets credit for the reductions. Attributing credit to both the affecting and affected states would necessarily weaken the stringency of the rule and result in double counting. Connecticut anticipates utilizing RGGI, a mass-based approach, for compliance, thereby reducing the potential for double-counting of RE/RE measures amongst the states involved. However, Connecticut recognizes that some states may elect to use rate-based targets; in order to ensure transparency and equity, EPA should include additional clarity in the final rule to avoid potential double-counting of RE/EE measures in compliance demonstrations.

Connecticut notes that a double-counting issue could arise at the seams of states not participating in joint compliance plans. Although the proposal suggests that this issue could be resolved by a cooperative accounting agreement among states,[62] the approach articulated in the proposal may not produce the desired resolution. The proposal suggests that a mass-based state could adjust

[61] 79 FR 34921

[62] *Technical Support Document: State Plan Considerations*, U.S. Environmental Protection Agency Office of Air and Radiation (June 2014), at 94.

the overall CO_2 emissions from the affected fleet to account for the "export" of avoided CO_2 emission credits. However, RE and EE benefits are automatically accounted for under a mass-based program, as the existence of RE generation and EE measures, or "negawatts," displaces the state's or region's reliance on fossil fuel-fired generation. Due to the nature of the electricity system and the economic dispatch model of our shared grids, it is difficult to unravel the location and type of fossil fuel-fired generation the specific unit of RE or EE has displaced. Any adjustment to the overall CO_2 emissions from the mass-based state's affected fleet would therefore be derived from assumptions — i.e., estimates of the magnitude by which to offset the emissions of the mass-based state's affected fleet. Should an adjacent state that relies on a rate-based approach attempt to claim credit for renewable generation produced in a mass-based state, Connecticut believes that this would result in unavoidable double-counting of the RE and/or EE measures.

To address this concern, Connecticut recommends that the EPA prohibit rate-based states from taking credit for RE and EE that is already accounted for under the cap of a mass-based state. Such a prohibition is necessary in order to ensure the integrity and stringency of the CPP targets. A categorical prohibition would not unduly restrict compliance options for states electing a rate-based approach, as these states still could comply using renewable energy generated in other rate-based states or through mechanisms designed to stimulate in-state renewable generation, such as feed-in tariffs or grant programs.

Connecticut recognizes that states utilizing a mass-based approach may not account for development of RE and/or EE measures in neighboring states (or countries) that are not subject to the same CO_2 cap. This event, however, does not create a problem unless the mass-based state's net energy imports relative to its demand significantly increases. Accordingly, Connecticut recommends that for states utilizing a mass-based approach, EPA should require the state to monitor its net energy imports over the compliance period of the proposed rule. If a state realizes a significant increase in net imports relative to its consumption, then the EPA should require an analysis of the cause of the imports to ensure that the state is not implicitly crediting RE and/or EE measures adopted by another state. This recommendation avoids the difficulty of tracking the location and type of the specific fossil fuel-fired generation that the specific unit of RE or EE has displaced, unless a problem becomes apparent.

9) State Plan Content, Development, Submission, Schedule

EPA seeks comment on all aspects of the elements of state plan content and the criteria for approval. The twelve state plan components are familiar to states that have been required to prepare state plans for incineration sources under CAA sections 129 and 111(d). All of those twelve components are sensible and easy to comprehend in the context of requiring particular sources to meet emissions limitations for identified pollutants. The conceptual function of each of those measures is applicable to state plan preparation for the CPP, although the unique approach to BSER in the CPP-- the application to a pollutant that is neither a criteria pollutant nor a hazardous air pollutant, and the interplay of air quality regulation and electric sector considerations -- requires EPA to allow some flexibility in how a state satisfies each of the twelve components. EPA has experience exercising appropriate flexibility and case-specific evaluation to make determinations that balance flexibility and achievement of the desired

environmental result in the desired timeframe. Connecticut views certain rule flexibilities in the final CPP as positive, understanding that EPA has the experience to apply flexibility appropriately, in a manner constrained by equity and achievement of the 30% reduction in power sector CO_2 emissions.

EPA's issuance of state plan templates can be a useful means of facilitating timely state plan submission and assist states that have had less experience with state plan submissions or state implementation plan submissions under CAA Section 110. Additionally, templates may also facilitate consistency across the various EPA regions. However, EPA should not mandate the use of the templates.

State plan templates can also serve the purpose of specifying the minimum level of information necessary to secure an extension. EPA must recognize that there will be factors outside the control of state environmental agencies (e.g., the schedule of convening state legislative bodies) that may require accommodation. Similarly, as EPA has recognized, additional time may be necessary to develop multi-state plans.

With regard to states that may be adopt a multi-state approach to CPP compliance, Connecticut notes that for multistate nonattainment areas for criteria pollutants, each state is required to submit an individual attainment plan, although the states must coordinate actions during the planning process and may rely on common inventories and modeling to satisfy the individual state plan requirement. Connecticut has participated in such multistate ozone and particulate matter attainment planning and knows that the process will work to achieve the desired result. EPA should consider whether this same approach might be well-suited to multistate areas under the CPP and whether states and EPA could benefit from the familiarity of that approach. EPA should vary from that approach only if EPA believes that administrative and cost efficiency would be achieved by an alternative approach.

EPA seeks comment on whether the EPA should develop guidance that describes acceptable projection approaches, tools, and methods for use in an approvable plan, as well as whether the EPA should provide technical resources for conducting projections.[63] Page 43 of the *Projecting EGU CO_2 Emission Performance in State Plans* TSD states that such guidance could include default modeling assumptions or data sources for key assumptions and that state modeling projections included in a state plan could include assumptions that deviate from EPA's recommended default assumptions, but a state plan would justify the reason for using alternative assumptions. Connecticut recommends that EPA develop guidance that describes acceptable projection approaches, tools, and methods for use in an approvable plan and also recommends that EPA accept collective state CO_2 projection tools such as Eastern Regional Technical Advisory Committee (ERTAC) EGU.

With regard to state plans assigning legal responsibility for compliance to affected sources and other entities, Connecticut notes that some states adopted such an approach for Municipal Solid Waste Combustors, another category of sources subject to regulation under Section 111(d) of the Clean Air Act. Specifically, Connecticut state regulations impose specific emissions limits,

[63] 79 FR 34923

monitoring, record keeping and reporting on owners and operators of affected sources. EPA has acknowledged that RGGI would be an acceptable compliance mechanism to meet the best system of emissions reductions. Under RGGI, the nine participating states each promulgated state rules that apply directly to affected sources, requiring them to satisfy individual requirements that in aggregate ensure compliance with state and regional mass based targets. Provided individual requirements are made federally enforceable and contained in the operating permits applicable to the affected units, Connecticut believes it would be appropriate to assign legal responsibility for meeting state plan commitments to the owners and operators of affected sources.

Alternatively, Connecticut is not opposed to state "commitment" or portfolio based plans that assign some or all of the CPP compliance obligation to the state, provided that such plans contain measures the achieve real reductions. EPA should provide guidance to regional offices for the review of such plans to ensure consistency across the regions. Where state plans allow for assignment of some of the compliance obligation to the state, such plans should include contingency measures or indicate a schedule for development and implementation of contingency measures if periodic reporting indicates that the plan is not achieving the projected rate of emissions reductions.

In its preamble, EPA seeks comment regarding corrective action in state plans where emission limits applicable to affected EGUs alone would not assure full achievement of the required level of performance, if any of the other portfolio of measures in the plan are not fully implemented or fail to achieve the required level of emission performance.[64] Additionally, the proposed CPP anticipates that state plans would include a process and schedule for implementing corrective measures if reporting shows that the plan is not achieving the projected level of emission performance. EPA seeks comment on: (1) whether corrective action should include the adoption of new plan measures and subsequent resubmission of the plan to the EPA for review and approval; (2) should the process specify the implementation of measures that are already included in the approved plan in the event that the projected level of performance is not being achieved; and (3) at what point should such a process and schedule be triggered. For state plans that are not self-correcting, EPA should leverage its experience with contingency measures in state attainment plans under CAA Section 110 to develop and administer the corrective measures of the CPP. Contingency measures in attainment planning serve the same purpose as corrective measures in the CPP in that they provide a means for the state to reach compliance if implemented required measures fail to achieve attainment or make reasonably further progress towards attainment by the applicable date. EPA has approved a number of different approaches to contingency depending on the specific circumstances of a state. EPA should allow for such flexibility in the final CPP corrective measures provisions, to the extent that flexibility does not interfere with timely goal achievement. Corrective measure requirements should not be so loose as to allow a state that fails to meet its goal to continue business as usual for the affected sources. EPA's policies and practices for reasonable further progress and attainment demonstrations under subpart 2 of part D of Title I of the CAA (as they relate to ozone nonattainment areas) provide a practical approach to state compliance with the CPP goals.

[64] 79 FR 34952

10) Technical Corrections

a) Baseline Generation from CPP Subject Units - Algonquin Windsor Locks:

Connecticut notes that there appears to be an inconsistency in the way that the Sum of Carbon Dioxide (tons), Sum of Electric Generation (MWh) and Sum of Net Energy Output (MWh) in the Natural Gas Combined Cycle (NGCC) data for Algonquin Windsor Locks in the 2012 Plant level data for likely covered fossil sources (Goal Computation TSD Data File - Appendix 7) spreadsheet was calculated, as compared with the data for Capitol District Energy Center. On the Unit-Level Inventory (Goal Computation TSD Data File - Appendix 7) spreadsheet, the Carbon Dioxide (tons), Electric Generation (MWh) and Net Energy Output (MWh) data for the STG was not added to the Carbon Dioxide (tons), Electric Generation (MWh) and Net Energy Output (MWh) data for the GTG for Algonquin Windsor Locks. However, the GTG and STG Carbon Dioxide (tons), Electric Generation (MWh) and Net Energy Output (MWh) data for Capitol District Energy Center were added together. Both facilities have combined cycle units that are used for cogeneration purposes. Connecticut recommends that the Carbon Dioxide (tons), Electric Generation (MWh) and Net Energy Output (MWh) data be calculated on a consistent basis for Algonquin Windsor Locks and Capitol District Energy Center. Connecticut realizes that if a data correction is warranted, it will likely not impact Connecticut's final state goal.

b) Baseline "Sales" data used in setting EE target under Building Block 4:

Building Block Four goals were set by using 2012 utility sales.[65] EPA calculated the total sales of "bundled" and "delivered" from "regulated" and "unregulated" utilities. Included in the sales was a "utility" named "Adjustment 2012" which reported 40,368 MWh. These sales, however, are a summation of the total sales from "unregulated" utilities already reported and used in the baseline determination. The data attributed to "Adjustment 2012" does not represent actual sales of electricity. Accordingly, "Adjustment 2012" represents a double counting and should be removed from Connecticut's 2012 baseline utility sales. Connecticut realizes that this data correction will likely not impact Connecticut's final state goal significantly.

[65] *See* Clean Power Plan Proposed Rule Technical Documents, Data File: GHG Abatement

Appendix A: Connecticut's Renewable Energy Experience

RPS requirements are a mechanism by which to drive investment in renewable energy through the participation of a state in a larger regional market. Through an RPS approach, renewable resources are incentivized to build at the most economically and technically feasible location within the borders of the defined RPS market—borders that generally correspond to the regional grid in which the state operates (or often neighboring regions) rather than aligning with individual state boundaries.[66] In establishing aggressive RPS policies, Connecticut considered the potential for the market to fulfill the demand created by the state policy, and did not anticipate the siting of all stimulated renewable energy to occur within its borders; to do so would be to ignore the benefits and realities of regional transmission. Accordingly, the EPA's proposed methodology that relies on state RPS goals to yield in-state renewable generation targets ignores the realities of the RPS mechanism as a beyond the state borders tool.

Connecticut is particularly dependent upon RE generation from out of state to meet its RPS requirements. For example, in 2010, only 11% of the electricity used to meet Connecticut's Class I standard came from in-state projects.[67] A total of 76% of ratepayer costs for Class I resources supports biomass plants, located primarily out-of-state. Another 13% of Connecticut's Class I requirement is supplied by landfill gas projects, also mostly located out-of-state.[68] Thus, although Connecticut had only about 5% of New England's installed renewable capacity as of 2011, it accounted for more than one-third of the Class I RPS demand in the region.[69] While in-state facilities will help Connecticut meet its RPS requirements, the resources most available in Connecticut can be more expensive than Class I resources available regionally. As a result, by 2020 in-state resources are expected to produce approximately 23% of the Class I RPS requirement, but will account for 32% to 45% of the total cost of complying with the Class I requirements.[70] Accordingly, a requirement that more in-state renewable generation be developed in Connecticut is economically prohibitive.

Because of the regional nature of the RPS market, Connecticut and its sister New England states have executed purchase power agreements with RE developers for projects throughout the region irrespective of the location of the project. Indeed, as the following figure[71] depicting recent PPAs for RE generation demonstrates, there is only a modest correlation between a RE generator's location and the state with which the facility has entered into a PPA:

---

[66] Several ISO-NE states allow RE from New York and Canada be certified as RPS eligible in their states. In Connecticut, as of October 2013, 6 wind and 2 landfill gas facilities from Canada and 6 wind, 1 biomass, 19 landfill gas, and 2 run of river hydro facilities from New York were certified as RPS eligible. In 2010, Six percent and one percent of Connecticut's Class I RPS came from New York and Canada respectfully. *See* Restructuring Connecticut's RPS (April 26, 2013). Available at http://www.ct.gov/deep/lib/deep/energy/rps/rps_final.pdf at p. 10.

[67] *Id.*

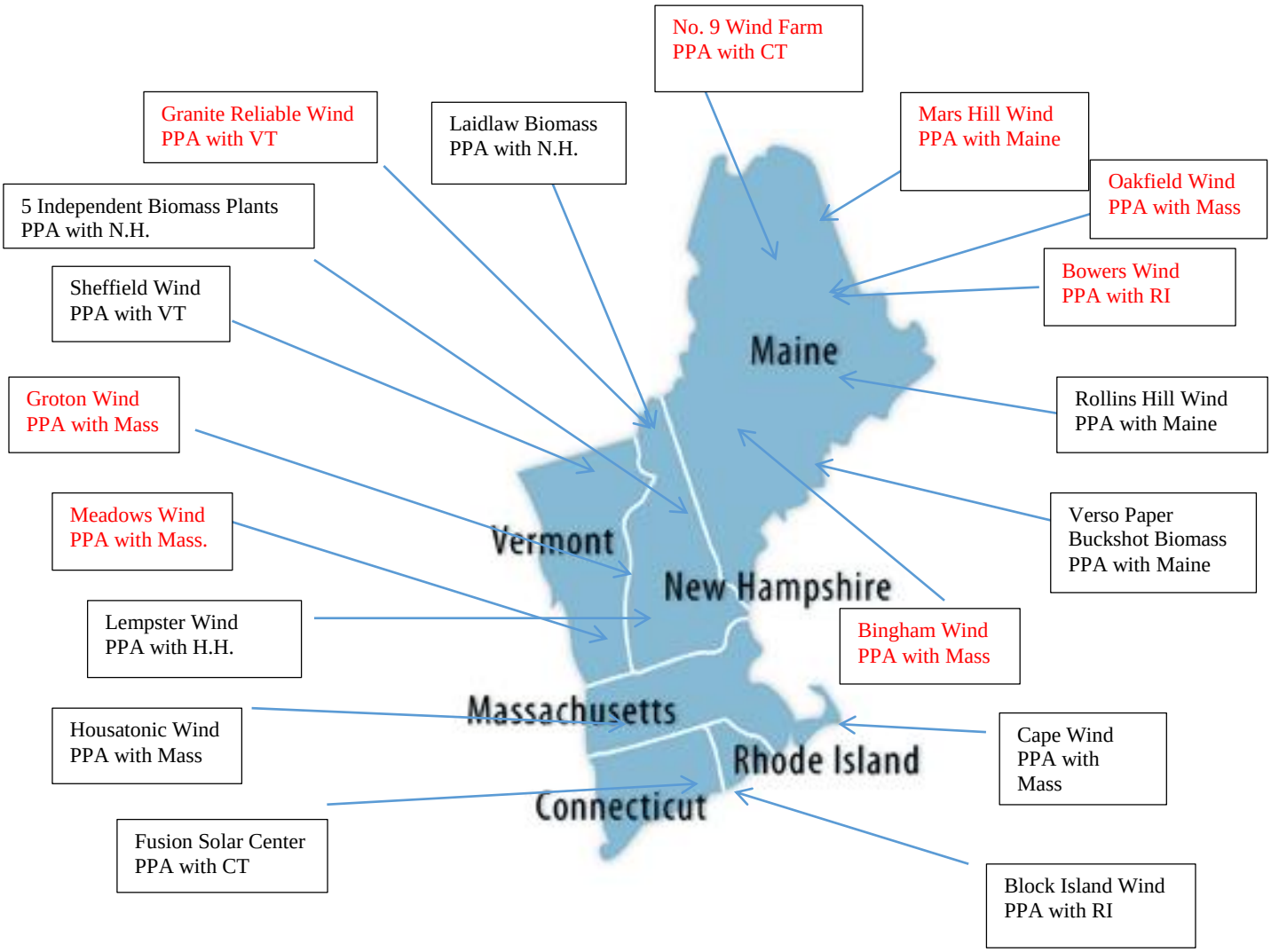
[68] *Id.* at p. 9

[69] *Id.* at p. 5

[70] *Id.* at p. 15

[71] Figure courtesy of ISO-NE

Figure 4: New England State PPAs for Renewable Energy



Appendix B: Connecticut's Energy Efficiency Experience

Energy efficiency is widely regarded as the least-cost energy resource option available today. A recent American Council for an Energy-Efficient Economy study concluded that electric utility energy efficiency programs, at an average cost of $.28/kWh ("kWh"), provide resource options ranging from 1/2 to 1/3 the cost of alternative options such as building new power plants.[72] Connecticut has been a leader in investing in energy efficiency programs. In 1998, the Connecticut General Assembly showed great leadership by establishing an energy efficiency fund, supported by a $.003/kWh assessment on all retail electric customers. These actions nearly tripled the investment in electric efficiency from approximately $30 million annually in the early 1990s to nearly $90 million in 2000. Beginning in 2005, ratepayer contributions to the Connecticut Energy Efficiency Fund were supplemented by new revenue sources, including revenues from the ISO-NE Forward Capacity Market, sales of Class III Renewable Energy Credits, and proceeds from CO_2 allowances through RGGI. In 2011, annual investment in electric efficiency reached $124 million.

These investments delivered real and significant savings to Connecticut consumers. From 2007 to 2011, Connecticut efficiency programs helped reduce the State's electricity consumption by more than 5%.[73] Between 2000 and 2011 more than 285,000 (or about 20%) Connecticut homes received home energy evaluations and associated measures such as efficient lighting, weatherization, and air sealing through residential energy efficiency programs. In addition, over 34,000 Connecticut businesses participated in the energy efficiency programs during this same period.[74] Since 2000, investments in electric energy efficiency measures have saved over 650 megawatts (MW) in peak demand and reduced consumption by about 13%.[75] For every dollar invested in energy efficiency, Connecticut receives electric, gas, fuel oil, and propane system benefits valued at nearly $2.40.[76]

Building upon its success, in 2014, Connecticut nearly doubled its annual investment in energy efficiency to nearly $200 million.[77] This substantial increase was part of Governor Malloy's multi-pronged effort to mitigate a projected increase in electricity rates.[78] Further, over the next ten years, this expanded efficiency investment is expected to nearly eliminate growth in the state's annual electricity consumption (projected to rise an average of only 0.05% per year), and

---

[72] Maggie Molina, *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, ACEEE Report Number U1402 (March 2014), at iii.

[73] Northeast Energy Efficiency Partnerships, "A Regional Roundup of Energy Efficiency in the Northeast and Mid-Atlantic States." Available at http://www.neep.org/uploads/policy/2011 Regional Roundup_FINAL.pdf.

[74] The Connecticut Light and Power Company, et al., 2012 Electric and Natural Gas Conservation and Load Management Plan. Available at http://www.energizect.com/sites/default/files/2012%20CLM%20Electric%20and%20Gas%20Plan%20FINAL.pdf.

[75] *Id.*

[76] Energy Efficiency Board 2013 Program and Operations Report. Available at http://www.energizect.com/sites/default/files/Final%202013%20ALR%20as%20Released%20for%20Print.WEB_.2.25.14_0.pdf.

[77] Connecticut Public Act, 13-298.

[78] 2013 Comprehensive Energy Strategy for Connecticut (February 19, 2013). Available at http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf at p.4

reduce electricity consumption during peak demand periods to 0.5% per year. Not only will the increased investment reduce electric bills, the program will create support 5,500 in-state jobs by 2022 and grow the State's economy.[79]

Further, as Connecticut ramps up its investment in energy efficiency, innovative financing sources will be required. Accordingly, Connecticut established the first-in-the nation "Green Bank," whose mission is to use limited state or ratepayer funds to attract private investment in clean energy. Over the past two years, each $1 of public funds invested via the Green Bank attracted approximately $5-$10 of investment from private sources.[80] Connecticut has also developed standardized energy savings performance contracts for State and municipalities to engage energy service companies, and launched a statewide Property Assessment Clean Energy finance program that will enable commercial entities to pay back energy efficiency and clean energy investments over time on their property tax bills. Connecticut has also launched a statewide Energize Connecticut campaign design to make Connecticut residents and businesses aware of the cheaper, cleaner energy choices available to them, as well as the expanded opportunities for financing these energy efficiency investments and clean energy alternatives. These investments will not only increase Connecticut's investment in energy efficiency, but will decrease the reliance on electric ratepayers.

[79] 2013 Comprehensive Energy Strategy for Connecticut (February 19, 2013). Available at http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf at p.4

[80] *Connecticut's Green Bank: Energizing Clean Energy Finance*, http://www.ctcleanenergy.com/annualreport/

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Deployment Committee

From: Jessica Bailey

CC: Mackey Dykes, Brian Farnen, Bert Hunter, and Bryan Garcia

Date: December 19, 2014

Re: Approval of Funding Requests below $300,000 – Deployment Committee Update

---

At the July 18, 2014 Board of Directors (BOD) meeting of the Connecticut Green Bank ("Green Bank") it was resolved that the BOD approves the authorization of Green Bank staff to evaluate and approve funding requests less than $300,000 which are pursuant to an established formal approval process requiring the signature of a Green Bank officer, consistent with the Comprehensive Plan, approved within Green Bank's fiscal budget and in an aggregate amount not to exceed $1,000,000 from the date of the last Deployment Committee meeting. This memo provides an update on funding requests below $300,000 that were evaluated and approved. During this period, 4 projects were evaluated and approved for funding in an aggregate amount of approximately $552,554. Also included in the Deployment Committee materials are internal documentation of the review and approval process Green Bank staff and officers go through.

Project Name:	**C & S Investments, LLC**
Amount:	$3,003 feasibility study loan (within fiscal budget)
Comprehensive Plan:	C-PACE Transaction
Staff Request:	Jessica Bailey, Director, Commercial and Industrial PACE; Bert Hunter, Chief Investment Officer

Description

This is a C-PACE feasibility study loan for the purpose of verifying the technical and economic feasibility of implementing energy efficiency improvements and solar PV. This energy audit loan will be capitalized into a C-PACE benefit assessment and financing agreement, subject to approval by the Deployment Committee and meeting all closing requirements.

Project Name:	**Valenti Auto Repair, 95 Commercial Street, Watertown**
Amount:	$195,986 feasibility study loan (within fiscal budget)
Comprehensive Plan:	C-PACE Transaction
Staff Request:	Jessica Bailey, Director, Commercial and Industrial PACE; Bert Hunter, Chief Investment Officer

Description

95 Commercial Street, Watertown consists of a 4,756 square foot, one-story building housing the Valenti Auto Repair Facility. The facility is on an adjacent parcel to the Valenti Auto Center, both of which are owned by Valenti Motors, Inc. – an entity wholly-owned by Fred M. Valenti. Fred M. Valenti acquired the property in 1990, four years after acquiring the adjacent parcel to establish Valenti Motors on the site of an existing Volkswagen/Audi franchise. In 1990, the original Valenti Motors added three new automobile manufacturers to their suite of products and the building underwent a significant expansion to become the Valenti Auto Center – a sales, financing, leasing, service, parts and – at 95 Commercial Street – an auto body facility.
The proposed investment is a C-PACE transaction under which the Connecticut Green Bank ("Green Bank") would provide construction financing and a term loan commitment in the amount of $194,986 to support the installation of a 64.77 kW rooftop solar photovoltaic ("PV") system on the property.

The contractor for the project will be Green Earth Energy Photovoltaic, a leading C-PACE solar contractor headquartered in Longmeadow, Massachusetts. To date, approximately ten transactions using this contractor have been approved, several of which were from the automobile dealership sector. The team employed by Green Earth Energy Photovoltaic consists of industry leading solar PV executives, utility professionals, project managers, and licensed electrical contractors, and the firm has completed projects across the industrial, commercial and governmental sectors.

The proposed solar upgrades are projected to bring $84,632 in total post-tax value in year one - including $10,574 in electricity savings and $7,779 in ZREC revenue - and an average of $24,219 annually over the term of the financing. The revenue from the ZREC contracts will bring $103 per MWh generated by each project and an expected $116,685 in total over the 15-year term of the contract. The total Federal Investment Tax Credit (ITC) is valued at $56,878 in reduced tax liabilities and total MACRS accelerated depreciation is worth another $56,405 in post-tax dollars – tax benefits that Fred M. Valenti has the capacity to assume.
With 6.0% term financing for 20 years, annual debt service will be $16,871, paid semi-annually via the property tax bill. The project's cash flow will be immediately positive, as the combined energy savings, ZREC revenue, and tax benefits put this project squarely into the black. The project's overall savings to investment ratio ("SIR") is a strong 1.44 and net post-tax cash flows over the 20 year term of the financing are positive, projected at $79,723.

Upon project completion, the Green Bank will either retain 100% ownership of the 5% construction loan via conversion to a term loan (envisioned to be 20 years at 6.0% interest rate) or sell it off partially or in total to a private capital provider. Regardless, a C-PACE assessment through the Town of Watertown will provide security.

The subject property is in strong financial health. Valenti Motors, Inc. has an average of $1,692,180 in net operating income ("NOI") between 2012 and 2013. The building has been fully owner occupied since it was acquired by the owner 24 years ago. After factoring in C-PACE Assessment payments and assuming no change in annual net operating income, the projected average debt service coverage ratio ("DSCR") is 21.76x.

The loan-to-value ("LTV") for the property, post-C-PACE Benefit Assessment, will be 76%, with a mortgage currently held by Ally Bank and cross-collateralized by a total of five parcels owned by Fred M. Valenti, all located adjacent to one another between two parallel streets: Commercial Street and Straits Turnpike. The parcels securing the mortgage are: 95 Commercial Street, 600 Straits Turnpike (a separate C-PACE transaction), and three additional parcels that consist of one building and two parking lots. The 10-year mortgage was initially taken out by the property owner in the amount of $875,222.62, but was later increased by $2,694,777.38 to a new, modified total of $3,570,000.

The LTV was calculated by adding the proposed assessments for 600 Straits Turnpike and 95 Commercial Street to the outstanding principal balance of the above described mortgage and dividing by the combined appraised value of all parcels securing the mortgage. Of that total 76% LTV, the proposed C-PACE Benefit Assessment would constitute a 56% lien-to-value ratio ("LiTV") for the property.

Though the LiTV is outside of the Green Bank's standard underwriting guidelines, Valenti Motors Inc.'s strong financial health and the relatively small semiannual benefit assessment amount - which, on average, is lower than projected energy savings, tax benefits, and ZREC cash flows - gives staff comfort in Fred M. Valenti's ability to pay back the ratepayer funds at risk. Additionally, the property meets four of the eight exceptions in the Green Bank's guidelines for transactions with LiTV's over 35%. Beyond exceeding the minimum SIR and DSCR requirements, the owner also successfully secured a 15-year ZREC contract. Finally, of note, the property has also been owner-occupied for over two decades; Valenti Motor Inc.'s current lease for 95 Commercial Street is valid through March 2018 and will almost certainly be renewed.

The Green Bank may also extend a short-term unsecured loan (the "Feasibility Study Loan") to the property owner to finance the feasibility study and/or energy audit work which is statutorily required by the C-PACE Program. All Feasibility Study Loans are programmatically limited to $30,500 with an interest rate of 5% with all principal and interest due 15 months from disbursement. Once the Green Bank executes a C-PACE financing agreement with the property owner then the principal and accrued interest of such Feasibility Study Loan will be added into the principal of the benefit assessment and financing agreement and repaid to Green Bank upon closing.

Project Name:	**T & C Greenhouses, 99 Route 2A, Preston**
Amount:	$195,986 feasibility study loan (within fiscal budget)
Comprehensive Plan:	C-PACE Transaction

Staff Request: Jessica Bailey, Director, Commercial and Industrial PACE; Bert Hunter, Chief Investment Officer

Description

The property at 99 Route 2A, Preston CT was originally constructed in 1950 with constructions of a new building and greenhouse in 1978 and 2001. T&C Greenhouses is a large farm on 18.43 acres and greenhouse with retail space totaling 80,000 square feet. The current owner, Diane Majcher, acquired the property in 2004.

The proposed investment is a C-PACE transaction under which the Connecticut Green Bank (the "Green Bank") would provide initial construction financing of $205,063 with an ultimate lien assessment of $153,797 to support the installation of a 59 kW roof-mounted solar photovoltaic system. The project has secured funding for a USDA Rural Development REAP grant for 25% of the project costs. However, they are unable to receive the grant until the project is live. Therefore, the total project costs are needed upfront to pay contractors ($205,063), and the 25% will be received shortly after the install – thus the initial lien at closing will be for the full $205,063 with a final lien assessment at $153,797.

The contractor for the project will be PurePoint Energy ("PurePoint"), a Norwalk-based solar PV contractor with a primary focus on the residential and agricultural solar market. PurePoint offers turnkey solutions, handling all incentives, permits, equipment and installation in house. Purepoint participates in the Green Bank's Residential Solar Investment Program, and also offers each of the Green Bank's financing programs in both residential and commercial sectors.

The proposed solar and efficiency upgrades are projected to bring $77,109 in cost savings in year one—including $8,588 in electricity savings, $7,726 in ZREC revenue, and $59,835 in reduced tax liability due to the Federal Investment Tax Credit—and an average of $20,079 annually over the term of the financing. The revenue from the ZREC contract will bring an expected $115,886 in total over the 14.5-year term of the contract.

With 6% financing for 20 years, annual debt service will be $13,307, paid semi-annually via the property tax bill. Due to the energy savings, tax benefits, and the ZREC revenue, the project's cash flow will be immediately positive. The project's overall SIR is 1.51, and net post-tax cash flows over the 20-year term of the financing are indeed positive, projected at $87,272.
Upon project completion, the Green Bank will either retain 100% ownership of the final construction loan amount via conversion to a term loan (envisioned to be 20 years at a 6% interest rate), or sell it off partially or in total to a private capital provider. Regardless, a C-PACE assessment through the Town of Preston will provide security.

Diane Majcher owns and operates T&C Greenhouses ("T&C") as well as the property itself. The underwriting analyses were performed on the underlying operating company, which reflect a business in moderate financial health. T&C has had an average of $90,637 in net operating income between 2012 and 2013. There has been no vacancy since 2004. T&C has a current ratio of 1.01 and a ratio of total liabilities to tangible net worth of 4.38, both somewhat outside the Green Bank's underwriting guidelines. Although these ratios fall outside the guidelines, the Green Bank is comfortable with this risk due to the relatively small CPACE Assessment and the evidence of positive cash flow over the past two years. After factoring in C-PACE Assessment payments, and assuming no change in annual net operating income, T&C's projected average debt service coverage ratio ("DSCR") is 2.28x.

The as-is Loan-To Value ("LTV") for the property will be about 93%, with an outstanding mortgage of $530,636 plus a C-PACE assessment of $153,797 against an appraised property value of $735,000, based on a 2013 appraisal done for Farm Credit East. While this lies outside of the Green Bank guidelines, using an income-capitalization approach, with a conservative, 10% CAP rate factoring in the first year energy savings (excluding tax benefits and ZREC), the "as-complete" LTV is 75%, which is within the Green Bank's guidelines. The Lien-to-Value ratio, both as-is and as-complete, is 21% and 17%, respectively, within Green Bank guidelines.

Project Name:	**133 Leibert Road, Hartford**
Amount:	$200,768 feasibility study loan (within fiscal budget)
Comprehensive Plan:	C-PACE Transaction
Staff Request:	Jessica Bailey, Director, Commercial and Industrial PACE; Bert Hunter, Chief Investment Officer

Description

The facility at 133 Leibert Road, Hartford, CT was originally constructed in 1999 and comprises a Volkswagen and Jaguar dealership totaling approximately 25,000 square feet of space. The property is part of the Valenti Auto Group portfolio, which began in 1920 as a single location in Wallingford, CT. The same family took the dealership from one location to a portfolio of dealerships throughout Connecticut and into Rhode Island representing Chrysler, Ford, Volkswagen and Subaru models. The property owner of record for 133 Leibert Road is Auto Corner, LLC, which ultimately shares common ownership with all the automotive operating companies owned by the Valenti family. Because Auto Corner, LLC is a pass-through entity, the bulk of this memo focuses on Euro Performance Cars, Inc. ("EPC") which owns the sole tenant of 133 Leibert and also shares common ownership with the Valenti family.

The proposed C-PACE investment would have the Connecticut Green Bank (the "Green Bank") provide construction (and potentially term) financing of $200,768 to support the installation of a 65 kW rooftop solar system.

The solar PV contractor for the project will be Green Earth Energy Photovoltaic, LLC, a C-PACE solar contractor headquartered in Longmeadow, MA. Green Earth Energy Photovoltaic specializes in designing, building, and operating renewable energy systems and has a team of professionals with deep experience in the energy sector, from upgrading electricity distribution systems to testing nuclear systems for the US military to developing high voltage safety systems. The team employed by Green Earth Energy Photovoltaic consists of industry leading solar PV executives, utility professionals, project managers, and licensed electrical contractors, and the firm has completed projects across the industrial, commercial, and governmental sectors.

The proposed solar installation is projected to bring significant cost savings to the company. Energy savings alone will amount to $12,591 annually, ZREC revenues at $90/MWh will

contribute another $6,729 annually for each of the project's first 15 years, and tax benefits of over $68,255 will also accrue to Valenti. With 6.0% financing for 20 years, annual debt service will be $17,371, paid semiannually via the property tax bill, meaning the project's post-tax cash flow will be immediately positive, although falling into the red after ZREC contracts terminate in year 15.

Upon project completion, the Green Bank will either retain 100% ownership of the construction loan via conversion to a term loan (again, envisioned to be 20 years at a 6.0% interest rate or lower depending upon the success of the group marketing campaign), or sell it off partially or in total to a private capital provider. Regardless, a C-PACE assessment through the City of Hartford will provide security.

EPC encompasses the facility at 133 Leibert, as well as the Cadillac, Jaguar, Mitsubishi and Mazda brands, and is in excellent financial health. The group will be undergoing a $1.2M renovation on 77 Leibert, funded from EPC's balance sheet to accommodate the company's recently awarded franchises for Fiat, Alfa Romeo, and Maserati. EBITDA for the group has averaged $1.3M over the past two years, and 2014 year to date as of October 1st is already at $1.4M.

The property was valued at $1,170,600 using Hartford's 2011 assessed value. The proposed C-PACE Benefit Assessment Lien of $200,768 would bring Lien-to-Value ratio to 9%, well within the Green Bank's guideline of 35%. Total Debt-to-Value, including a $1,518,719 mortgage held by GMAC, would be 76%, also within the Green Bank's guideline of 80%.

EPC's current ratio, which measures liquidity and the ability to satisfy short-term obligations, is 1.45, within the Green Bank's guidelines of 1.25 or more. Similarly, when considering EPC's total liabilities and its tangible net worth, the picture looks good, with a debt-to-net worth ratio for the property of 1.94x, within the Green Bank's criteria of a ratio less than 2.0x.

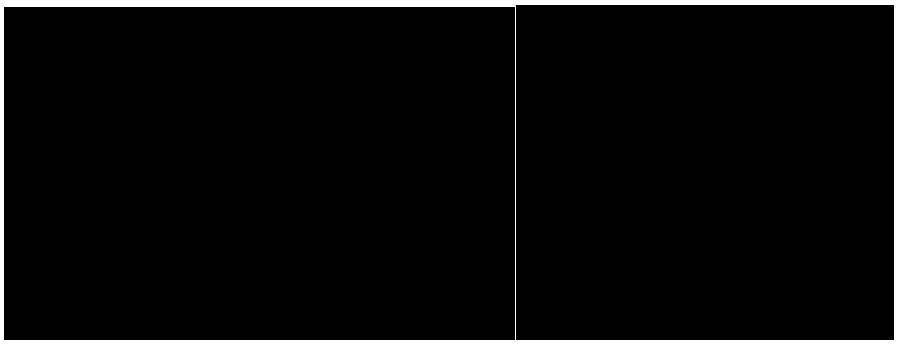
From a Debt Service Coverage Ratio ("DSCR") perspective, EPC has sufficient operating income to more than cover both its existing mortgage debt obligations and the required payments due under the proposed C-PACE Benefit Assessment Lien. With an average DSCR of 15.98x over the term of the financing (with very conservative mortgage repayment assumptions), the firm easily satisfies the Green Bank underwriting criteria on this front.

The Green Bank may also extend a short-term unsecured loan (the "Feasibility Study Loan") to the property owner to finance the feasibility study and/or energy audit work which is statutorily required by the C-PACE Program. All Feasibility Study Loans are programmatically limited to $30,500 with an interest rate of 5% with all principal and interest due 15 months from disbursement. Once the Green Bank executes a C-PACE financing agreement with the property owner then the principal and accrued interest of such Feasibility Study Loan will be added into the principal of the benefit assessment and financing agreement and repaid to Green Bank upon closing.

77 Leibert Road: A C-PACE Project in Hartford, CT

Address	77 Leibert Road, Hartford CT			
Owner	VAG Development, LLC			
Proposed Assessment	$495,143 (1)			
Term (years)	20			
Term Remaining (months)	Pending Construction Completion			
Annual Interest Rate	6.0% (2)			
Annual C-PACE Assessment	$42,669			
Savings-to-Investment Ratio	1.31			
Average Debt-Service Coverage Ratio	[redacted]			
Loan-to-Value Ratio	[redacted]			
Lien-to-Value Ratio	[redacted]			
Estimated Energy Saved and/or Produced (MMBtu)		EE	RE	Total
	Per year	N/A	553	553
	Over term	N/A	10,111	10,111
Estimated Cost Savings	Per year	N/A	$56,128	$56,128
	Over term	N/A	$1,122,561	$1,122,561
Objective Function	20.5kBtu Saved per ratepayer $ at risk			
Location	City of Hartford			
Type of Building	Retail – Big Box (> 25,000 SF)			
Year of Build	1993			
Building Size (total sf)	25,000			
Year Acquired by Current Owner	2011			
Assessed Value	[redacted]			
Status of Mortgage Lender Consent	In process			
Proposed Project Description	Installation of a 170kW PV system			
Est. Date of Construction Completion	Pending closing			
Current Status	Pending Board of Directors approval			
Energy Contractors	[redacted]			

Additional Comments	[redacted]



Beriah-Lewis Farm: A C-PACE Project in North Stonington, CT

Address	273 Boombridge Rd, North Stonington, CT 06359		
Owner	David Babcock Lewis, LLC		
Proposed Assessment	$307,561		
Term (years)	20		
Term Remaining (months)	Pending Construction Completion		
Annual Interest Rate	6%		
Annual C-PACE Assessment	$26,612		
Savings-to-Investment Ratio	1.24		
Average Debt-Service Coverage Ratio	[redacted]		
Loan-to-Value &Lien-to-Value Ratio (no mortgage)	[redacted]		
Proposed Energy Savings and/or Produced		RE	Total
	Per year	468 (MMBtu)	468 (MMBtu)
	Over loan	8,566 (MMBtu)	8,566 (MMBtu)
Estimated Cost Savings (and Tax Benefits)	Per year	$32,798	$32,798
	Over loan	$655,966	$655,966
Objective Function	27.9 kBtu per ratepayer dollar at risk		
Location	Town of North Stonington		
Type of Building	Retail – Big Box (> 25000 SF)		
Year of Build	1791		
Building Size (total sf)	30,000		
Year Acquired by Current Owner	2001		
Appraised Value	[redacted]		
Status of Mortgage Lender Consent	No Mortgage		
Proposed Project Description	112.5 kW rooftop solar PV		
Est. Date of Construction Completion	Pending closing		
Current Status	Pending Board of Directors approval		
Energy Contractors	[redacted]		
Additional Comments			

[redacted]

Valenti Auto Center: A C-PACE Project in Watertown, CT

Address	600 Straits Turnpike, Watertown, CT 06795		
Owner	Fred M. Valenti		
Proposed Assessment	$399,406		
Term (years)	20		
Term Remaining (months)	Pending Construction Completion		
Annual Interest Rate	6.0%*		
Annual C-PACE Assessment	$34,559		
Savings-to-Investment Ratio	1.51		
Average Debt-Service Coverage Ratio	[redacted]		
Loan-to-Value Ratio	[redacted]		
Lien-to-Value Ratio	[redacted]		
Proposed Energy Saved and/or Produced		RE	Total
	Per year (MMBtu)	587 MMBtu	587 MMBtu
	Over term (MMBtu)	10,747MMBtu	10,747 MMBtu
Estimated Cost Savings	Per year ($)	$52,137	$52,137
	Life Cycle ($)	$1,042740	$1,042,740
Objective Function	26.9 kBTU per ratepayer dollar at risk		
Location	Town of Watertown		
Type of Building	Large Retail: Automobile Dealership		
Year of Build	1959		
Building Size (total sf)	27,024		
Year Acquired by Current Owner	1986		
Appraised Parcel Value	[redacted]		
Status of Mortgage Lender Consent	Pending (Ally Bank)		
Proposed Project Description	135.15 kW Rooftop Solar Photovoltaic		
Est. Date of Construction Completion	Pending closing		
Current Status	Pending CT Green Bank Board of Directors Approval		
Energy Contractors	[redacted]		
Additional Comments:	[redacted]		

Connecticut Green Bank

October Financial Report

Index

1. Executive Summary
2. CGB Balance Sheet
3. CGB Statement of Revenues and Expenditures
4. CGB Budget to Actual Report
5. CGB Summary of Unfunded Commitments
6. CPACE Loan Report
7. Program Loan Report

Connecticut Green Bank

October 2014 Financial Package

Executive Summary

Overview

This financial package contains financial information for the Connecticut Green Bank (CGB). A separate supplimental package containing financial information for CGB's affliates is included in your Board package.

Balance Sheet

The October 2014 balance sheet is compared to the balance sheet for the same period for the previous fiscal year. This comparision highlights the CGB's continuing efforts to finance renewable energy equipment installations and energy efficiency upgrades. Total non current assets (excluding fixed assets) of $ 46.7 million increased by $19.2 million when compared to the previous period. This was primarily the result of advances to CGB affiliates to finance residential loan and lease products ($7 million) and the financing of CPACE benefit assessment agreements and other program loans ($11 million).

Statement of Revenues and Expenditures

Two schedules are presented, one comparing the current year operations to the same period in the previous year and the second comparing the current year operations to the budgets through October and the full year budget. Through October, utility customer assessments of $9.3 million were approximately $700,000 (7.5%) below projections for the four month period and proceeds from the first RGGI auction for the current year of $ 4.1 million were approximately $700,000 (17%) below projections. Expenses in the areas of marketing and program development and administration were noteably under budget however we expect this variance to shrink as the year progresses.

Unfunded commitments and program loans

The unfunded commitment schedule provides a summary along the lines of programs and types of commitments. Overall the CGB currently has a total of $ 94.8 million in unfunded commitments. The three programs comprising the majority of this balance are: 1. The CPACE program with $30.7 million; 2. the Solar PV PBI program with $25.1 million and 3. the AD/CHP programs with $14.2 million. It should be noted that the PBI program commitments will be paid out quarterly over a six year period. We have also included detailed schedules of the CPACE and non CPACE financings by borrower for your review.

Connecticut Green Bank

Balance Sheet

As of October 31, 2014

	Oct 31, 2014	Oct 31, 2013	$ Change
ASSETS			
Current Assets			
Cash and cash equivilents			
Cash - unrestricted	$ 65,108,152	$ 68,498,982	$ (3,390,830)
Cash - restricted	$ 4,062,436	$ 4,547,628	$ (485,192)
Total Cash and cash equivilents	$ 69,170,588	$ 73,046,610	$ (3,876,022)
Other Current Assets			
Receivables - utility/other	1,995,772	4,149,473	$ (2,153,701)
HOPBI working capital loans	$ 312,817	$ -	$ 312,817
C-PACE timeliness reserve advances	$ 153,574	$ -	$ 153,574
Prepaid assets	$ 127,360	$ 125,609	$ 1,751
Total Other Current Assets	$ 2,589,523	$ 4,275,082	$ (1,685,559)
Total Current Assets	$ 71,760,111	$ 77,321,692	$ (5,561,581)
Fixed Assets			
Furniture, Equipment & Software,net	$ 193,728	$ 220,095	$ (26,367)
L/H Improvements,net	$ 98,869	$ 113,705	$ (14,836)
Total Fixed Assets	$ 292,597	$ 333,800	$ (41,203)
Other Assets			
Investment/advances to affiliates	$ 14,126,530	$ 7,134,000	$ 6,992,530
Solar Lease I promissory notes,net of reserve	$ 10,364,631	$ 11,067,787	$ (703,156)
CPACE & other loans,net of reserves	$ 18,522,168	$ 7,030,520	$ 11,491,648
CPACE selldown bonds	$ 1,600,000	$ -	$ 1,600,000
Other assets	$ 2,069,390	$ 2,217,491	$ (148,101)
Total Other Assets	$ 46,682,719	$ 27,449,798	$ 19,232,921
TOTAL ASSETS	$ 118,735,427	$ 105,105,290	$ 13,630,137

Connecticut Green Bank

Balance Sheet

As of October 31, 2014

	Oct 31, 2014	Oct 31, 2013	$ Change
LIABILITIES & EQUITY			
Current Liabilities			
Accounts payable&accrued expenses	$ 916,555	$ 830,975	$ 85,580
Deferred Revenue	$ 58,000	$ 33,000	$ 25,000
Custodial Liability - DEEP	$ 360,000	$ 360,000	$ -
Total Current Liabilities	$ 1,334,555	$ 1,223,975	$ 110,580
Net Position			
Investment in capital assets	$ 292,597	$ 333,800	$ (41,203)
Restricted-energy programs	$ 4,062,436	$ 4,547,628	$ (485,192)
Unrestricted	$ 113,045,839	$ 98,999,887	$ 14,045,952
Total Net Position	$ 117,400,872	$ 103,881,315	$ 13,519,557
TOTAL LIABILITIES & EQUITY	$ 118,735,427	$ 105,105,290	$ 13,630,137

Connecticut Green Bank
Statement of Revenues and Expenditures
July through October 2014

	Jul - Oct 14	Jul - Oct 13	$ Change
Revenues			
Utility customer assessments	$ 9,273,538	$ 9,812,352	$ (538,814)
RGGI Auction Income-Renewables	$ 1,385,483	$ 1,705,179	$ (319,697)
RGGI Auction-Energy Efficiency	$ 2,674,907	$ -	$ 2,674,907
Interest income	$ 422,481	$ 122,672	$ 299,809
C-PACE closing fees,net	$ 149,775	$ -	$ 149,775
REC sales,net	$ 153,064	$ -	$ 153,064
Grant income-federal programs	$ 47,824	$ 158,355	$ (110,531)
Misc. income	$ 111,626	$ 85,551	$ 26,075
Total Revenues	$ 14,218,698	$ 11,884,109	$ 2,334,589
Expenses			
Salaries & wages	$ 1,375,723	$ 1,054,372	$ 321,351
Employee benefits	$ 981,094	$ 773,849	$ 207,246
Advisory/Program develop. & admin.	$ 348,973	$ 470,797	$ (121,824)
Project inspections	$ 87,217	$ 64,136	$ 23,081
Marketing	$ 123,936	$ 436,937	$ (313,001)
Rent/IT/Office	$ 178,325	$ 127,047	$ 51,278
Legal	$ 39,622	$ 42,184	$ (2,563)
Insurance	$ 14,237	$ 12,983	$ 1,254
Travel & Meals	$ 36,096	$ 29,579	$ 6,517
Depreciation/amortization	$ 51,991	$ 34,354	$ 17,637
Financial incentives-CGB grants	$ 254,573	$ 857,463	$ (602,890)
Financial incentives-federal grants	$ 13,617	$ 152,030	$ (138,413)
EPBB Incentives	$ 2,434,347	$ 1,857,606	$ 576,742
PBI Incentives	$ 313,690	$ 134,281	$ 179,409
Interest rate buydowns	$ 115,169	$ 5,073	$ 110,096
Total Expenses	$ 6,368,612	$ 6,052,691	$ 315,921
Net revenues over expenses	**$ 7,850,086**	**$ 5,831,418**	**$ 2,018,668**

Connecticut Green Bank
Total Sectors, Budget vs. Actual
July 2014 through October 2014

	July 2014 through October 2014			Reference
	Actual	Budget	Over(Under)	Full Year FY15 Budget
Revenues				
Utility customer assessments	$ 9,273,538	$ 9,952,839	$ (679,301)	$ 27,525,000
RGGI auction proceeds-Renewables	$ 1,385,483	$ 1,700,000	$ (314,517)	$ 6,800,000
RGGI auction proceeds-Energy Efficiency	$ 2,674,907	$ 3,050,000	$ (375,093)	$ 12,200,000
Income income	$ 422,481	$ 305,842	$ 116,639	$ 1,231,000
C-PACE closing fees	$ 149,775	$ 190,387	$ (40,612)	$ 773,800
C-PACE closing fees paid to TPA	$ -	$ -	$ -	$ (615,000)
REC sales,net	$ 153,064	$ 143,750	$ 9,314	$ 575,000
Grant income-federal programs	$ 47,824	$ 47,613	$ 211	$ 146,000
State bond funds	$ -	$ -	$ -	$ 5,000,000
Misc. Income	$ 111,626	$ 19,839	$ 91,787	$ 100,000
Total Revenues	$ 14,218,698	$ 15,410,270	$ (1,191,572)	$ 53,735,800
Expenses				
Salaries & wages	$ 1,375,723	$ 1,412,674	$ (36,951)	$ 4,700,500
Employee benefits	$ 981,094	$ 1,092,378	$ (111,284)	$ 3,547,800
Advisory/Program develop. & admin.	$ 348,973	$ 905,771	$ (556,798)	$ 2,943,900
Project inspections	$ 87,217	$ 22,934	$ 64,283	$ 430,000
Marketing	$ 123,936	$ 1,055,161	$ (931,225)	$ 3,255,000
Rent/IT/Office	$ 178,325	$ 170,797	$ 7,528	$ 624,700
Legal/Accounting	$ 39,622	$ 91,326	$ (51,704)	$ 354,000
Insurance	$ 14,237	$ 19,839	$ (5,602)	$ 60,000
Travel & Meals	$ 36,096	$ 35,817	$ 279	$ 110,000
Depreciation/amortization	$ 51,991	$ 71,846	$ (19,855)	$ 183,400
Financial incentives-CGB grants	$ 254,573	$ 254,573	$ -	$ 8,625,000
Financial incentives-federal grants	$ 13,617	$ 13,617	$ -	$ 75,000
EPBB incentives	$ 2,434,347	$ 2,434,347	$ -	$ 4,000,000
PBI incentives	$ 313,690	$ 313,690	$ -	$ 10,400,000
Interest rate buydowns	$ 115,169	$ 115,169	$ -	$ 905,000
Provision for loan losses	$ -	$ -	$ -	$ 3,983,500
Total Expenses	$ 6,368,610	$ 8,009,939	$ (1,641,329)	$ 44,197,800
Net revenues over expenses	$ 7,850,088	$ 7,400,331	$ 449,757	$ 9,538,000

Connecticut Green Bank

Summary - Unfunded Commitments

As of 11/30/2014

	BALANCE	Grants	EPBB	PBI	PBI_Solar Lease 2	HOPBI Program	CPACE Loans	Non CPACE Loans
AD/CHP Programs	$ 14,247,637	$ 353,250	$ -	$ -	$ -	$ -	$ -	$ 13,894,387
Alpha and Operational Demonstrati	$ 632,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 632,000
CPACE	$ 30,674,279	$ -	$ -	$ -	$ -	$ -	$ 30,557,188	$ 117,091
Education and Outreach	$ 919,041	$ 919,041	$ -	$ -	$ -	$ -	$ -	$ -
Energy Efficiency Programs	$ 1,213,864	$ 863,000	$ -	$ -	$ -	$ -	$ -	$ 350,864
Fuel Cells	$ 1,363,389	$ 1,363,389	$ -	$ -	$ -	$ -	$ -	$ -
Other Technologies	$ 103,274	$ 57,973	$ -	$ -	$ -	$ -	$ -	$ 45,301
Pre-development programs	$ 262,755	$ -	$ -	$ -	$ -	$ -	$ -	$ 262,755
LBE - Working Capital Loans	$ 1,800,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,800,000
Solar	$ 40,800,757	$ 2,160,236	$ 1,953,870	$ 25,055,418	$ 4,350,273	$ 6,280,960	$ -	$ 1,000,000
Wind	$ 2,800,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,800,000
	$ 94,816,996	$ 5,716,889	$ 1,953,870	$ 25,055,418	$ 4,350,273	$ 6,280,960	$ 30,557,188	$ 20,902,397

Note: PBI's will be paid over a six year period on a quarterly basis.

Connecticut Green Bank
Statement of CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Owner	Approved or Contracted Amount	Advances to date	Current Valuation
9/3/2013	02/15/13	PT-100008	855 Main State LLC	$ 1,992,976	$ 1,770,154	$ 1,770,154
6/17/2013	04/30/13	PT-100063	H. Bushnell Memorial Corporation	$ 384,016	$ 384,000	$ 384,000
12/4/2013	07/02/13	PT-100022	290 Pratt LLC	$ 1,790,847	$ 1,199,041	$ 1,199,041
11/19/2013	09/03/13	PT-100201	Crest Mechanical	$ 350,000	$ 305,000	$ 305,000
10/25/2013	09/03/13	PT-100110	FSL2 LLC	$ 148,500	$ 148,500	$ 148,500
3/13/2014	11/15/13	PT-100202	Sofia's Plaza	$ 750,000	$ 750,000	$ 750,000
3/13/2014	11/15/13	PT-100203	Sofia's Plaza	$ 750,000	$ 750,000	$ 750,000
3/19/2014	12/20/13	PT-100377	Bourdon Acres	$ 1,500,000	$ 1,500,000	$ 1,500,000
3/25/2014	12/20/13	PT-100069	Bud and Bobby Enterprises LLC	$ 485,000	$ 483,785	$ 483,785
	12/20/13		EllenvilleAssoc	$ 523,311	$ -	$ -
	12/20/13		InfinityVII	$ 829,399	$ -	$ -
	12/20/13		Khima LLC	$ 850,000	$ -	$ -
	12/20/13		YMCA	$ 372,466	$ -	$ -
4/10/2014	03/07/14	PT-100323	L&H Realty LLC	$ 122,471	$ 122,100	$ 122,100
5/6/2014	03/21/14	PT-100405	Eli Properties LLC	$ 219,743	$ 194,151	$ 194,151
3/28/2014	03/24/14	PT-100333	Leone Realty & Development LLC	$ 139,050	$ 139,050	$ 139,050
4/21/2014	04/03/14	PT-100389	Calvary Temple Christian Center, Inc.	$ 51,116	$ 51,116	$ 51,116
9/30/2014	04/25/14	PT-100169	Brookfield YMCA	$ 1,084,893	$ 16,512	$ 16,512
5/22/2014	04/25/14	PT-100334	Polamer Realty NB LLC	$ 2,502,975	$ 2,366,688	$ 2,366,688
	05/15/14		1200 High Ridge Company LLC	$ 292,986	$ -	$ -
6/4/2014	05/15/14	PT-100358	Dee Zee Ice, LLC	$ 306,641	$ 306,641	$ 306,641
	05/15/14		Historic Cargill Falls Mill LLC	$ 2,250,000	$ -	$ -
8/29/2014	06/20/14	PT-100327	14 Alcap LLC	$ 1,984,880	$ 886,325	$ 886,325
	06/20/14		New Century Gardens LLC	$ 343,374	$ -	$ -
8/14/2014	06/20/14	PT-100220	The J.W. Green Company	$ 446,205	$ 308,337	$ 308,337
	07/18/14		290 Pratt Street LLC	$ 2,852,942	$ -	$ -

Connecticut Green Bank
Statement of CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Owner	Approved or Contracted Amount	Advances to date	Current Valuation
	07/18/14		E.H. 800 Connecticut Boulevard LLC	$ 2,353,541	$ -	$ -
9/29/2014	07/18/14	PT-100181	Forty Scitico Road LLC	$ 957,000	$ 907,000	$ 907,000
9/16/2014	07/18/14	PT-100443	Gerald Pelletier	$ 1,225,492	$ 205,371	$ 205,371
7/30/2014	07/18/14	PT-100498	MDL Realty LLC	$ 1,811,461	$ 569,307	$ 569,307
	07/18/14		Siebar Windsor LLC	$ 636,367	$ -	$ -
8/13/2014	07/28/14	PT-100273	Allen Associates Property Group LLC	$ 126,194	$ 1,500	$ 1,500
8/25/2014	07/29/14	PT-100502	125 Granfield Ave LLC	$ 30,358	$ 30,002	$ 30,002
9/24/2014	07/31/14	PT-100473	A1 Property Investment Group LLC	$ 53,622	$ 53,560	$ 53,560
10/10/2014	08/05/14	PT-100319	OIC of New London, Inc.	$ 128,313	$ 21,597	$ 21,597
12/10/2014	08/26/14		VKR Venture Associates LLC	$ 763,375	$ -	$ -
	09/16/14		GGCJ LLC	$ 813,875	$ -	$ -
10/31/2014	09/16/14	PT-100139	Katz Hardware, Inc.	$ 295,291	$ 117,598	$ 117,598
11/6/2014	09/16/14	PT-100554	Lamberton Road Associates LLC	$ 333,250	$ 138,510	$ 138,510
	09/16/14		Luthern Home of Southbury, Inc.	$ 631,349	$ -	$ -
	09/16/14		Nine West Broad Property LLC	$ 473,893	$ -	$ -
	10/17/14		Beaudoin Family LLC(land);Crowley Ford LLC (building)	$ 777,313	$ -	$ -
	10/17/14		Danbury Hospitality LLC	$ 718,082	$ -	$ -
	10/17/14		G&M Real Estate Enterprises,LLC	$ 840,640	$ -	$ -
11/10/2014	10/17/14	PT-100580	Norwich Commercial Group, Inc.	$ 629,352	$ 12,052	$ 12,052
11/7/2014	11/07/14	PT-100559	650 Franklin Ave. LLC	$ 208,605	$ 5,691	$ 5,691
	11/07/14		Eddie's Auto Body LLC	$ 235,763	$ -	$ -

Connecticut Green Bank
Statement of CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Owner	Approved or Contracted Amount	Advances to date	Current Valuation
11/12/2014	11/07/14		Jesus Saves Ministry Church,Inc	$ 30,273	$ -	$ -
	11/07/14		K Washington Street LLC	$ 98,202	$ -	$ -
11/11/2014	11/07/14	PT-100567F	William M Sullivan Realty LLC	$ 30,256	$ 30,256	$ 30,256
11/11/2014	11/07/14	PT-100568F	William M Sullivan Realty LLC	$ 30,000	$ 30,000	$ 30,000
	11/14/14		Bridgeport International Academy Inc.	$ 215,948	$ -	$ -
	11/14/14		ECP Main Ave LLC	$ 246,958	$ -	$ -
	11/14/14		Fountain Lake Site 7 LLC	$ 206,000	$ -	$ -
	11/14/14		Little House Properties LLC	$ 117,091	$ -	$ -
	11/14/14		MP Development Associates LLC	$ 291,425	$ -	$ -
	11/14/14		The Boys And Girls Club of The Lower Naugatuck Valley, Inc.	$ 250,987	$ -	$ -
	11/14/14	PT-100568	William M Sullivan Realty LLC	$ 205,114	$ -	$ -
	11/14/14	PT-100567	William M Sullivan Realty LLC	$ 725,500	$ -	$ -
	12/02/14		Incubator Associates LP	$ 621,575	$ -	$ -
	12/02/14		Think Snowmobiles, Inc.	$ 495,768	$ -	$ -
	12/02/14		Manchester Sports Center, Inc.	$ 596,725	$ -	$ -
	12/02/14		Carling Technologies Inc.	$ 1,116,624	$ -	$ -

Connecticut Green Bank
Statement of CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Owner	Approved or Contracted Amount	Advances to date	Current Valuation
	12/02/14		Silver Nichols LLC	$ 185,037	$ -	$ -
	12/02/14		Loehmann-Blasius Chevrolet Inc.	$ 1,530,622	$ -	$ -
				$ -	$ -	$ -
				$ 44,361,032	$13,803,844	$13,803,844
					$30,557,188	

Connecticut Green Bank
Statement of Non CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Borrower	Project	Approved Commitment	Investment/ Advances to date	Principal Repayments to date	Reserve	Unfunded
Fuel Cell Project Financing									
3/5/2013	12/21/2012	FCE-001	Fuel Cell Energy, Inc.	Development of Bridgeport Fuel Cell Park	$ 5,873,188	$ 5,873,188	$ -	$ -	$ -
3/5/2013	12/21/2012	FCE-001	Fuel Cell Energy, Inc.	Accrued Interest to Date	$ 152,594	$ 152,594	$ -	$ -	$ -
					$ 6,025,782	$ 6,025,782	$ -	$ -	$ -
Anaerobic Digester Financing									
	9/13/2013	AD-001	Greenpoint Energy Partners LLC	Development of Anaerobic Facility in the City of Ansonia	$ 4,500,000	$ -	$ -	$ -	$ 4,500,000
	3/7/2014	AD-002	Quantum Biopower LLC	Development of Anaerobic Facility in the Town of Southington	$ 1,997,403	$ -	$ -	$ -	$ 1,997,403
	4/25/2014	AD-003	Bridgeport Bioenergy Facility LLC	Development of Anaerobic Facility in the City of Bridgeport	$ 3,384,000	$ -	$ -	$ -	$ 3,384,000
	6/20/2014	AD-004	Covanta Energy/Turning Earth LLC	Development of Anaerobic Facility in the Town of Southington	$ 4,012,984	$ -	$ -	$ -	$ 4,012,984
					$ 13,894,387	$ -	$ -	$ -	$ 13,894,387
Other Loans - CPACE-WC/CPACE-Condo/CES Innovation Fund									
7/29/2014	7/29/2014	M-001	ISCT Real Estate LLC	CPACE - WC	$ 21,110	$ 21,110	$ (2,614)	$ -	$ -
9/4/2014		M-002	Terrace Heights Condo Assoc.	CPACE Condo Program	$ 89,000	$ 89,000	$ -	$ -	$ -
	12/2/2014	M-003	Little House Properties LLC	CPACE -WC	$ 117,091	$ -	$ -	$ -	$ 117,091
					$ 227,201	$ 110,110	$ (2,614)	$ -	$ 117,091
Multifamily & Affordable Housing									
	4/25/2014	MTFL-001	CHIF	Multifamily Permanent Energy Loan Program (MPEL) Project by Project draw down of available funds	$ 1,000,000	$ -	$ -	$ -	$ 1,000,000
Energy Savings Performance Contracting Working Capital Loan Fund									
	11/14/2014		Various State Agencies/DEEP - Admin.	Leed by Example Initiative for State Agencies	$ 1,800,000	$ -	$ -	$ -	$ 1,800,000
Feasiblity Study Loans									
2/15/2013	2/15/2013	FEA - 001	Nu Power Thermal LLC	Bridgeport District Energy System	$ 89,000	$ 89,000	$ -	$ -	$ -
	8/19/2013	FEA-002	Distributed Sun LLC	Micro grid Project, Great Pond Windsor	$ 49,501	$ 4,200	$ -	$ -	$ 45,301
					$ 138,501	$ 93,200	$ -	$ -	$ 45,301
Energy Efficiency Financing									
9/13/2012	7/27/2012	GU-001	Greener U/Campus Efficiency Now	Energy efficiency financing to Colleges and Universities in the CT Conference of Independent Colleges -available for projects	$ 194,907	$ -			$ 194,907
			Projects:	University of New Haven	$ 305,000	$ 251,136	$ -	$ -	$ 53,864
				University of Hartford	$ 500,093	$ 398,001	$ -	$ -	$ 102,092
					$ 1,000,000	$ 649,136	$ -	$ -	$ 350,864
SHW Financing									
12/9/2013	10/10/2013	SHW - 001	Two Roads Brewery	Commercial SHW Loan	$ 75,000	$ 75,000	$ (13,249)	$ -	$ -
					$ 75,000	$ 75,000	$ (13,249)	$ -	$ -
Alpha Program									
8/28/2012		13-50100-2	Anchor Science, LLC	Development of nanomaterial for thermal energy management in electronics.	$ 150,000	$ 135,000	$ -	$ -	$ 15,000

Connecticut Green Bank
Statement of Non CPACE Program Loans
As of November 30, 2014

Contract Date	Approval Date	Loan No.	Borrower	Project	Approved Commitment	Investment/ Advances to date	Principal Repayments to date	Reserve	Unfunded
8/9/2012		13-50100-1	Apollo Solar, Inc.	Development of solar smart grid inverter.	$ 150,000	$ -	$ -	$ -	$ 150,000
					$ 300,000	$ 135,000	$ -	$ -	$ 165,000
Op Demo Program (1)									
3/1/2013	1/8/2013	ODP-005	New England Hydropower Co.,LLC	Demonstration of commercial viability of company's small hydropower technology.	$ 500,000	$ 150,000	$ -	$ -	$ 350,000
5/1/2013	1/8/2013	ODP-006	RPM Sustainable Technologies, Inc.	Innovative processing equipment for biofuels production.	$ 500,000	$ 383,000	$ -	$ -	$ 117,000
					$ 1,000,000	$ 533,000	$ -	$ -	$ 467,000
Wind Financing									
	4/25/2014	WIND-001	Wind Colebrook South LLC	Mezz Debt	$ 2,000,000	$ -	$ -	$ -	$ 2,000,000
	4/25/2014	WIND-001	Wind Colebrook South LLC	Working Capital Debt	$ 800,000	$ -	$ -	$ -	$ 800,000
					$ 2,800,000	$ -	$ -	$ -	$ 2,800,000
Pre Development Program (1)									
4/30/2009		PD-002	Chestnut Hill BioEnergy CT, LLC	Biomass generation project, Waterbury,CT	$ 500,000	$ 237,245	$ -	$ (237,244)	$ 262,755
02/19/09		PD-003	BNE Energy Inc.	Colebrook Wind - Phase I	$ 119,625	$ 119,625	$ -	$ (119,624)	$ -
02/19/09		PD-004	BNE Energy Inc.	Prospect Wind - Phase I	$ 102,375	$ 102,375	$ -	$ (102,374)	$ -
06/24/10		PD-005	BNE Energy Inc.	Colebrook Wind - Phase II	$ 380,375	$ 380,375	$ -	$ (380,374)	$ -
06/24/10		PD-006	BNE Energy Inc.	Prospect Wind - Phase II	$ 397,625	$ 397,625	$ -	$ (397,624)	$ -
					$ 1,500,000	$ 1,237,245	$ -	$ (1,237,240)	$ 262,755
				Project Loans:	$ 29,760,871	$ 8,858,474	$ (15,863)	$ (1,237,240)	$ 20,902,397
				Unfunded:		$ 20,902,397			

(1) Due to the nature of the Pre Development and Op Demo Loans, the loans are currently fully reserved for.

Connecticut Green Bank

October Financial Report

CGB Affiliates

Index

1. CEFIA Holdings LLC Balance Sheet
2. CEFIA Holdings LLC Profit and Loss Statement
3. CT Solar Loan I LLC Balance Sheet
4. CT Solar Loan I Profit and Loss Statement
5. CEFIA Solar Services Inc. Balance Sheet
6. CEFIA Solar Services Inc. Profit and Loss Statement
7. CT Solar Services 2 LLC Balance Sheet
8. CT Solar Lease 2 LLC Profit and Loss Statement

CEFIA Holdings LLC

Balance Sheet

As of October 31, 2014

	Oct 31, 2014	Oct 31, 2013	$ Change
ASSETS			
Current Assets			
Cash	$ 2,097,309	$ 23,280	$ 2,074,029
Total Current Assets	$ 2,097,309	$ 23,280	$ 2,074,029
Other Assets			
Commercial Solar PV Projects	$ 390,524	$ -	$ 390,524
Investment/advances to affiliates	$ 9,336,521	$ 5,959,950	$ 3,376,571
Total Other Assets	$ 9,727,045	$ 5,959,950	$ 3,767,095
TOTAL ASSETS	$ 11,824,354	$ 5,983,230	$ 5,841,124
LIABILITIES & EQUITY			
Liabilities			
Current Liabilities			
Other Current Liabilities			
Accounts payable - PV system contractors	$ 1,284,190	$ -	$ 1,284,190
Accrued Expenses	$ 7,185	$ -	$ 7,185
Custodial account.-CGB Promos	$ 3,821	$ -	$ 3,821
Total Current Liabilities	$ 1,295,196	$ -	$ 1,295,196
Other Liabilities			
Due to CGB	$ 9,015,344	$ 5,885,000	$ 3,130,344
Contractor Holdbacks	$ 93,214	$ -	$ 93,214
Total Other Liabilities Liabilities	$ 9,108,558	$ 5,885,000	$ 3,223,558
Total Liabilities	$ 10,403,754	$ 5,885,000	$ 4,518,754
Equity			
CGB Capital Contribution	$ 99,000	$ 99,000	$ -
CI Capital Contribution	$ 1,000	$ 1,000	$ -
Members Equity - Prior year	$ 12,923	$ -	$ 12,923
Net Income	$ 1,307,677	$ (1,770)	$ 1,309,447
Total Equity	$ 1,420,600	$ 98,230	$ 1,322,370
TOTAL LIABILITIES & EQUITY	$ 11,824,354	$ 5,983,230	$ 5,841,124

CEFIA Holdings LLC
Profit & Loss Statement
January through October 2014
(Calendar Year Entity)

	YTD 10 Months
Income	
Sales - Residential PV Systems	$ 6,564,525
Income-Large Systems	$ 8,448
Total Income	$ 6,572,973
Cost of Goods Sold	
Cost of Goods Sold	$ 5,234,822
Total COGS	$ 5,234,822
Gross Profit	$ 1,338,151
Implementation Fees	
Servicing Set-up Fees	$ 10,560
Total Implementation Fees	$ 10,560
Professional Fees	
Professional Fees	
Accounting/Tax	$ 4,000
Legal Fees	$ 6,161
Total Professional Fees	$ 10,161
Bank Fees	$ 6,859
Project Inspection Services	$ 2,895
Total Operating Expenses	$ 19,915
Total Expenses	$ 30,475
Net Income	$ 1,307,676

CT Solar Loan I LLC
Balance Sheet
As of October 31, 2014

	Oct 31, 2014	Oct 31,2013	$ Change
ASSETS			
Cash			
Cash-Operations	$ 218,034	$ 145,485	$ 72,549
Cash-Maintenance Reserve	$ 6,511	$ -	$ 6,511
Cash-Loan Loss Reserve	$ 300,000	$ -	$ 300,000
Total cash	$ 524,545	$ 145,485	$ 379,060
Other assets			
Interest receivable	$ 7,995	$ 252	$ 7,743
Residential Solar Loans -complete	$ 1,522,178	$ 101,559	$ 1,420,619
Residential Solar Loans -in process	$ 611,979	$ -	$ 611,979
Total other assets	$ 2,142,152	$ 101,811	$ 2,040,341
TOTAL ASSETS	$ 2,666,697	$ 247,296	$ 2,419,401
LIABILITIES & EQUITY			
Liabilities			
Due to CGB and affiliates	$ 2,258,850	$ 248,850	$ 2,010,000
Note Payable-Solar Mosaic	$ 118,179	$ -	$ 118,179
Total Long Term Liabilities	$ 2,377,029	$ 248,850	$ 2,128,179
Total Liabilities	$ 2,377,029	$ 248,850	$ 2,128,179
Equity			
Members Equity-prior year	$ (2,560)	$ -	$ (2,560)
Net Income	$ 292,227	$ (1,554)	$ 293,781
Total Equity	$ 289,667	$ (1,554)	$ 291,221
TOTAL LIABILITIES & EQUITY	$ 2,666,696	$ 247,296	$ 2,419,400

CT Solar Loan I LLC
Profit & Loss Statement
January through October 2014
(Calendar Year Entity)

	YTD 10 Months
Income	
Interest Income	$ 42,403
Grant Income - ARRA	$ 300,000
Other Income	$ 98
Total Income	$ 342,501
Expenses	
Loan Origination Services	
Loan Origination Fees	$ 34,370
Upfront Fees	$ 217
Portfolio Management Fees	$ 607
Monthly Servicing Fees	$ 2,749
UCC Filing & Processing Fees	$ 3,080
Total Loan Origination Services	$ 41,023
Operating Expenses	
Legal Fees	$ 602
Office/bank fees	$ 1,713
Public Relations	$ 902
Total Operating Expenses	$ 3,217
Interest Rate Buydown	$ 3,625
Interest Expense	$ 2,409
Total Operating Expenses	$ 9,251
Total Expenses	$ 50,274
Net Income	$ 292,227

CEFIA Solar Services Inc.

Balance Sheet

As of October 31, 2014

	Oct 31, 2014	Oct 31, 2013	$ Change
ASSETS			
Current Assets			
Cash			
Cash	$ 73,250	$ 500	$ 72,750
Total Cash	$ 73,250	$ 500	$ 72,750
Other Current Assets			
Other Receivables	$ 161,000	$ 40,000	$ 121,000
Total Other Current Assets	$ 161,000	$ 40,000	$ 121,000
Total Current Assets	$ 234,250	$ 40,500	$ 193,750
Other Assets			
Investment in CT Solar lease 2	$ 2,179,159	$ 100	$ 2,179,059
Investment in CT Solar lease 2- ARRA	$ 3,500,000	$ 3,500,000	$ -
Due From CT Solar Lease 2 - wc loan	$ 1,076,940	$ -	$ 1,076,940
Total Other Assets	$ 6,756,099	$ 3,500,100	$ 3,255,999
TOTAL ASSETS	$ 6,990,349	$ 3,540,600	$ 3,449,749
LIABILITIES & EQUITY			
Liabilities			
Due to CGB and affliliates	$ 6,844,126	$ 3,511,000	$ 3,333,126
Total Liabilities	$ 6,844,126	$ 3,511,000	$ 3,333,126
Equity			
retained earnings	$ 49,373	$ -	$ 49,373
Common Stock - Par Value	$ 1	$ 1	$ -
Paid in Capital - Common Stock	$ 99	$ 99	$ -
Net Income	$ 96,750	$ 29,500	$ 67,250
Total Equity	$ 146,223	$ 29,600	$ 116,623
TOTAL LIABILITIES & EQUITY	$ 6,990,349	$ 3,540,600	$ 3,449,749

CEFIA Solar Services Inc.
Profit & Loss Statement
January through October 2014
(Calendar Year Entity)

	YTD 10 Months
Income	
Administrative services fee	$ 101,000
Total Income	$ 101,000
Expenses	
Operating Expenses	
Professional Fees	
Accounting and tax	$ 4,000
Total Professional Fees	$ 4,000
State Tax Filing Fees	$ 250
Total Operating Expenses	$ 4,250
Total Expense	$ 4,250
Net Income	$ 96,750

CT Solar Lease 2 LLC

Balance Sheet

As of October 31, 2014

(Calendar Year Entity)

	Oct 31, 2014	Oct 31, 2013	$ Change
ASSETS			
Current Assets			
Cash			
Cash-Operating account	$ 629,534	$ 313,785	$ 315,749
Cash-Prepayment account	$ 512,366	$ -	$ 512,366
Cash-Oper. & Maint. Reserve (restricted)	$ 1,000,000	$ 1,000,000	$ -
Cash- loan loss reserve(restricted)	$ 3,500,000	$ 3,500,000	$ -
Total Cash	$ 5,641,900	$ 4,813,785	$ 828,115
Other Current Assets			
Prepaid Insurance	$ 16,864	$ 27,111	$ (10,247)
Total Other Current Assets	$ 16,864	$ 27,111	$ (10,247)
Total Current Assets	$ 5,658,764	$ 4,840,896	$ 817,868
Energy equipment			
Residential PV systems - in service	$ 3,434,495	$ -	$ 3,434,495
Residential PV systems - in construction	$ 3,238,125	$ -	$ 3,238,125
Accum. Depr. - Residential PV systems	$ (38,188)	$ -	$ (38,188)
Total Energy equipment, net	$ 6,634,432	$ -	$ 6,634,432
Other Assets			
Deferred financing fees	$ 487,563	$ -	$ 487,563
Accum. amort.-financing fees	$ (38,240)	$ -	$ (38,240)
Total Other Assets	$ 449,323	$ -	$ 449,323
TOTAL ASSETS	$ 12,742,519	$ 4,840,896	$ 7,901,623

CT Solar Lease 2 LLC

Balance Sheet

As of October 31, 2014

(Calendar Year Entity)

	Oct 31, 2014	Oct 31, 2013	$ Change
LIABILITIES & EQUITY			
Liabilities			
Current Liabilities			
Other Current Liabilities			
Accrued Expenses	$ 409,232	$ 137,597	$ 271,635
Deferred Revenue	$ 500,640	$ -	$ 500,640
Accrued Interest-CGB Note	$ 77,121	$ -	$ 77,121
Total Other Current Liabilities	$ 986,993	$ 137,597	$ 849,396
Total Current Liabilities	$ 986,993	$ 137,597	$ 849,396
Other Liabilities			
Due to CGB and affiliates	$ 2,868,510	$ 69,550	$ 2,798,960
Due to managing member	$ 123,418	$ -	$ 123,418
Note Payable-CGB	$ 2,300,000	$ 2,300,000	$ -
Total Other Liabilities	$ 5,291,928	$ 2,369,550	$ 2,922,378
Total Liabilities	$ 6,278,921	$ 2,507,147	$ 3,771,774
Equity			
Firstar Development Corp. capital	$ 1,727,096	$ 236,594	$ 1,490,502
CEFIA Solar Services capital	$ 3,132,681	$ 100	$ 3,132,581
CEFIA Solar Services capital - ARRA	$ 3,500,000	$ 3,500,000	$ -
Prepaid Priority Return-Firstar Development Corp.	$ (57,437)	$ -	$ (57,437)
Deferred Syndication Costs-Firstar Development Corp.	$ (853,480)	$ -	$ (853,480)
Members Equity - prior year	$ (437,317)	$ -	$ (437,317)
Net Income-current year	$ (547,945)	$ (1,402,945)	$ 855,000
Total Equity	$ 6,463,598	$ 2,333,749	$ 4,129,849
TOTAL LIABILITIES & EQUITY	$ 12,742,519	$ 4,840,896	$ 7,901,623

CT Solar Lease 2 LLC
Profit & Loss Statement
January through October 2014
(Calendar Year Entity)

	YTD 10 Months
Income	
Rental Income	$ 16,185
Interest Income - Solar Leases	$ 7,096
PBI Income	$ 13,815
Total Income	$ 37,096
Expenses	
Implementation Fees	
Servicing Set-up Fees	$ 1,500
Total Implementation Fees	$ 1,500
Lease Origination Services	
Lease Origination Fees	$ 14,700
Monthly Servicing Fees	$ 600
Total Lease Origination Services	$ 15,300
Operating Expenses	
Legal/Accounting/Tax	$ 27,556
Bank/transaction Fees	$ 1,401
Training Expense	$ 6,500
Insurance Expense	$ 46,945
Commitment Fees	$ 240,731
Administrative services fee	$ 101,000
Warranty Management	$ 31,993
Misc. Expense	$ 2,000
Total Operating Expenses	$ 430,570
Depreciation-energy equipment	$ 38,188
Amortization-financing fees	$ 23,900
Interest Expense	$ 48,030
Total depreciation,amort./interest	$ 110,118
Total expenses	$ 585,044
Net Loss:	$ (547,948)

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Connecticut Green Bank Board of Directors

From: Jessica Bailey (Director of Commercial and Industrial Programs)

Cc Mackey Dykes (VP & COO), Brian Farnen (General Counsel and CLO), Bert Hunter (EVP and CIO), Ali Lieberman (Assistant Director of Clean Energy Finance), Genevieve Sherman (Assistant Director of Commercial and Industrial Programs)

Date: December 12, 2014

Re: Role of a Green Bank – C-PACE (Version 2.0)

Commercial Property Assessed Clean Energy (C-PACE) is a quintessential green bank model program. C-PACE is a publicly supported financing program – not a grant program – that (1) lowers the cost of clean energy for commercial, industrial, multifamily, and non-profit consumers, and (2) increases the value of the property as a result of clean energy improvements. Connecticut has been successful implementing its C-PACE program as a result of communities committed to supporting clean energy deployment, an exceptional staff at the Connecticut Green Bank that is passionate about results, a strong program design, a $40 million warehouse that served as a catalyst to market activity, and a large market potential for significant long-term investment. This memo provides an update on the status of the C-PACE program and proposes steps forward under consideration by the staff in order to engage the Board of Directors in a conversation on the role of the Connecticut Green Bank.

Overview

The Connecticut C-PACE Program is widely recognized as the most successful commercial PACE program in the nation and frequently cited as a model for other states. To date, the Connecticut Green Bank (Green Bank) has approved ($28 million) and closed ($30 million) totaling roughly $58 million in C-PACE deals and has a current pipeline of $100 million under consideration. In 2014, the C-PACE program doubled the dollar volume of transactions it approved in 2013 and it nearly quadrupled the number of buildings upgraded – from $20 million to $40 million and from 20 buildings to over 75 buildings.

Achieving this success started with appropriate statutory provisions detailed in Connecticut Public Act 12-2, which specifies the administration of the C-PACE program on a statewide basis under the authority of the Green Bank. The statue works because it:

- Respects existing mortgage holders' rights by **requiring their consent** for a C-PACE benefit assessment lien to be placed on a property on which they hold a first lien;

- Requires a robust process to evaluate energy savings by requiring the Green Bank to confirm **energy savings that exceed the assessment** payments over the term of the obligation through a savings to investment ratio requirement; and

- **Allows municipalities to opt in**, ensuring the buy-in of these essential participants in the placement of the benefit assessment lien on the property. The timely placement of the benefit assessment lien is fundamental for perfecting the capital providers' security interest in the property, and is the key to unlocking millions of dollars of economic activity and jobs to local communities across the state.

The Board of Directors' approval for the existing $40 million funding warehouse facility using Green Bank funds was another key to the program's success. The internal warehouse allowed the Green Bank to step into the early stage of the C-PACE market to prove the concept and give early borrowers and contractors confidence that funding would be available for their projects.

The Green Bank's investment in enabling the market for C-PACE was another key reason for success. The C-PACE legislation and the Green Bank envisioned an open market program with significant investment from the private sector. Without clear insight into a new market like C-PACE via a clear business opportunity and/or extremely high fees and borrowing costs, no private market player would have spent the time or resources to conduct initial municipal outreach, contractor training, raising awareness of the availability of C-PACE, and trouble-shooting early stage issues that emerged as the program was being built. Taking leadership in developing projects, approving them, and financing them was important in demonstrating to the market that PACE financing works. And the Connecticut Green Bank took on that role and served as a market catalyst.

This memo is meant to reflect on the progress made in the first two years of the C-PACE program and present how the staff is thinking about the continued improvement and development of the program for discussion with the Board of Directors.

C-PACE (Version 1.0)

The enabling C-PACE statute, PA 12-2, anticipated that the Green Bank would provide the statutorily required functions of administering the program, which includes:

1. Bringing on municipalities;
2. Designing technical standards;
3. Approving deals based on Savings to Investment Ratio and mortgage lender consent;
4. Establishing credit enhancement; and
5. Requiring muni to place lien and collect assessments.

The team recognized early that the market distortion in C-PACE wasn't just a capital challenge in reaching this market. C-PACE creates a financial product that works for investors; but those investors didn't have a channel to pull in transaction volume, and thus the market was going to be slow to develop unless the Green Bank began developing projects and "showing and telling" how this market could work in Connecticut. While the team initially envisioned a "lending tree" type financing model where there was a standard offer for private investors, the Green Bank would approve transactions and then connect Borrowers with Lenders, the team saw a reluctance of capital providers to jump into this new asset class – particularly on a deal by deal basis. The Green Bank qualified 20 capital providers to serve this function, but unfortunately given the nascent market at the time, no private capital activity occurred.

With the approval of the Green Bank Board of Directors for an internal warehouse facility of $40 million in Green Bank capital for construction and term finance, the Green Bank began lending directly to building owners through C-PACE. While C-PACE is envisioned as a private capital solution to financing clean energy, the fact that the Green Bank took on this retail lending role in Phase 1 has allowed the Green Bank to iron out programmatic wrinkles or issues as they've emerged and, more importantly, to demonstrate to the private capital market that C-PACE is a financial tool that works and Connecticut is a market to invest.

The Green Bank has been functioning in all aspects of the C-PACE market from origination of transactions to privately placing the first-of-its-kind securitization of C-PACE backed benefit assessments. As a result, Green Bank public capital animated or catalyzed this market and jumpstarted private sector investment in the Sell Down of C-PACE assessments in 2014. The Green Bank has made a 2 year investment in setting up the market – doing the legal work on municipal agreements, determining how to get a lien on the building, building confidence among mortgage lenders, contractors, building owners, capital providers, mayors, and tax collectors. After 24 months of work, the table has now been set for success for C-PACE in Connecticut to grow and attract private investment in building energy improvements, and the investment by the Green Bank was critical in enabling this to happen.

The C-PACE program, entering its third year, ought to now be considered in the context of the role of the Green Bank. The question for the Board of Directors is whether and how the Green Bank role changes in order to realize the market potential by maximizing the number of buildings upgraded and private capital being attracted and leveraged. The Green Bank should rightly feel proud of what has been accomplished to date, while recognizing that we are only scraping the surface of the Total Addressable Market (TAM) – the potential for significant long-term investment in building energy improvements in Connecticut.

C-PACE (Version 2.0)

As we begin to think about the size of the market – which we haven't even hit 1% of the TAM – the work invested by the Green Bank to get Connecticut market ready and "open for business" for C-PACE growth, we need to wrestle with the Green Bank's limited capacity to scale up to meet the demands of a growing market.

First, we are currently stretching the capacity of the organization in many areas – origination, underwriting, closing financings, and administering the construction facility. Indeed, much of the work of the Green Bank as it relates to C-PACE now is "back office" work to get deals through the approval process and get money out the door and projects completed. There are also other requirements put on the Green Bank as a quasi-public agency that limits rapid scale and realization of the market potential. For example, competitive bid requirements slow down the underwriting and review process and limit the speed with which Green Bank staff can review transactions. State contracting requirements put additional burdens on potential Borrowers.

Second, we are currently allocating a large portion of the Green Bank's balance sheet to C-PACE and, if market projections are accurate, our internal warehouse will quickly become too small for the volume of C-PACE deals possible in Connecticut starting in June 2015. Furthermore, while C-PACE has enjoyed a significant portion of the Green Bank's balance sheet, there are other places (see Comprehensive Plan) for the Green Bank to be investing its resources to catalyze new markets.

Third, we have learned over the past two years that the secret to C-PACE (in Connecticut and nationally) is transaction volume. Efforts to bring deals in the door and get them funded need to

be ramped up significantly. Unfortunately, it is clear that with the Green Bank actively playing the "market maker" role, it is unlikely to be undertaken by any private market participants who may otherwise be attracted to come into the market. If the Green Bank is the sole originator, we will necessarily limit the number of deals that can be done by our human and financial capacity. The staff of the Green Bank recognizes this limitation, and because we are committed to seeing the market for energy improvements grow in Connecticut because it creates jobs and protects the environment, we recognize a need to pursue new strategies for advancing our efforts.

Finally, and most importantly, market signals suggest that the private market is ready to come into Connecticut and serve many of the activities that have thus far been subsidized by the Green Bank, including origination, underwriting, and financing. In just 2 years, the Green Bank has created a model that could flourish – and be replicated in other states – without the Green Bank providing all the financing for it. Among the goals of the Green Bank is to be a model for the rest of the country. What we have created with C-PACE is a national model but unfortunately, funding it only with public capital limits its exportability to states without active and funded green banks.

Developments and Considerations
As we presented at our October Board of Directors Committee meeting, at a September staff offsite meeting on C-PACE, we determined two steps were necessary to continue to grow the C-PACE market in Connecticut and to fulfill the Green Bank's goal of deployment of clean energy and attraction of private capital.

The first step is to issue an RFP to capital providers for a capital facility that will allow the continuation of C-PACE transactions coming into the Green Bank for financing. The reason to take this step is that the $40 million internal warehouse approved by the Board of Directors while significant is insufficient because it is nearly committed and it is important to ensure the continuation of available capital to C-PACE projects. The surest way to slow the C-PACE market growth would be for there to be a lapse in available capital for transactions. The lessons of the past (i.e., Connecticut Clean Energy Fund's small solar incentive program), should inform our strategies of the future. Raising a private capital facility, or an external warehouse, will allow for C-PACE financings to happen in Connecticut without disruption - even as the Green Bank considers enabling the private market to take over some functions.

The second step is to issue a standard offer credit enhancement and guidance to private originators to bring transactions to the Green Bank for approval, but not financing. Not unlike what was originally envisioned with the "lending tree" model and the qualified capital providers at the outset of the program, this will encourage the entrance of private originators – the key ingredient – and financiers to the Connecticut C-PACE market and allow the market to grow beyond the small portion of the TAM that the Green Bank team is able to cover with its internal resources.

Raising a Warehouse: Solving the Capital Challenge
The first C-PACE benefit assessment lien $30 million sell down in the spring of 2014 was a significant milestone – truly a revolutionary moment for commercial and industrial energy efficiency finance. This watershed transaction[1] demonstrated how the Green Bank uses strategic and relatively small amounts of ratepayer funds to animate or catalyze markets, driving millions of dollars of private capital into the clean energy marketplace. $24 million of the Green Bank's investment will be replenished by ~March 2015 from Clean Fund, the winner of the C-

[1] *In a 'Watershed' Deal, Securitization Comes to Commercial Efficiency* in Greentech Media ((May 19, 2014)

PACE 2013 Sell-Down Auction. Additionally, the Green Bank will retain a 20% subordinated role in the capital stack during the term – $6 million – through Series B (10%) and Series C (10%) bonds, and benefit from interest income from the loans over time.

With the demand for C-PACE financing on the rise, and deals being approved at approximately $5 million per month, the Green Bank is preparing an RFP to secure a capital facility with the goal of continuing to grow the C-PACE market. We will be seeking to develop a facility that will enable both short-term ("construction") financing, as well as term finance with (or without) a Green Bank credit enhancement. The Green Bank's current projection of our pipeline of deals should be sufficient to fill a $50 million warehouse over a period of 12 months.

We envision that the competitive selection will be made based on the following, broad criteria:

- Economic
    - Value capture for the Green Bank:
        - To increase origination efforts, either through the Green Bank or through bidder, or an external party
        - For the Green Bank to recoup program administration costs (depending on how much, if any, Green Bank involvement is requested by QCP)
        - Balanced with minimal requirement for credit enhancements from the Green Bank
        - At a minimum, responses should propose structures that allow the Green Bank to recapture its roughly $3M in annual administrative costs.
    - Minimum commitment fees
    - Low cost of capital and maximum advance rate allowing maximum Green Bank and borrower economics

- Structure
    - Ability to structure an SPV or external entity that will be the Lender of Record (with any requisite but non-controlling participation from the Green Bank)
    - Clarity to term financing arrangement
    - Ability to scale with program growth

- Integration with current program operations
    - Mutually designed underwriting criteria with ability to accommodate exceptions
    - Warehouse and term financing terms that are economically compatible with borrower rates and terms as published in the C-PACE program guidelines (currently 5% for 10 years to 6% for 20 years, adjusted at regular, predetermined intervals which enable clear signaling to the market)

- Process
    - Simplified documentation
    - Potential for an outsourced solution for origination, underwriting, legal, and/or backend

While initially envisioned to be a $50 million warehouse, Green Bank would seek a partner that would be prepared to allow for continued growth of the warehouse as demand for financing grows.

Issuing a Standard Offer: Solving the Human Capital Challenge

In order to attract both private capital *and* more importantly privately funded origination efforts, the Green Bank plans to restart the "lending tree" model and issue a Standard Offer Credit Enhancement Program to qualified capital providers in the C-PACE program. In this structure, the Green Bank Board of Directors will approve C-PACE transactions brought by private capital providers (those not seeking to take advantage of the warehouse facility) based on the statutory requirements of the C-PACE legislation:

1. Confirming SIR test
2. Confirming lender consent secured
3. Confirming owner of real property knows conditions to financing

The transactions will be originated, underwritten, and financed by private capital providers. The Green Bank will offer a credit enhancement, where appropriate and necessary, on par with the current offering credit enhancement to the warehouse facility (ex: 10% or 20% subordinated debt) to the transaction to enable the private capital provider to compete with the Green Bank on interest rates.

In addition to fulfilling the statutory requirements of verifying the project is C-PACE eligible, the Green Bank will perform the following functions:

1. Reviewing documents provided pursuant to Originator's Obligations and providing Program Administrator Approval.
2. Reviewing the Capital Provider's protocol for determining that SIR is greater than one for Eligible Projects is satisfactory.
3. Entering into legal agreements with any Connecticut municipality whose legislative body passes a resolution to participate in the C-PACE program.
4. Coordinating with municipalities in order to insure that Benefit Assessment liens and assignments of such liens are filed in a timely manner.
5. Working with municipalities and the Program Administrator's Servicer in collecting repayment of Benefit Assessments and remitting such payments to Originator.
6. Upon evidence of the execution of a financial agreement between the Capital Provider and Borrower the Green Bank will coordinate with municipalities in order to insure that Benefit Assessment liens and assignments of such liens are filed. Liens will be assigned to the Capital Provider.
7. Upon evidence of completion of the construction period, the Green Bank will coordinate with Capital Provider to ensure that the revised lien (if necessary) and payment schedule is filed with the municipality.
8. Work with municipalities and the Program Administrator's Servicer in collecting repayment of Benefit Assessments and remitting such payments to Capital Provider. Cortland Capital Market Services LLC, or any designee as determined from time to time by the Program Administrator, serves as the Master Servicer for C-PACE assessments in CT.
9. Seeking approval from the Board of Directors, where necessary, for the use of credit enhancements to support a transaction with a private capital provider.

We expect the Warehouse to provide needed capital to continue to finance C-PACE transactions that are coming into the Green Bank as a result of its own marketing and origination efforts. We expect the Standard Offer to encourage private origination and funding of

C-PACE transactions in Connecticut. Pursuing a Standard Offer in conjunction with a flexible external warehouse would give the Green Bank flexibility to test the market readiness of an open market C-PACE program, while retaining the ability to continue in its current role should market solutions prove to be insufficient. The Standard Offer was released in December 2014 and any transactions that come to the Green Bank for financing will be brought to the Board for approval per our operating procedures. This offering reopens the idea of a "lending tree" model that was initially anticipated as the way C-PACE deals would be financed in CT.

Green Bank Ongoing Role
In addition to the two near term solutions to the capital and human capital challenges facing the C-PACE program described above, the Green Bank Board of Directors should contemplate how to encourage the private sector to take over the origination and underwriting of C-PACE transactions that would allow for:

- The deployment of more clean energy
- The attraction of more private capital into the state
- At a lower cost to the Green Bank

There are several pathways the program could take between:

Business As Usual which is attractive because we have been doing it well, have trusted relationships, and are motivated by a public sector goal of clean energy deployment. It is unattractive due to our limited human and financial capacity to meet demands of a growing market, our state processes limiting rapid scale up, the limit of private sector involvement, and the lack of national replicability of our model.

Green Bank Performing Only Statutory Requirements which is attractive because the private market has indicated a willingness to engage, the C-PACE warehouse could be dedicated elsewhere in the Green Bank, private companies can more effectively meet growth needs, and the "Connecticut model" of C-PACE could go national. It is unattractive because there is no natural private sector partner to take over the role that the Green Bank has been playing, the private sector would be motivated by profit rather than policy which could cause interest rates to rise, and it could cause a slow-down in market growth.

There are undoubtedly other pathways this program could run down – and run it should! There is nothing more urgent to us than creating jobs and confronting climate change. The market for C-PACE in Connecticut has impressed the country and we should do everything in our power to continue to lead the pack. In just 2 years, Connecticut has leapfrogged C-PACE programs around the country that have been in existence since 2008. We should take great pride in what we have created while we also push ourselves to think about how we do more. From Version 1.0 to Version 2.0 we expect to continue on the pathway to realizing the market potential for private capital investments in building energy improvements in Connecticut.

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Connecticut Green Bank Board of Directors

From: Kerry O'Neil, Director of Residential Programs; Kim Stevenson, Associate Director of Multifamily Programs; Ben Healey, Assistant Director of Clean Energy Finance

CC: Bryan Garcia, President and CEO; Bert Hunter, EVP and CIO; Mackey Dykes, VP and COO; Brian Farnen, General Counsel and CLO

Date: December 12, 2014

Re: Role of a Green Bank – Low Income Solar Deployment

The Residential Solar Investment Program (RSIP) is a quintessential green bank model program. Since the start of the program in 2012, subsidies from the Connecticut Green Bank have decreased by nearly 60% per installed kilowatt (i.e., from $1.78/W in 2012 to $0.76/W in 2014), while the deployment of rooftop solar PV has increased by 650% (i.e., 5.5 MW in 2012 to 35.8 MW in 2014). Investment in residential solar PV deployment has gone from $27 million in 2012 to $156 million in 2014. While the deployment of residential solar PV has increased dramatically across Connecticut, harder to reach customer segments such as low income have not been nearly as successful (see Market Analysis of Residential Solar Deployment and Housing Characteristics of Connecticut's Low Income Sector memo of December 12, 2014). This memo provides an overview of the challenges ahead and proposes steps forward under consideration by the staff in order to engage the Board of Directors in a conversation on the role of the Connecticut Green Bank.

INTRODUCTION

The purpose of this memo is to respond to the Connecticut Green Bank (Green Bank) Board of Director's August 2014 request for staff to detail solar deployment in Connecticut's low income communities and discuss strategies to achieve greater adoption among this demographic. This memo will address:

- The level of residential solar deployment in the low income segment
- Defining characteristics of Connecticut's low income housing market
- Overview of current Green Bank initiatives supporting solar for low income residents
- Proposed priorities, strategies, initiatives, and future policies

RESIDENTIAL SOLAR DEPLOYMENT IN THE LOW INCOME SECTOR

As shared with the Board of Directors at the October 17, 2014 meeting, residential solar is predominantly deployed in moderate and higher income communities in Connecticut, as

expected. Higher relative penetration rates are also seen in communities with strong Solarize campaigns. See the December 12, 2014 CGB Board memo "Market Analysis of Residential Solar Deployment and Housing Characteristics of CT's Low Income Sector" (Market Analysis Memo) for a detailed analysis on current solar deployment in the state, broken out by income bands and census tracts.

The Green Bank is making inroads into lower income communities, but there is significant room for improvement. For example, as the table below shows, current solar penetration rates (in terms of kW installed per capita) in lower income communities strongly lag those of middle and upper class neighborhoods:

- Census tracts at < 60% of area median income (AMI) have **1/10th** the kW per capita of tracts at >80% AMI; and
- Census tracts at 60% to 80% of AMI have **1/4th** the kW per capita of tracts at >80% AMI.

Income Level[1]	# of Census Tracts	Population	# of Projects	Projects per Capita	kW Installed	kW Installed per Capita
<60% AMI	179	651,267	257	.00039	1,422	.00218
60-80% AMI	113	518,459	473	.00091	2,950	.00569
>80% AMI	532	2,395,353	6,756	.00282	48,284	.02016
Total	824	3,565,079	7,486	.00210	52,656	.01477

However, the data also confirms that concentrated and targeted marketing and outreach campaigns can lead to higher than average solar penetration in low income communities. To date, six Solarize campaigns have been run in distressed communities: Bridgeport, Enfield, Montville, Torrington, West Haven and Windham. When looking at the kW per capita in these communities compared to the statewide averages there is:

- 27% higher penetration in <60% AMI census tracts
- 21% higher penetration in 80%-60% AMI census tracts
- Across all census tracts in these 6 communities, the penetration was at 95% of the statewide penetration rate, *almost* at parity

To date the Green Bank and its predecessor organization has invested $103.5 million in residential solar incentives. Solar installed in low income census tracts represents about 8% of the total installed to date, for an estimated investment of $8.6 million in solar incentives in low income tracts. Additionally, 2 C-PACE affordable multifamily solar projects have been financed for $400,000.

The data clearly demonstrates that the challenge in front of us is significant – and we need to be strategic, patient, and diligent, and commit to investing the time and resources, if we hope to make a meaningful impact.

[1] Median Household Annual Income statewide is $76,377, for <60% AMI it is <$45,826, for 80%-60% AMI it is $45,826 - $61,102, and for >80% AMI it is >$61,102.

Recent Green Bank customer segmentation analysis has revealed that going solar resonates with a wide range of income groups and customer profiles, including a customer segment unique to Connecticut that skews older and lower in income. The identification of this specific customer segment is encouraging, as it will support targeted messaging and outreach to a subset of the low income market.

DEFINING CHARACTERISTICS OF CT'S LOW INCOME HOUSING MARKET

Low income housing, defined as units with residents at 80% of area median income or below, represents about 507,000 units or 34% of Connecticut's total housing units. Properties with low income residents run the gamut from single family owner occupied homes, to small and large investor owned buildings. Our analysis shows a clear correlation between lower incomes and high concentrations of renters living in older buildings – predominantly in the core cities, and scattered across the northeastern and northwestern quiet corners of the State.

Connecticut's low income housing market generally falls into the following categories:

- Owner occupied housing (1 to 4 units)
- Naturally occurring affordable rental housing (investor owned small and large properties)
- State funded affordable housing (public and privately owned)
- Federally funded (HUD) properties

As the table below makes clear, nearly 70% of CT's low income residents live in owner-occupied single family homes and small, investor owned multifamily rentals (2 to 19 units). Over half live in single family homes and 2-4 unit rentals. Collectively, this is the hardest of the hard-to-reach markets, in a segment, the low income sector, that is already very hard to serve.

Type of Housing	# of Low Income Households	% of Low Income Households
Single Family Owner-Occupied ("SF OO") Homes	151,493	30%
2-4 Unit Rentals	130,684	26%
5-19 Unit Rentals	67,092	13%
Total SF 00 + 2-19 Unit Rentals	*349,269*	*69%*

Different classes of affordable properties share various important characteristics. For example, smaller rental properties tend to be:

- Concentrated in the urban core (although with a significant disbursement in suburban and rural communities;
- Naturally occurring affordable (i.e. privately owned, non-subsidized);
- Challenged by significant deferred maintenance needs and health and safety issues;
- Operating on thin margins or at a loss, with limited capacity for new debt; and

- Due to tenant paid utilities, unlikely to pursue energy upgrades independently given split incentives, leaving tenants to shoulder hard choices between food, medicine, and heat.[2]

On the other hand, larger properties (50 units and above) as well as State and HUD financed/subsidized properties, feature:

- Better conditions than the smaller, privately owned, non-subsidized properties, due to stronger property management and maintenance budgets enabled by economies of scale, as well as building and other code requirements mandated by Department of Housing (DOH), Connecticut Housing and Finance Authority (CHFA), and Housing and Urban Development (HUD);
- Management and ownership structures better positioned to take advantage of Green Bank programs; and
- Often, master meters (meaning owners pay utilities), particularly for heat and hot water. For master metered properties, owners have a strong incentive to make energy upgrades that will result in utility and maintenance cost savings, and solar can be a particularly attractive investment option.

Overall, with deferred maintenance an overriding issue and property owners who are less well-resourced than the C&I sector, developing projects to a point where they are ready for financing is a huge challenge and requires significant technical support. Thus, this sector requires substantial public investment and grant funding to build out the necessary supporting infrastructure, alongside a nuanced project financing strategy.

Furthermore, given the brutal utility cost burden on low income residents, it is critical that Green Bank-funded programs lower total energy/operating costs and tenant utility costs with high levels of confidence (e.g. guarantees). Solar is a key part of that solution, but care must also be taken to develop initiatives that support the holistic improvement of the building stock.

Comprehensive financing solutions that address deferred maintenance, health and safety, and energy improvements, including solar, all at the same time will be most beneficial.

Additional background on the low income housing market can be found in the December 12, 2014 Green Bank Board Market Analysis Memo.

CURRENT GREEN BANK SOLAR INITIATIVES FOR LOW INCOME RESIDENTS

While the Green Bank has a number of initiatives in place to support development of low income residential solar, they are clearly not sufficient to achieve the same solar penetration levels that moderate and affluent residents currently enjoy. Our strategy has been to target the easiest, most immediate opportunities first, understanding that we will need a sustained and focused effort over the long term to truly make progress in this difficult market segment. Below is a summary of current solar initiatives:

[2] The average low income household owes about $2360 more in annual energy bills than it can afford to pay - http://www.operationfuel.org/wp-content/uploads/Connecticut-2014-HEAG-Final.pdf

MULTIFAMILY PROGRAMS	
Solarize State Sponsored Housing Portfolio (SSHP)	CGB-CHFA partnership that targets state funded multifamily housing. Four CGB-qualified installers are currently working with upwards of 30 properties, representing some 1,200 affordable units across the state, to help them go solar.
Programs for Clean Energy Upgrades, Including Solar:	
CHIF LIME Loan	Unsecured loan funding low income, multifamily energy upgrades, including solar installations
Credit Enhancement RFP	For multifamily energy upgrades including solar
C-PACE for Multifamily	Funds solar and other energy upgrades
MacArthur Foundation	CGB has been approved for a $5M program related investment (PRI) to support the low income, multifamily sector.
OWNER OCCUPIED & SMALL INVESTOR-OWNED PROGRAMS	
Residential Solar Investment Program	Incentives for residential solar PV
Solarize CT	Municipal-led community outreach initiative targeting owner occupied homes. The following distressed communities have participated and, as a group, have seen higher penetration rates than the statewide low income penetration rates for solar: Bridgeport, Enfield, Montville, Torrington, West Haven, and Windham[3]
Housing Development Fund's Cozy Home Loan	Low income loan product for homeowners in Fairfield, Litchfield and New Haven counties, supports solar and energy upgrades and health and safety measures
Residential Solar Financing RFP	Releasing in December 2014, will allow CGB to solicit proposals focused on underserved solar markets including low income populations and credit-challenged consumers. Several potential respondents have shown eagerness to originate and finance solar projects among lower FICO customers, and one potential respondent includes a leasing company that is specifically focused on the low and moderate income market
INFRASTRUCTURE DEVELOPMENT INITIATIVES	
Solar Customer Market Segmentation Analysis	Developing messaging for key segments, including "Prudent Yankees" which skews towards lower income
Owner Technical Support/ One Stop Process	Building capacity through partner New Ecology, Inc.
CHFA-CGB Collaboration	MOU / demo program to inform programmatic approaches
DOH-CGB Collaboration	Strategic discussions for programmatic collaboration/ pilot
Interagency Collaboration	CHFA, DOH, HUD, CHIF, then DPH, DEEP, Utilities
National Engagement	With thought leaders and implementers to learn from others

[3] These 6 communities have seen a 27% higher penetration in the <60% AMI census tracts and a 21% higher penetration in the 80%-60% AMI census tracts than the state averages.

POTENTIAL FUTURE POLICIES AND INITIATIVES

In order to make significant progress on penetration of solar into low income communities, there are a range of new policies and initiatives that should be considered, in addition to the early stage activities already underway. These are outlined below and intended to spark a conversation as to potential future areas worthy of Green Bank focus and dedicated resources.

- **Potential New Legislative Policies Needed**
  - **SHREC** – establish a Solar Home Renewable Energy Credit (SHREC) - a sustainable source of revenues to meet the overall growing market demand is critical if the Green Bank wants to offer tiered incentives to low income residents
  - **Community (or shared) solar** with a low income carve-out
  - **Benchmarking** of energy usage for affordable multifamily buildings to establish best prospects for investment and **Energy Opportunity Assessments/ Audits** to define work scopes that will deliver highest return on investment
  - **Clean energy utility allowances** – establish a clean energy utility allowance that incents owners of properties with tenant paid utilities to invest in energy upgrades and achieve utility cost savings that will benefit both owners and tenants
  - **Sub-metering policy** – this is a medium-term goal, but one necessary to achieve true scale in this market given the prevalence of low income residents in rental properties with tenant paid utilities
  - **Community Reinvestment Act (CRA) advocacy** - National advocacy around expansion of CRA credits for low income and clean energy specifically – American Council for an Energy Efficient Economy ("ACEEE") is pursuing this. State advocacy and outreach to Banking Commissioner and Connecticut Bankers Association – would be ideal to have Banking Commissioner provide guidance to lenders signaling importance of investing in clean energy in CRA-eligible and distressed communities

- **Potential New Green Bank Policies**
  - Over the next year, explore setting a specific target for low income solar (e.g. install XX MW of solar by 20xx date for low income, etc.)
    - President Obama's call for 100 MW of solar on HUD properties has demonstrated setting targets can focus attention and catalyze activity
    - Regardless, SHREC and community solar policies **must** be in place to achieve any scale in the low income segment
  - Over the next year, modify Residential Solar Investment Program (RSIP) incentives to support low income
    - Current RSIP structure restricts incentives to owner-occupied residences; SHREC policy would have no such restriction and would support investor owned 1-4 unit residences
    - Explore feasibility of tiered incentives for low income; questions include how to operationalize, and when to implement (e.g. after we get SHREC, or at Step 7; perhaps keep low income at Step 5 when we move to Step 7)

- **Potential New Capacity Building Initiatives**

- Even with appropriate legislative and Green Bank policies in place, addressing the low income solar opportunity is primarily a DEMAND challenge. To that end, two key areas should be explored:
  - Develop a sustainably funded model for technical support/owner's agent services for the low income multifamily market, with a specific emphasis on 1-20 unit investor owned properties
  - Pilot targeted outreach models – since the majority of Connecticut's low income residents live in owner occupied single family homes and small multifamily rentals, innovative community-based outreach models will need to be developed, with a focus on partnering with social service and other agencies serving this demographic (e.g. Operation Fuel, housing and aging service agencies, municipal community development departments, etc.), drawing on our experience in the state with Solarize and the Neighbor to Neighbor Energy Challenge (and their work with local fuel banks), and work from around the country (including other neighborhood/block outreach models, employer-assisted models, municipal-led neighborhood revitalization initiatives)

- **Potential New Financing Products**
  - There are a variety of targeted financing products that would ultimately be needed to address the low income solar market, including financing structures for investor-owned 1-4 unit and small multifamily (5-20 units) properties, community solar, the HUD - CDBG Sec. 108 Loan Guaranty program for solar (for municipalities), an acquisition/rehab mortgage product that supports solar, a solar + storage warehouse facility for affordable multifamily (multi-state exploration going on now), and portfolio-based approaches for local lenders active in the affordable multifamily sector

STAFF PRIORITIZATION OF MARKET INITIATIVES

Although we have made inroads, we still have much to learn regarding how to address the low income sector and overcome penetration barriers. Over the next year, we plan to focus on our full plate of current initiatives and hone in on the most promising approaches, then work to scale them up in the following years. Below are our proposed sector priorities:

Initiative	Partner(s) / Approach	Description
1	DOH, CHFA Med-Large Rentals	• Engage with DOH CHAMP applicants on energy upgrades as part of broader capital improvement plans • Expand Solarize SSHP model for solar • Establish clean energy benchmarking / energy assessments/ standards / utility allowances for state funded housing to help drive demand and enable successful financing
2	Solar Financing Companies, via Residential Solar RFP	• Expect to partner with at least one fast-growing solar leasing company focused on low and moderate income customers with subordinated debt investment • Pursue strongest proposals addressing credit challenged and/or low income customer population

	Owner Occupied 1-4, Potentially Small-Med Rentals	
3	Targeted Community Campaigns, with Housing Development Fund, Solar Financing Companies Owner Occupied 1-4	• Promote Cozy Home Loan product with local mini campaigns (via agencies like Operation Fuel) focused on bundling solar with other upgrades (efficiency, health & safety) • Run Solarize-style campaigns in communities / neighborhoods, when new partners are identified via the Solar RFP • Test messaging for "Prudent Yankee" customer segment (applicable to owner-occupied single family market, ~ 30% of low income residents in the state).
4	HUD Med-Large Rentals	• Go beyond current EPC model (restricted to largest public housing authorities) to establish a model for self-performing energy performance contracts, rather than working with 3rd party ESCOs, allowing excess savings to be reinvested in the properties
5	DOH, Municipalities, CDCs/CBOs, Developers, and Local Lenders Naturally Occurring Small-Med Rentals	• Initial focus on this challenging market will be analysis and development of a strategic plan with key partners, including DOH, municipal community development offices, utilities, and lenders in this sector • Significant outreach, technical support and education are needed to support owners (and funders) in this market. Goal is to build on existing housing renovation and revitalization initiatives. Key partners will be municipal housing and community development departments, funded by federal HOME and CDBG dollars, as well as local CDCs and other community based organizations

CONCLUDING COMMENTS

The low income market for solar, and energy upgrades more generally, is extremely challenging. The Green Bank will need to be strategic, patient, and diligent, and commit to investing time and resources, if we hope to make a meaningful impact on the penetration of solar in low income communities in Connecticut. This segment will require a level of support traditionally not seen in our other Green Bank initiatives, including funding at a higher level (with lower leverage ratios); budgeting for programmatic and marketing initiatives; and dedicating other resources, including potentially additional staff or partnership support. Staff is ready, willing, and excited to develop a budget to support this work, based on Board of Director feedback and guidance.

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

Memo

To: Connecticut Green Bank Board of Directors

From: Kerry O'Neil, Director of Residential Programs; Kim Stevenson, Associate Director of Multifamily Programs

CC: Bryan Garcia, President and CEO; Bert Hunter, EVP and CIO; Mackey Dykes, VP and COO; Brian Farnen, General Counsel and CLO

Date: December 12, 2014

Re: Market Analysis of Residential Solar Deployment and Housing Characteristics of CT's Low Income Sector

Introduction

The purpose of this memo is to respond to the Connecticut Green Bank (Green Bank) Board of Director's August 2014 request for staff to detail solar deployment in Connecticut's low-income communities and discuss strategies to achieve greater adoption in this sector. This memo will address:

- The level of current residential solar deployment and market penetration in the low income segment
- Overview of customer segmentation market research for the solar customer
- Defining characteristics of Connecticut's low income housing market

Approach to Analysis

Green Bank staff worked with Connecticut Center for Economic Analysis at UCONN, http://ccea.uconn.edu, to perform analysis on current solar deployment and the low income housing market. For solar deployment, ***all*** residential solar deployment to date was included (e.g. projects from the Connecticut Clean Energy Fund (CCEF), going back to 2004, were included). Analysis was done across the state at the census tract level, where census tracts were grouped by Area Median Income (AMI):

- 60% of median income or below
    - Chosen since 60% of AMI or lower correlates quite closely to 150% of the federal poverty rate or lower, a cutoff used by many low income advocates
    - Annual average household median income of less than $45,826
- 60% - 80% of median income

    - Chosen since 80% of AMI or lower is used as the cutoff for eligibility of programs such as CEEF's Home Energy Solutions-Income Eligible program, the Cozy Home Loan, and others
    - Annual average household median income of $45,826 to $61,102
- 80% of median income or higher
    - Since the focus of the analysis is on low income residents, Green Bank and UCONN decided to group all others into this 3rd category
    - Annual average household median income of $61,102 or above

For the solar deployment analysis, the data was visualized in two ways at the census tract level: by number of projects and by kW installed. An additional visualization was done showing the concentration of residents at 150% poverty level for projects only.

Residential Solar Deployment in the Low Income Sector

Residential solar is predominantly deployed in moderate and higher income communities in Connecticut, as expected. Higher relative penetration rates are also seen in communities with strong Solarize campaigns. The Green Bank is making some inroads into lower income communities, but there is significant room for improvement. For example, as the Table 1 shows, current penetration of kW installed per capita in:

- Census tracts at < 60% of area median income (AMI) **is 1/10th** that of tracts at >80% AMI
- Census tracts at 60% to 80% of AMI **is 1/4th** that of tracts at >80% AMI

Table 1. Statewide Solar Deployment Summary by Income of Census Tract

Income Level	# of Census Tracts	Population	# of Projects	Projects per Capita	kW Installed	kW Installed per Capita
<60% AMI	179	651,267	257	.00039	1,422	.00218
60-80% AMI	113	518,459	473	.00091	2,950	.00569
>80% AMI	532	2,395,353	6,756	.00282	48,284	.02016
Total	824	3,565,079	7,486	.00210	52,656	.01477

However, the data also confirms that concentrated and targeted marketing and outreach campaigns can lead to higher than average solar penetration in low income communities. To date, six Solarize campaigns have been run in distressed communities: Bridgeport, Enfield,

Montville, Torrington, West Haven and Windham. When looking at the kW per capita in these communities compared to the statewide averages in Table 1 there is:

- 27% higher penetration in <60% AMI census tracts
- 21% higher penetration in 80%-60% AMI census tracts
- Across all census tracts in these 6 communities, the penetration was at 95% of the statewide penetration rate, *almost* at parity

The data clearly demonstrates that the challenge in front of us is significant – and we need to be strategic, patient, and diligent, and commit to investing the time and resources, if we hope to make a meaningful impact.

Despite the low overall penetration rates for low income, we were surprised and pleased to see such a broad dispersion of projects deployed geographically as Figure 1 shows, including in lower income census tracts, despite the fact that lower income households are very hard to reach and to date the Green Bank has not done a lot to target these households, except for a handful of Solarize campaigns in distressed communities. This speaks to the broad appeal of solar across income spectrums – especially as a tool to reduce/control energy costs.

Figure 2 shows the same project data but with census tracts coded at the % of the federal poverty level, again demonstrating some coverage of lower income communities and the potential appeal of solar for lower income populations. This map shows us in darker colors where low-income residents are concentrated – a better tool for us when thinking about targeting outreach.

Overall, 83% of census tracts have done at least 1 solar project and 70% have done at least 3 projects (see Table 2)

Table 2. Project Coverage in Census Tract Groupings

Percentage of Coverage, by Num of Projects, of CT's Census Tracts

	Entire State			
	Total^	>80%	80%-60%	60% (and below)*
Total num of census tracts in CT:	824	532	113	179
Num of census tracts with at least one project:	693	508	95	90
Percent of total:	84%	95%	84%	50%
Num of census tracts with at least three projects:	587	488	65	34
Percent of total:	71%	92%	58%	19%

*60% of median income is roughly equivalent to 150% of poverty level.

^In the maps there are 824 census tracts, which excludes 9 'special tracts' such as Yale campus, UConn, etc.

To date the Green Bank and its predecessor organization has invested $103.5 million in residential solar incentives. Solar installed in low income census tracts represents about 8% of the total installed to date, for an estimated investment of $8.6 million in solar incentives in low income tracts (see Table 3). Additionally, 2 C-PACE affordable multifamily solar projects have been financed for $400,000.

Table 3. Level of Solar Investment (2004-2014)

Income Level	% of kW Installed	Total Incentive Amount	Total System Cost
<80% AMI	8.3%	$ 8,589,306	$ 26,986,779
>80% AMI	91.7%	$ 94,859,571	$ 298,039,719
Total	108%	$ 103,448,877	$ 325,026,498

Estimate, based on incentives through 12/15/2014 and the pro rata share of total kW Installed in low income census tracts

See Appendix 1 for the UCONN team's memo on their insights on the solar deployment analysis, including a detailed table of data in Appendix C of their mem. Some additional maps for our three largest cities and their surrounding regions is also provided.

Figure 1

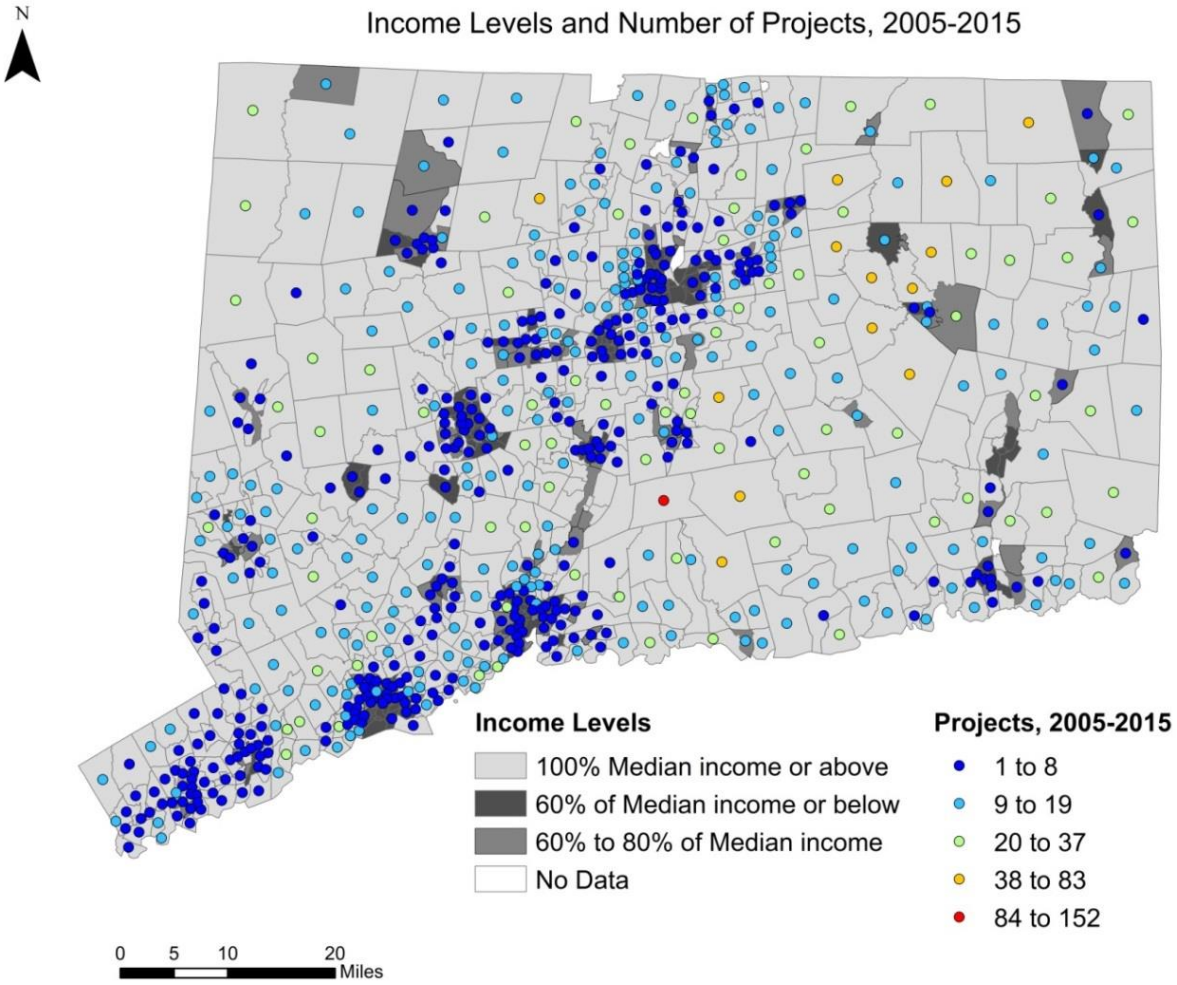
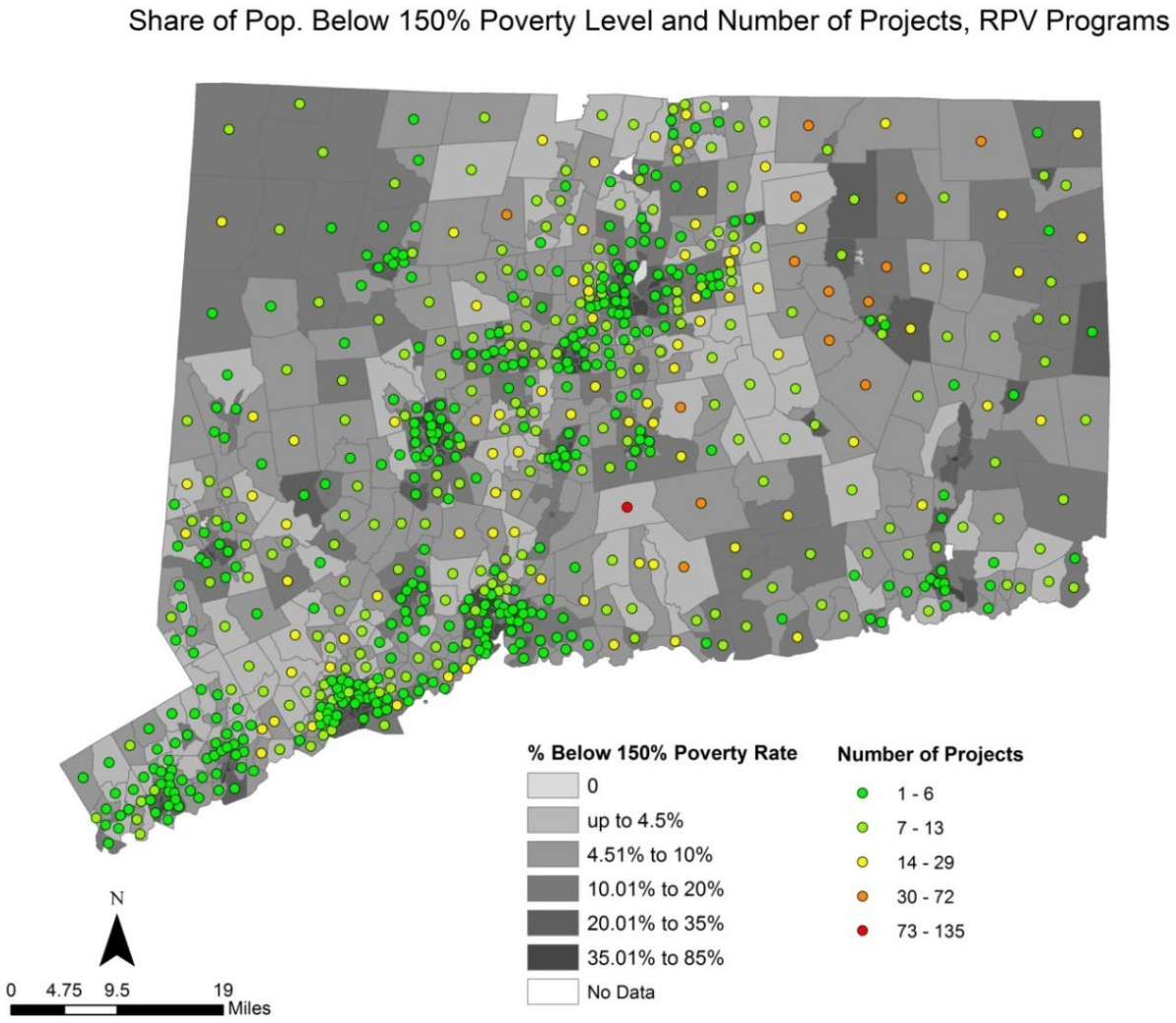

N
Income Levels and Number of Projects, 2005-2015
Income Levels
100% Median income or above
60% of Median income or below
60% to 80% of Median income
No Data
Projects, 2005-2015
1 to 8
9 to 19
20 to 37
38 to 83
84 to 152
0 5 10 20
Miles

Figure 2


Share of Pop. Below 150% Poverty Level and Number of Projects, RPV Programs
% Below 150% Poverty Rate
0
up to 4.5%
4.51% to 10%
10.01% to 20%
20.01% to 35%
35.01% to 85%
No Data
Number of Projects
1 - 6
7 - 13
14 - 29
30 - 72
73 - 135
N
0 4.75 9.5 19
Miles

Overview of Solar Customer Segmentation Research

Green Bank staff worked with our agency, Match Drive, to do a Nielsen customer market segmentation analysis of the current solar customer in CT. This segmentation analysis has revealed that going solar resonates with a wide range of income groups and customer profiles, including a customer segment unique to CT that skews older and lower in income. The identification of this specific customer segment is encouraging, as it will support targeted messaging and outreach to a subset of the low income market.

Our *current* customer base can be broken into 2 primary segments:

- **"Solar Homes"** – the mainstream solar customer in CT - affluent married couples, likely to have children in the home.
- **"Prudent Yankees"** – segment unique to CT, very different from Solar Homes – a smaller segment, likely not have a college degree, and older including retirees.

Nielsen identified an additional segment based on their national profile of solar customers. This profile represents customers that are going solar elsewhere, but don't seem to be going solar here in CT and is a new opportunity for state:

- **"Solar Prospects"** – represents an opportunity to test messaging & targeting. The "Solar Prospects" are middle-aged with an average income, likely to not have children in the home. They are also a higher percent Hispanic than the national average.

Table 4 summarizes the key characteristics of these three customer segments.

Table 4. Summary of Solar Customer Segments

Segment	% of Current Customers	Avg. Household Income	Avg. Age	College Education	% w/ Children in Home	% Employed Full Time	Potential CT Households
Solar Homes	70%	$148K	44	52% college+	54%	66%	483K
Prudent Yankees	10%	$48K	52	16% college+	48%	38%	83K
Solar Prospects	<10%	$79K	50	32% college+	27%	49%	250K

Visualizations of where customers in each segment live are provided in Appendix 2.

Defining Characteristics of CT's Low-Income Housing Market

Low income housing, defined as units with residents at 80% of area median income or below, represents about 507,000 units or 34% of CT's total housing units (see the Low Income Housing Stock Summary table in Appendix 3 for details). Properties with low income residents run the gamut from single family owner occupied homes, to small and large investor owned buildings. Our visualization analysis (Figure 3) shows a clear correlation between lower incomes and high concentrations of renters living in older buildings – predominantly in the core cities as well and scattered across the northeastern and northwestern quiet corners of the State.[1]

It is interesting to note the older housing is along the coast and river valleys, reflecting CT's industrial history. Older houses in the northwest likely relate to historic mansions for wealthy vacationers from Boston and New York City.

Connecticut's low income housing market generally falls into the following categories:

- Owner occupied housing (1 to 4 units)
- Naturally occurring affordable rental housing (investor owned small and large properties)
- State funded/subsidized affordable housing (public and privately owned)
- Federally funded/subsidized (HUD) properties

As Table 5 shows, the majority (nearly 70%) of CT's low income residents live in owner-occupied single family homes and small, investor owned multifamily rentals (2 to 19 units). Over half live in single family homes and 2-4 unit rentals. Most of these units fall within the "naturally occurring affordable" category, meaning they don't receive public subsidies. Collectively, this is the hardest of the hard to reach markets.

Table 5. Concentration of Housing Types for Low Income Households

Type of Housing	# of Low Income Households	% of Low Income Households
Single Family Owner-Occupied (SF OO) Homes	151,493	30%
2-4 Unit Rentals	130,684	26%
5-19 Unit Rentals	67,092	13%
Total SF 00 + 2-19 Unit Rentals	*349,269*	*69%*

[1] Partnership for Strong Communities also has some excellent state and community housing profiles: http://pschousing.org/news/2013-municipal-housing-data-profiles-now-available

Figure 3. Income Level, Share of Renters, Median Housing Age

Many of these small properties are concentrated in the urban core, but are also disbursed throughout suburban and rural communities (particularly elderly, owner occupied single family homes). They are characterized by significant **deferred maintenance needs** and **health and safety issues** (leaks, mold, lead, asbestos, etc.). Many investor-owned properties are operating on thin margins or at a loss; consequently owners have **limited capacity to take on additional debt** or other financial obligations. Further, many tenants in this sector pay their own utilities and have high utility cost burdens, often **making hard choices** between food, medicine and heat.[2] This utility payment structure also creates a disincentive for owners to invest in energy upgrades – the classic **split incentive issue**.

In general, larger properties (50 units and above) as well as State and HUD financed/subsidized properties are in better condition than the smaller, privately owned, non-subsidized properties[3]. This is due to stronger property management and maintenance budgets enabled by economies of scale, as well as building and other code requirements mandated by DOH, CHFA and HUD. This group typically has management and ownership structures better positioned to take advantage of CGB programs and are, therefore, a more immediate opportunity for solar and other energy upgrades. Further, many properties in this sector are master metered (meaning owners pay utilities), particularly for heat and hot water. For master metered properties, owners have a strong incentive to make energy upgrades that will result in utility and maintenance cost savings and solar can be a particularly attractive investment option.

However, across the board, housing in CT suffers from years of **deferred maintenance** as well as lack of public investment under prior administrations, now changing under Governor Malloy. Many owners in this market are **less sophisticated and much more stretched** (than the commercial and industrial market). Consequently, developing projects to a point where they are ready for financing is a huge challenge and requires significant technical support to owners. This sector will require substantial public investment and grant funding to build out the necessary supporting infrastructure.

Furthermore, given the brutal utility cost burden on low-income residents, it is also critical that Green Bank-funded programs lower total energy/operating costs and tenant utility costs with high levels of confidence (e.g. guarantees). While the opportunity to achieve deeper penetration of solar deployment in the low income sector is most certainly important, care must be taken to develop solutions that support the holistic improvement of the building stock. **Comprehensive financing solutions that address deferred maintenance, health and safety, and energy improvements, including solar, all at the same time will be most beneficial.**

[2] The average low income household in CT owes about $2360 more in annual energy bills than it can afford to pay – see http://www.operationfuel.org/wp-content/uploads/Connecticut-2012-HEAG-Final.pdf.

[3] Just over 50% of CT's low-income multifamily housing is naturally occurring affordable; just under 50% is subsidized affordable – CGB analysis.

See Appendix 3 for detailed maps highlighting the age of the housing stock, income levels within towns, and share of rentals.

Appendix 1

Memo from UCONN team to Green Bank staff and additional solar deployment maps.

SEMNIA LLC MEMORANDUM

TO: Mackey Dykes
FROM: Bill Waite & Marcello Graziano
SUBJECT: Mapping project thoughts and recommendations
DATE: October 31, 2014
CC: Lucy Charpentier, Kim Stevenson, Kerry E. O'Neill

The purpose of this memo is twofold: (1) summarize the work done to-date on the "CT Green Bank Mapping Project"; and (2) present additional information and recommendations regarding subsequent analysis.

Summary of Work Completed:

Thus far, Semnia has produced a series of maps illustrating various demographic characteristics of Connecticut and the adoption of solar power generation capabilities. Additionally, Semnia has provided analysis and commentary regarding the aforementioned maps. The following list is not comprehensive, but rather a summary of what we believe are the key take-aways from Semnia's analysis.

1) Adoption rates are quite high across the state – see Appendix A – but do drop off markedly as income levels decline (particularly below 60% of median income, which is approximately equivalent to 150% of the poverty level).
    a. The decrease in penetration rates is to be expected (due simply to economic and financial constraints; aka, financial barriers-to-adoption).
    b. The map in Appendix B provides another way in which data can be visualized/analyzed to identify areas that warrant special attention. They key to effectively utilizing identification strategies such as the one shown is determining where to set the different 'break-points' (such as 60% of median income, etc.). With even three variables in the mix, there are simply too many combinations and permutations to analyze each possible scenario.

2) The adoption of solar does tend to vary with the age of housing units across the state. As is the case in point 1, above, this is very much understandable. However, this finding does raise questions regarding causality; specifically: Why do individuals who live in older houses tend to not adopt as readily? There are several possible answers to this question, including structural concerns, the preferences of individuals who choose to live in older homes, etc. One potential explanation is that zoning/building regulations make installing solar systems difficult; that is, there is a regulatory barrier-to-entry. If this is the case, additional analysis seems warranted regarding how CT might mitigate this issue,

as well as the trade-offs between adoption of solar technologies and preservation of historical aesthetics.

3) While the issue was not analyzed in depth, it seems that CT Green Bank's outreach initiatives have been successful, with regard to higher adoption rates in areas where there was a targeted program as compared to those in which no such effort existed. The ability of CT Green Bank to effectively impact adoption is certainly positive, and suggests that the expansion of support for its programs would materially impact the adoption of solar across the state.

Additional Information:

Copies of the data tables not previously made available will accompany this memo in electronic form. The accompanying tables provide additional information regarding the breakdown of multifamily and owner- vs. renter-occupied residential properties. Select summary statistics regarding this data is presented in Appendix C.

Recommendations:

The following are recommendations for future action on the part of CT Green Bank (and, indirectly, municipalities and governing agencies across the state). As is the case with the key take-aways on Page 1 of this memo, the following is not an exhaustive list. Rather, these are the topics on which Semnia believes CT Green Bank should focus some of its efforts (above and beyond continuing to run the successful programs/initiatives it already has underway).

1) Regarding data: Support ongoing efforts to aggregate and integrate housing parcels data state-wide, and encourage Councils of Governments (COGs) that have not already begun such initiatives to do so. In CT, this data is kept at the town-level (within the Assessor's Office). There are some groups that are aggregating regional data – such as the South Central Regional Council of Governments, RiverCOG, etc. – but, in general, the data is still inconsistent, not available, etc. The issue with using Census data is that while it good/appropriate for studies/comparison at the aggregate level (comparisons between states, for instance), the information really isn't all that great for micro-analysis. Having integrated housing parcels data would allow for a much more rigorous, accurate analysis, and facilitate efforts to create targeted programs.

2) More in-depth study and analysis of:
   a. Split incentives (to target renters);[4]
   b. Regulatory barriers to adoption regarding multi-tenant properties, specifically metering/sub-metering;[5]
   c. Consumer behavior.[6]

[4] See: Gillingham, Kenneth; Harding, Matthew; Rapson, David. Split Incentives in Residential Energy Consumption, *The Energy Journal*; 2012; 33, 2.

[5] See: 2) Sara C. Bronin, Building-Related Renewable Energy and the Case of 360 State Street, *Vanderbilt Law Review*, Vol. 65, No. 6, 2012.

[6] See: http://www.washingtonpost.com/blogs/wonkblog/wp/2014/10/23/study-solar-energy-isnt-just-for-rich-liberals-any-more/

Appendix A

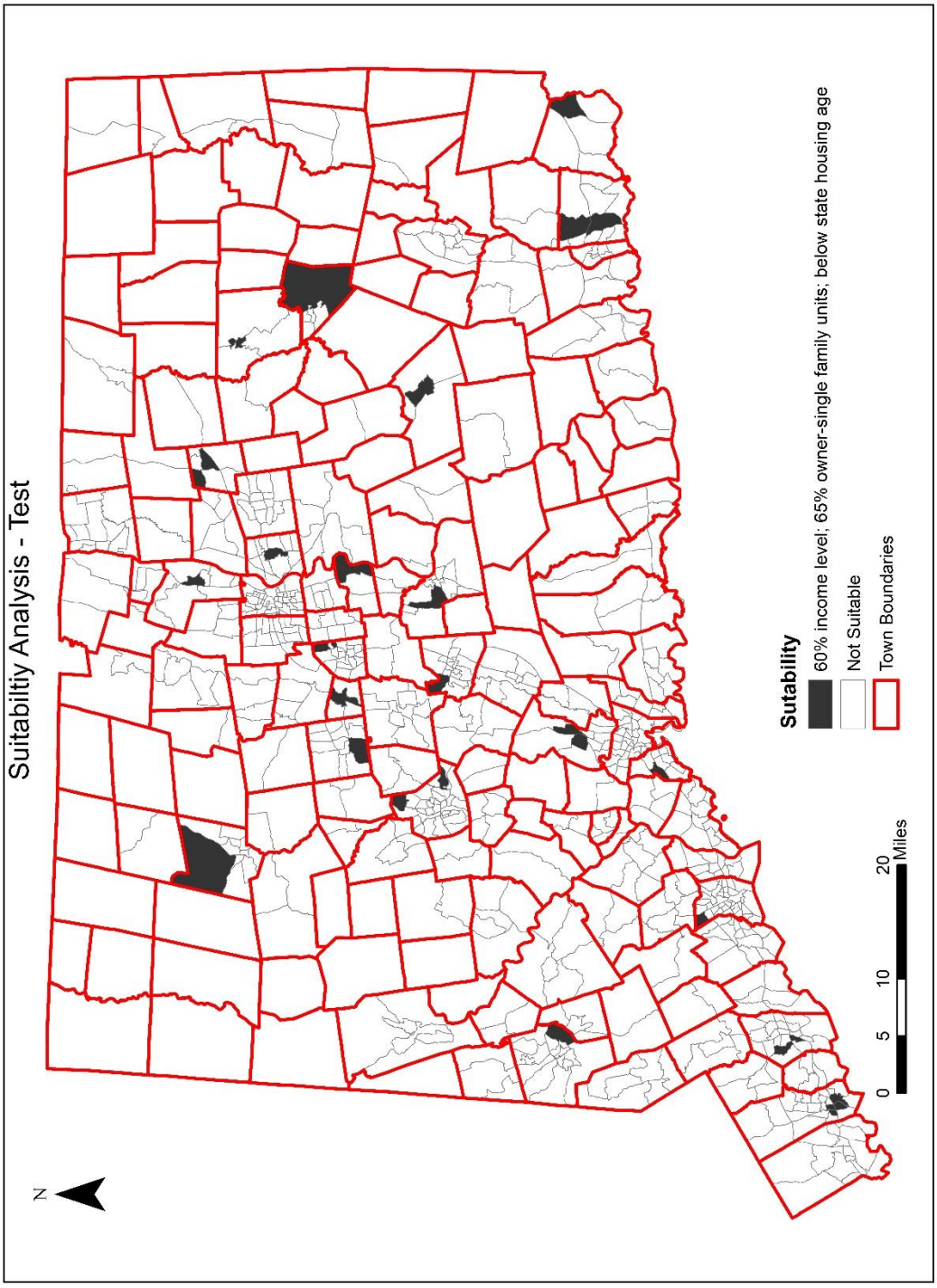
Percentage of Coverage, by Num of Projects, of CT's Census Tracts

	Entire State			
	Total^	>80%	80%-60%	60% (and below)*
Total num of census tracts in CT:	824	532	113	179
Num of census tracts with at least one project:	693	508	95	90
Percent of total:	84%	95%	84%	50%
Num of census tracts with at least three projects:	587	488	65	34
Percent of total:	71%	92%	58%	19%

*60% of median income is roughly equivalent to 150% of poverty level.

^In the maps there are 824 census tracts, which excludes 9 'special tracts' such as Yale campus, UConn, etc.

Appendix B


Suitabiltiy Analysis - Test
N
Sutability
60% income level; 65% owner-single family units; below state housing age
Not Suitable
Town Boundaries
0
5
10
20
Miles

Housing Characteristics Data, Segmented by Percent of Median Income

	Entire State				Solarize Cities/Towns (Bridgeport, Enfield, Montville, Torrington, West Haven, Windham)							
median household annual income** =	$76,377											
median household annual income	>$61,102	<$61,102 and >$45,826	<$45,826		>$61,102		<$61,102 and >$45,826		<$45,826			
					>80% Median		80%-60% Median		<60% Median		Totals	
	>80% Median	80%-60% Median	<60% Median	Totals	Number	Ratio or %	Number	Ratio or %	Number	Ratio or %	Number	Ratio or %
Number of Tracts	532	113	179	824	46	8.65%	21	18.58%	45	25.14%	112	13.59%
Number of Projects	6,756	473	257	7,486	780	11.55%	116	24.52%	79	30.74%	975	13.02%
Total Population	2,395,353	518,459	651,267	3,565,079	198,941	8.31%	106,140	20.47%	162,911	25.01%	467,992	13.13%
Total Housing Units	978,118	220,657	286,613	1,485,388	79,761	8.15%	44,678	20.25%	76,391	26.65%	200,830	13.52%
Total kW	48,284	2,950	1,422	52,656	5,354	11.09%	733	24.86%	451	31.72%	6,538	12.42%
Total kWh	53,572,123	3,251,784	1,570,765	58,394,672	6,007,161	11.21%	804,634	24.74%	508,210	32.35%	7,320,005	12.54%
Average Total % Owner Occupied^	81.9%	54.8%	30.6%		80.95%	0.99	63.82%	1.16	34.77%	1.14		
1 Unit	76.03%	43.43%	19.42%		76.24%	1.00	52.46%	1.21	20.97%	1.08		
2 Units	1.45%	4.24%	5.07%		1.55%	1.07	3.92%	0.92	6.44%	1.27		
3-4 Units	0.86%	1.75%	2.74%		0.76%	0.88	1.39%	0.79	2.89%	1.05		
5-9 Units	1.22%	1.77%	1.08%		0.62%	0.51	1.71%	0.97	1.72%	1.59		
10-19 Units	0.72%	1.33%	0.66%		0.41%	0.57	1.48%	1.12	0.90%	1.36		
20-49 Units	0.50%	0.82%	0.59%		0.47%	0.93	0.48%	0.58	0.75%	1.26		
50 of More Units	0.57%	0.75%	0.65%		0.21%	0.36	1.00%	1.33	0.97%	1.50		
Average Total % Renter Occupied^	18.1%	45.2%	69.4%		19.0%	1.05	36.2%	0.80	65.2%	0.94		
1 Unit	5.94%	7.32%	7.20%		6.46%	1.09	6.96%	0.95	8.64%	1.20		
2 Units	2.73%	8.95%	11.22%		2.92%	1.07	7.89%	0.88	12.65%	1.13		
3-4 Units	2.86%	10.74%	19.22%		3.60%	1.26	7.05%	0.66	17.98%	0.94		
5-9 Units	1.81%	5.24%	10.02%		1.91%	1.06	3.32%	0.63	7.21%	0.72		
10-19 Units	1.34%	3.66%	6.53%		1.45%	1.08	2.74%	0.75	6.08%	0.93		
20-49 Units	1.34%	4.07%	6.14%		1.23%	0.92	3.29%	0.81	5.78%	0.94		
50 of More Units	1.92%	5.04%	8.89%		1.20%	0.62	4.62%	0.92	6.80%	0.76		
kW per capita	0.02016	0.00569	0.00218	0.01477	0.02691	1.34	0.00691	1.21	0.00277	1.27	0.01397	0.95
kWh per capita	22.365	6.272	2.412	16.380	30.196	1.35	7.581	1.21	3.120	1.29	15.641	0.95
Projects per House	0.00691	0.00214	0.00090	0.00504	0.00978	1.42	0.00260	1.21	0.00103	1.15	0.00485	0.96
Projects per House Owned*	801,079	120,999	87,758		64,569		28,514		26,558			
Projects per House Rented*	177,039	99,658	198,855		15,192		16,164		49,833			

NOTES:

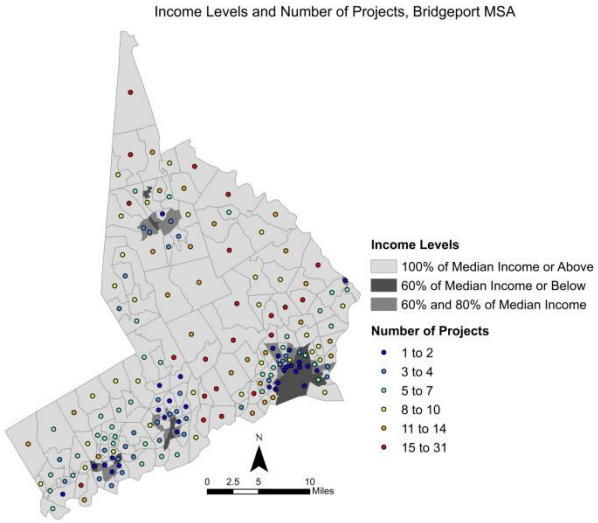
^Total averages calculated independently of break-outs; rounding error means that the sum of the broken-out numbers is slightly lower than the total averages.

*Estimate based on Average Percent of House Owned/Rented multiplied by Total Housing Units.

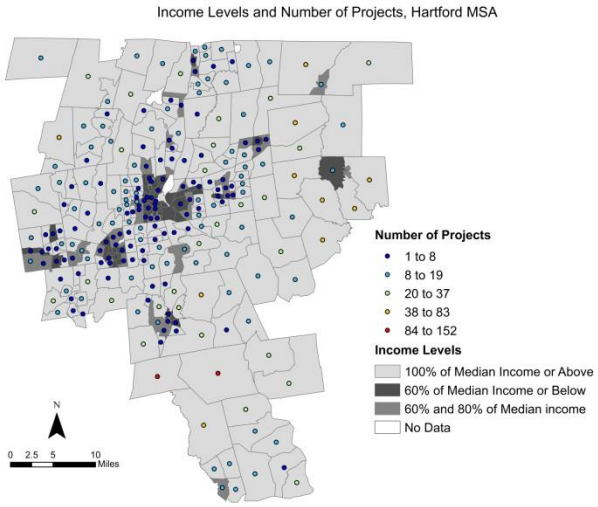
**Median annual household income for the state is $67,098, which is from the 2013 American Community Survey 1-Year Estimates; the median numbers used in this analysis are from the ACS 2008-2012 5-Year Average, with Data at Tract Level (the most recent figures available for every geography (tract and/or group level) in the state).

MSA Maps - Going down a level of detail in our 3 largest cities, this also shows that we have solar installs in many of our lower income census tracts

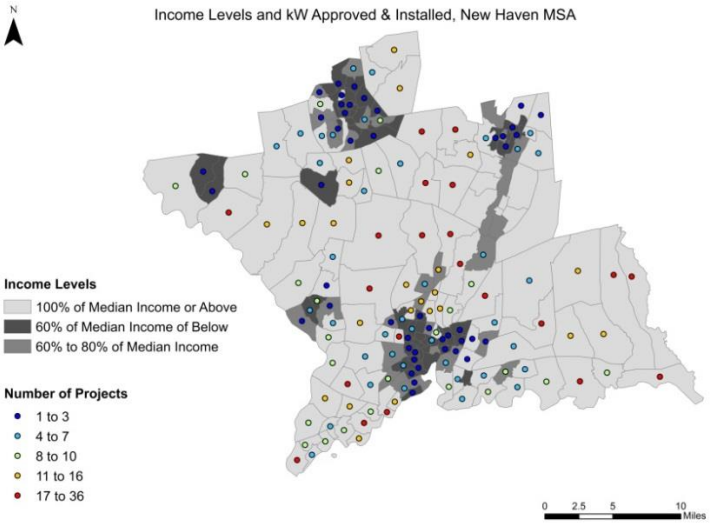
Bridgeport MSA



Hartford MSA



New Haven MSA (map mislabeled, it should read “Income Levels and Number of Projects, New Haven MSA”)


N
Income Levels and kW Approved & Installed, New Haven MSA
Income Levels
100% of Median Income or Above
60% of Median Income of Below
60% to 80% of Median Income
Number of Projects
1 to 3
4 to 7
8 to 10
11 to 16
17 to 36
0 2.5 5 10
Miles

Appendix 2 – Customer Segmentation Maps

Solar Homes - 482,972 households

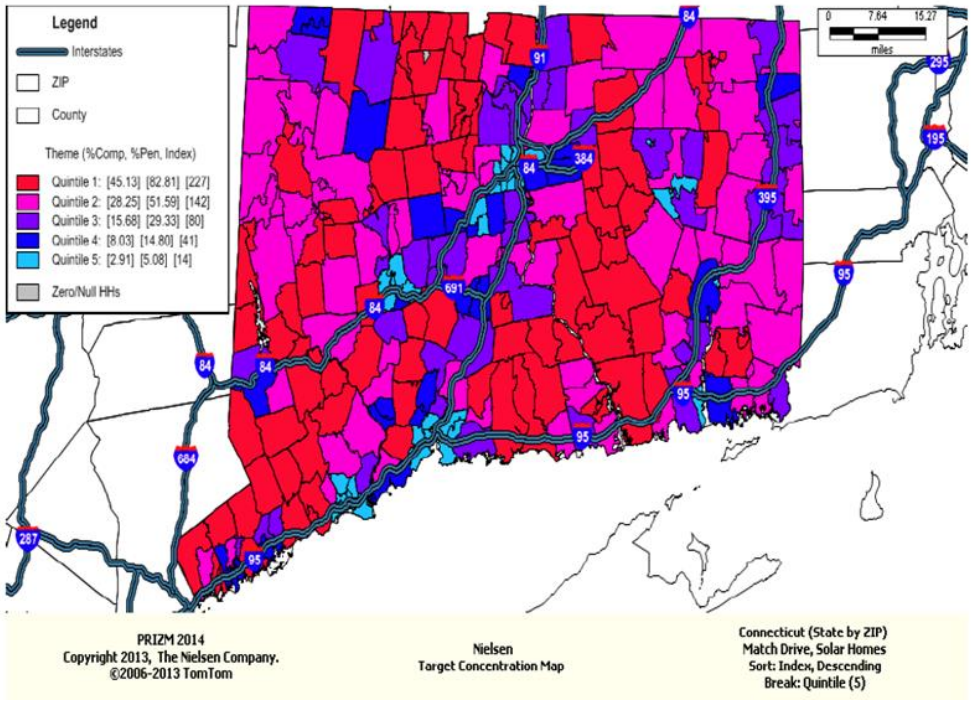
The "Solar Homes" are affluent married couples, likely to have children in the home.

Top Indexing Towns in CT

1. Stamford
2. Easton
3. Weston
4. West Simsbury
5. New Canaan
6. Marlborough
7. Cos Cob
8. South Glastonbury
9. Wilton
10. West Granby

Highest % Composition Towns in CT

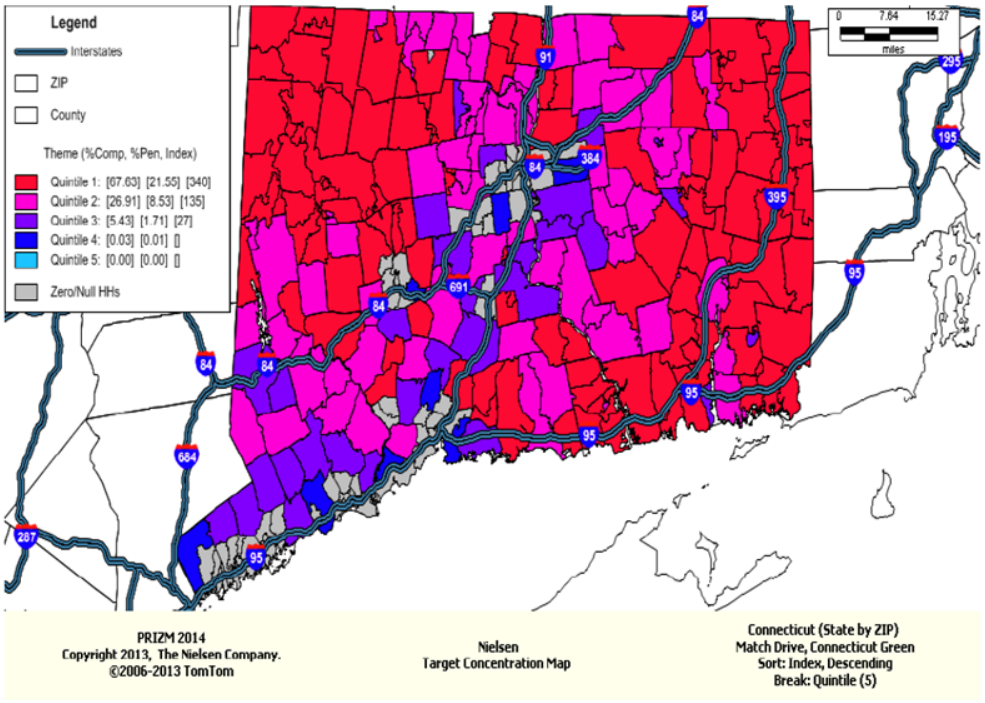
1. Westport
2. Fairfield
3. Cheshire
4. Ridgefield
5. New Canaan
6. Darien
7. Guilford
8. Durham
9. Wilton
10. Madison



Prudent Yankees – 82,857 households

The "Prudent Yankees" are lower income, older, and likely to not have a college degree.

Top Indexing Towns in CT	Highest % Composition Towns in CT
1. Falls Village	1. Southbury
2. Montville	2. Torrington
3. Dayville	3. North Haven
4. East Berlin	4. Mystic
5. Moosup	5. Winsted
6. Westbrook	6. South Windsor
7. Uncasville	7. Old Saybrook
8. South Windham	8. Guilford
9. Old Saybrook	9. Jewett City
10. Plymouth	10. Uncasville



Solar Prospects – 250,904 households

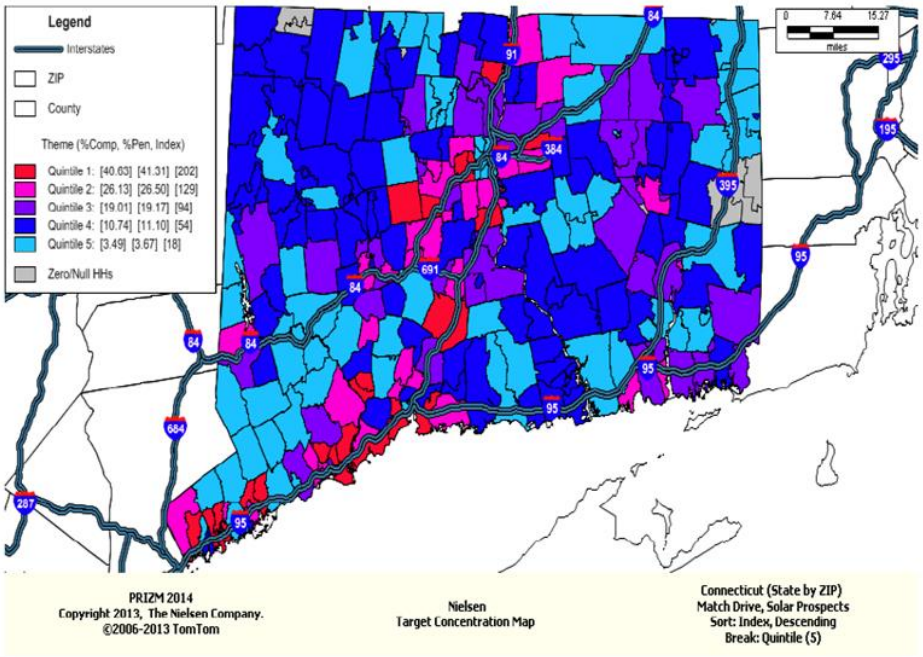
The "Solar Prospects" are middle-aged with an average income, likely to not have children in the home. They are also a higher percent Hispanic than the national average.

Top Indexing CT Towns

1. Stamford (06906)
2. Milford (06460)
3. Stamford (06901)
4. Windsor Locks (06096)
5. Bridgeport (06606)
6. Norwalk (06851)
7. West Hartford (06107)
8. Greenwich (06830)
9. Hartford (06103)
10. East Haven (06512)

Highest % Composition Towns in CT

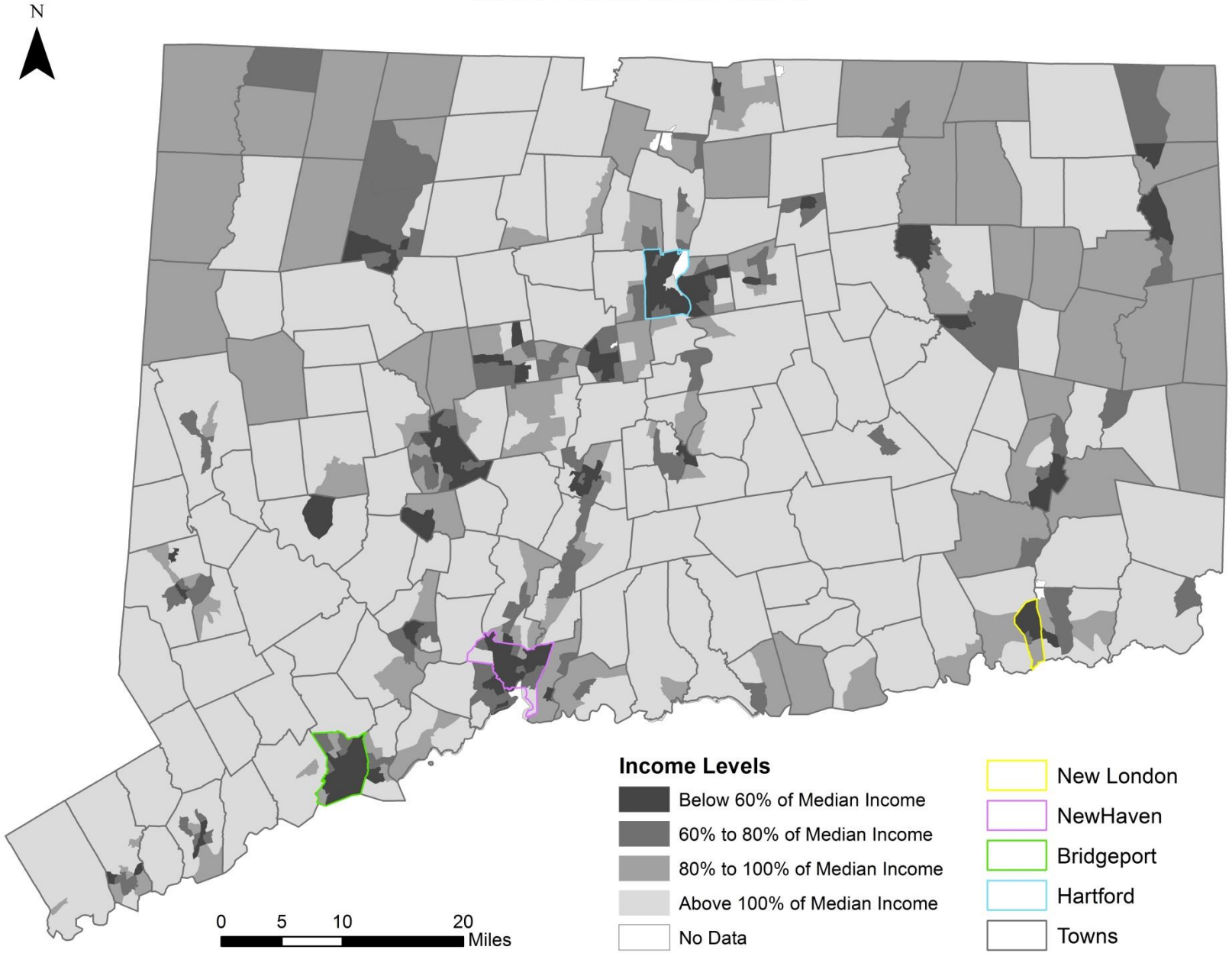
1. Milford (06460)
2. Bridgeport (0660
3. Stamford (06902)
4. Bristol (06010)
5. West Haven (06516)
6. East Haven (0651
7. Norwalk (06851)
8. Greenwich (0683
9. Stratford (06614)
10. Manchester (06042)



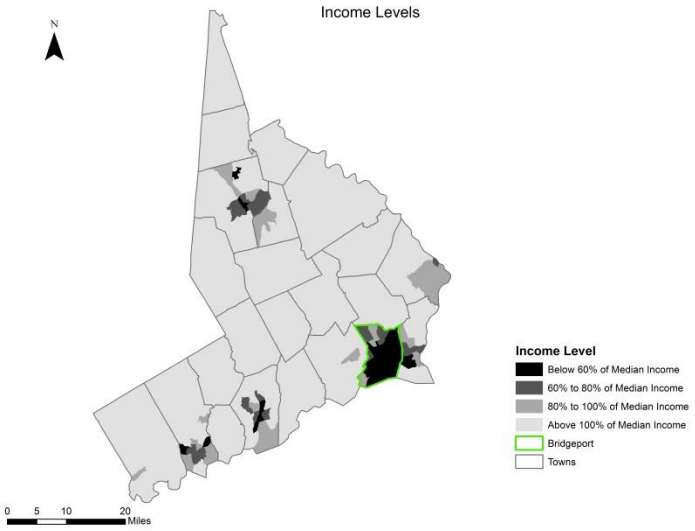
Appendix 3 – Low Income Housing Market Analysis and Maps

Low Income Housing Stock Summary - Look at <80% Totals						
	<60%	<60% # HHs	80%-60%	80%-60% # HHs	<80%	<80% # HHs
Total Population	18%	651,267	15%	518,459	33%	1,169,726
Total Housing Units	19%	286,613	15%	220,657	34%	507,270
In this table, %'s represent % of state totals						
	<60%	<60% # HHs	80%-60%	80%-60% # HHs	<80%	<80% # HHs
% OO	31%	87,758	55%	120,999	41%	208,758
Single Family	19%	55,660	43%	95,833	30%	151,493
2-4 Units	8%	22,384	6%	13,226	7%	35,610
5-19 Units	2%	4,996	3%	6,832	2%	11,828
20+ Units	1%	3,550	2%	3,477	1%	7,027
% Rental	69%	198,855	45%	99,658	59%	298,512
Single Family	7%	20,647	7%	16,149	7%	36,796
2-4 Units	30%	87,231	20%	43,453	26%	130,684
5-19 Units	17%	47,451	9%	19,641	13%	67,092
20+ Units	15%	43,080	9%	20,096	12%	63,176
In this table, %'s represent % of category totals						
Top Housing Categories by Units						
1	30%	Rental 2-4	43%	OO SF	30%	OO SF
2	19%	OO SF	20%	Rental 2-4	26%	Rental 2-4
3	17%	Rental 5-19	9%	Rental 20+	13%	Rental 5-19
4	15%	Rental 20+	9%	Rental 5-19	12%	Rental 20+
In this table, %'s represent % of category totals						
	<60%	<60% # HHs	80%-60%	80%-60% # HHs	<80%	<80% # HHs
# of OO SF + Rental 2-4 units:						
	50%	142,891	63%	139,286	56%	282,177
# of OO SF + Rental 2-20 units:						
	66%	190,343	72%	158,927	69%	349,269
In this table, %'s represent % of category totals						

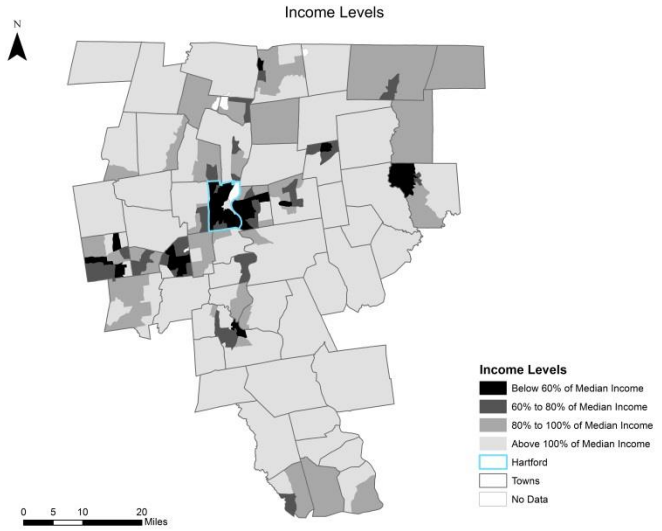
Income Levels within Towns



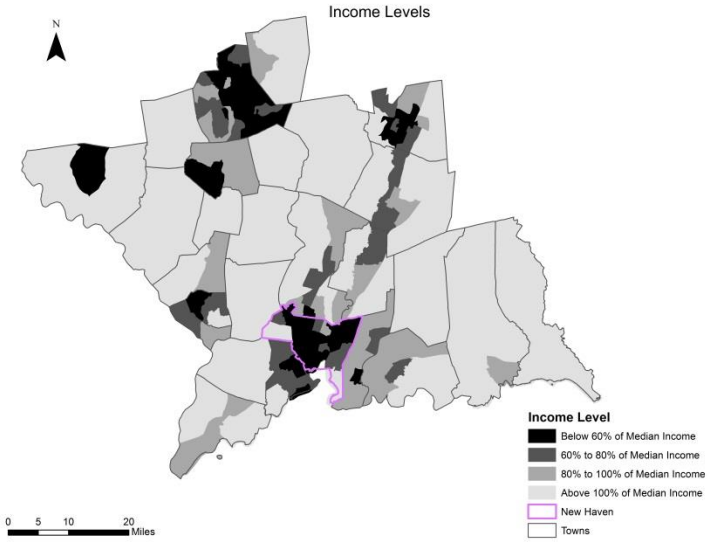
Bridgeport MSA

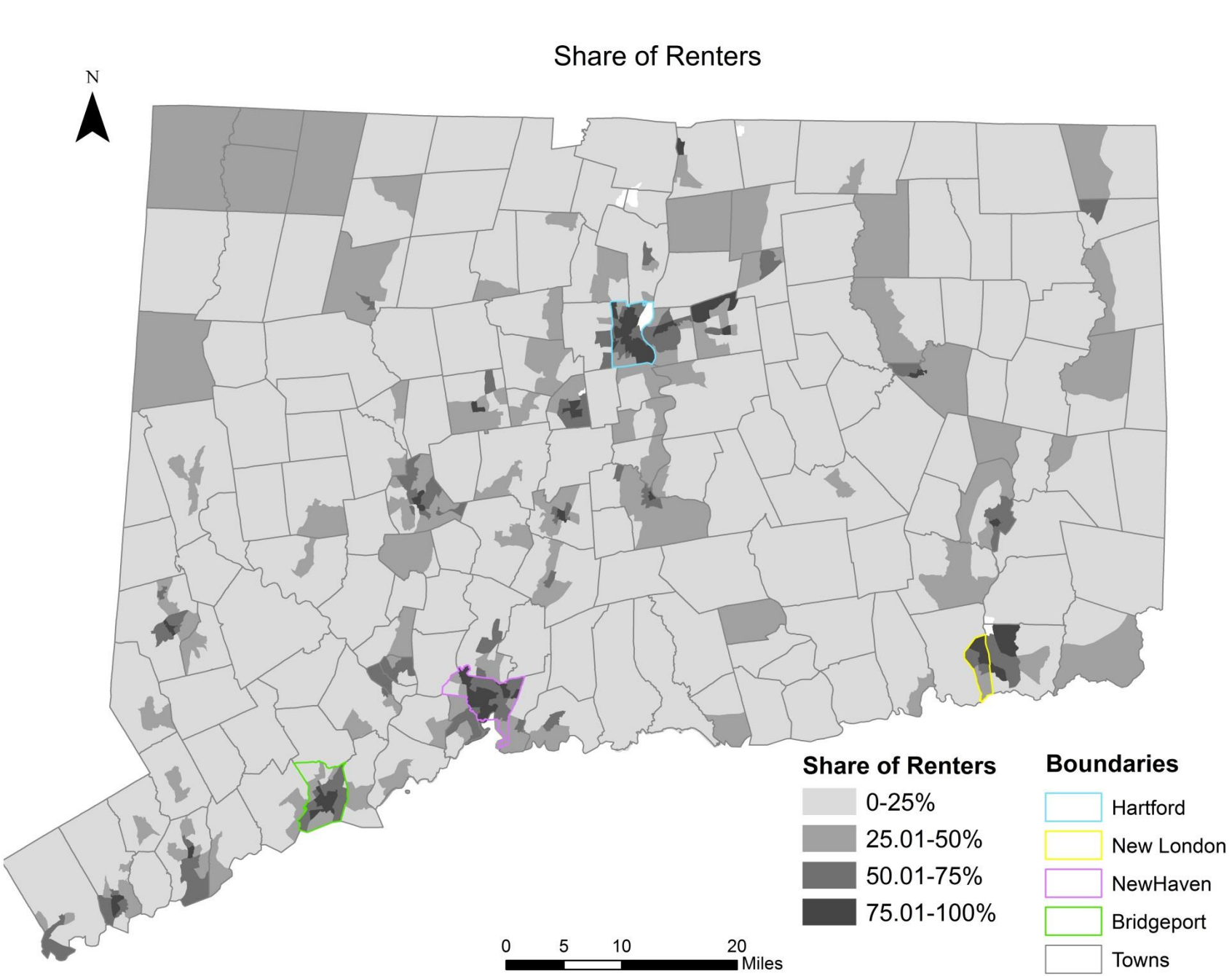


Hartford MSA

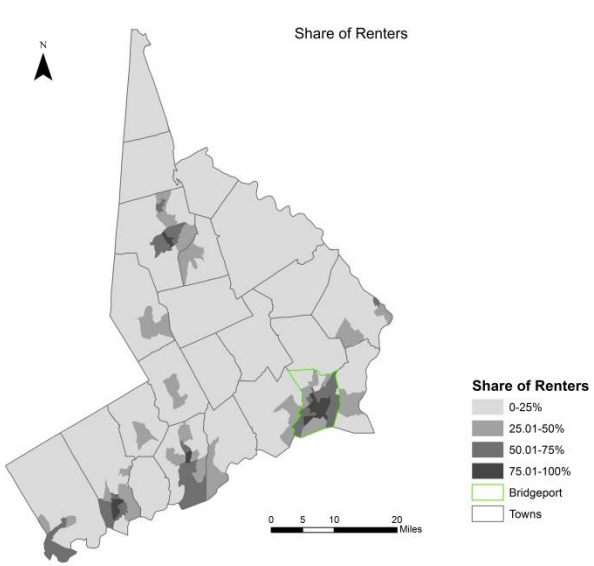


New Haven MSA

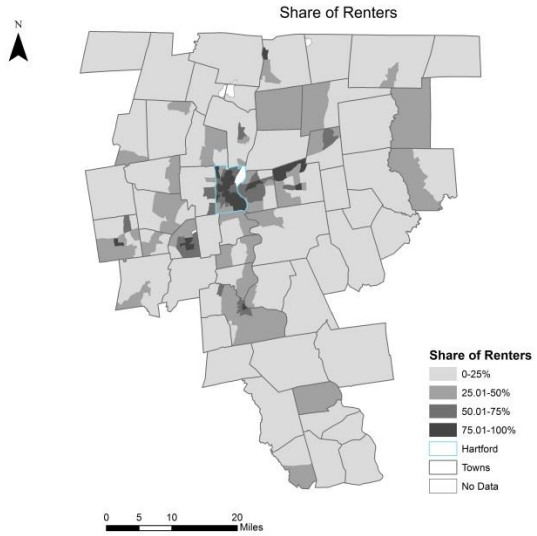


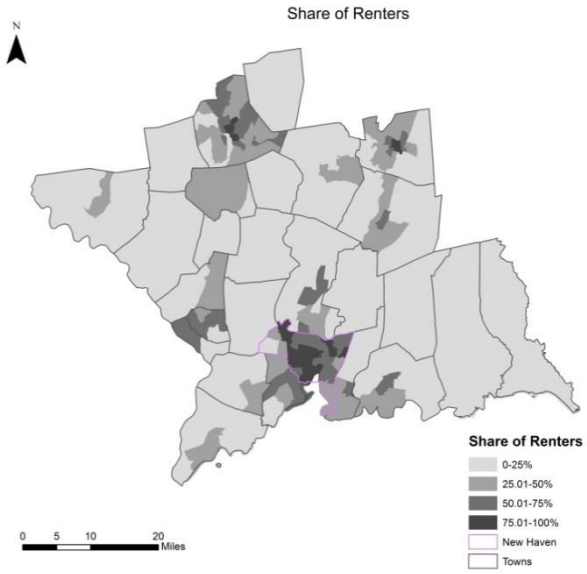

Share of Renters
N
Share of Renters
0-25%
25.01-50%
50.01-75%
75.01-100%
Boundaries
Hartford
New London
NewHaven
Bridgeport
Towns
0
5
10
20
Miles

Bridgeport MSA

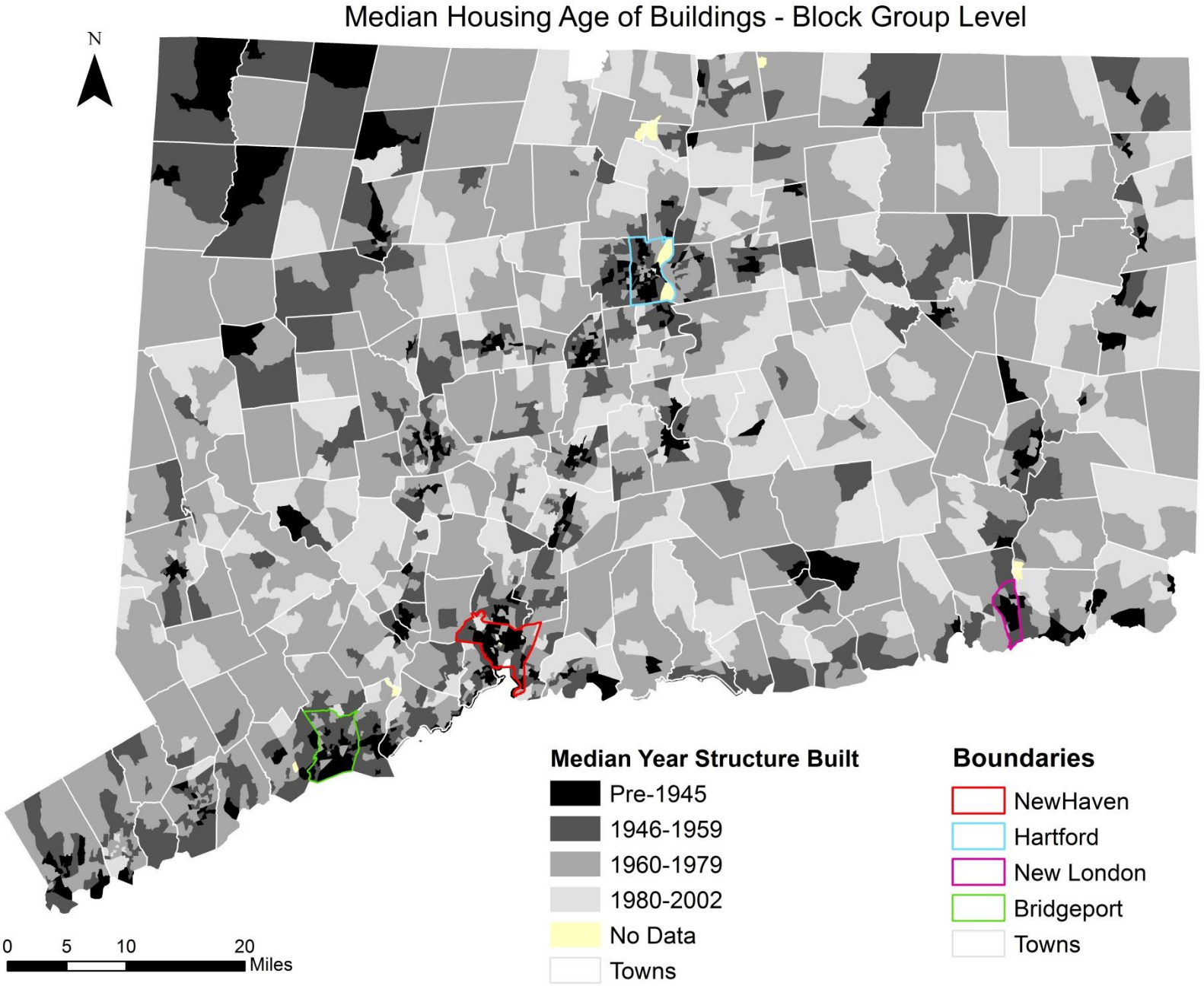


Hartford MSA

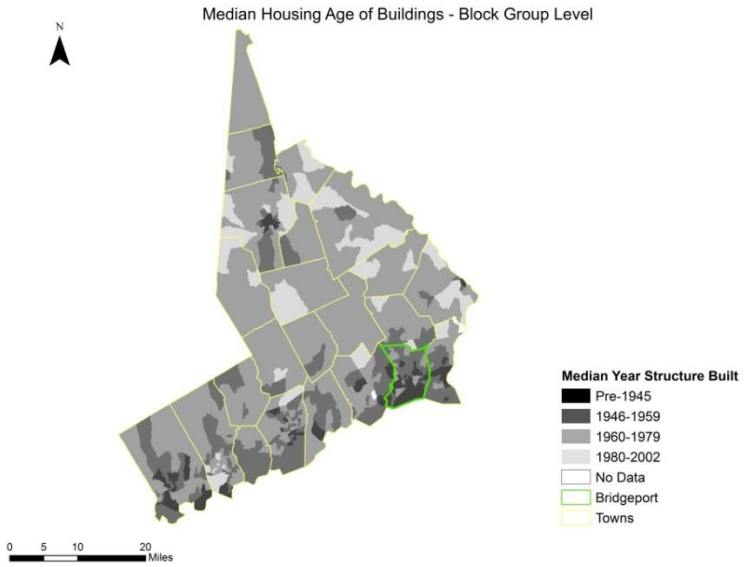




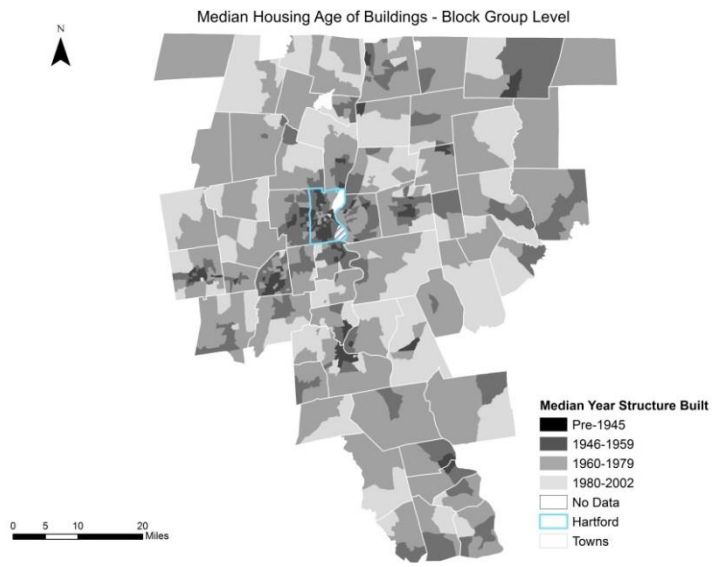
New Haven MSA


Median Housing Age of Buildings - Block Group Level
N
0 5 10 20
Miles
Median Year Structure Built
Pre-1945
1946-1959
1960-1979
1980-2002
No Data
Towns
Boundaries
NewHaven
Hartford
New London
Bridgeport
Towns

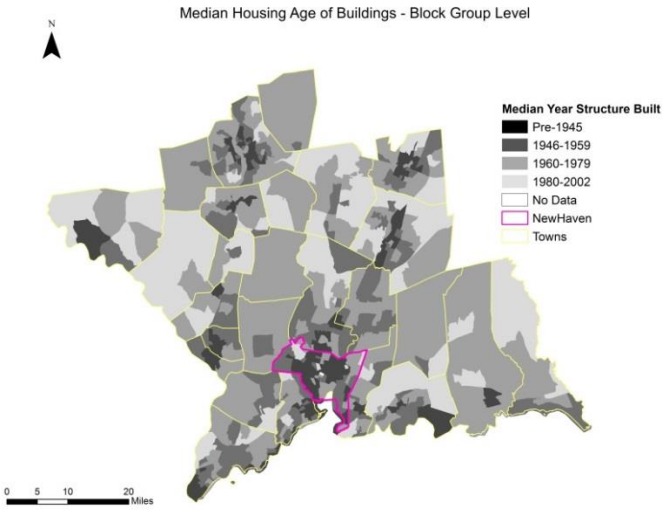
Bridgeport MSA



Hartford MSA



New Haven MSA



CLEAN ENERGY
FINANCE AND INVESTMENT AUTHORITY

845 Brook Street
Rocky Hill, Connecticut 06067

300 Main Street, 4th Floor
Stamford, Connecticut 06901

T: 860.563.0015
F: 860.563.4877
www.ctcleanenergy.com

Memo

To: Board of Directors of the Clean Energy Finance and Investment Authority

From: Dale Hedman (Director of Statutory and Infrastructure Programs)

Cc Bryan Garcia (President and CEO)

Date: December 16, 2014

Re: Residential Solar Investment Program – Step 6 and Step 7

The August 20, 2014 revised due diligence package for the Residential Solar Investment Program (RSIP), contains thorough background information and due diligence on the market and program. This memo should be considered an addendum to that package, which proposes a transition from the board-approved Step 5 to a request for approval of Step 6 and Step 7. **THOSE AREAS HIGHLIGHTED IN YELLOW ARE NEW INFORMATION ADDED TO THE MEMO SINCE THE NOVEMBER 25, 2014 MEMO DISTRIBUTED TO THE BOARD OF DIRECTORS FOR THE DECEMBER 2, 2014 MEETING.**

Background

On March 2, 2012, the Connecticut Green Bank launched the RSIP. Per Section 106 of Public Act 11-80 (now codified at Connecticut General Statute Sec. 16-245ff), the RSIP requires that a minimum of 30 MW of new residential solar PV be installed in Connecticut on or before December 31, 2022, at a reasonable payback to the customer all the while developing a sustainable market for contractors. The RSIP provides to residential customers, via solar PV contractors, direct financial incentives in the form of a home ownership performance based incentive ("HOPBI", and previously an expected performance-based buydown or "EPBB") and a performance-based incentive ("PBI") for the purchase and/or lease of qualifying PV systems respectively.

To date, through the RSIP, we have approved, in progress, and completed over 50 megawatts of projects while reducing the level of subsidies by nearly 60 percent through five steps – see Table 1.

Table 1. Installed Capacity by Step for Approved, In Progress, or Completed Projects (as of December 12, 2014)

RSIP Incentive Step	Approved (kW)	In Progress (kW)	Completed (kW)	Total (kW)	Average Incentive ($/W$_{STC}$)
Step 1	-	32	1,148	1,180	$1.78
Step 2	-	161	6,037	6,198	$1.64
Step 3	769	2,404	10,373	13,546	$1.23
Step 4	11,846	2,780	6,783	21,409	$1.04
Step 5	9,242	270	125	9,637	$0.75
Total	**21,857**	**5,636**	**24,477**	**51,971**	**$1.10**

The investment of nearly $230 million in residential solar PV in Connecticut through the RSIP, has created over 3,500 job-years (i.e., 1,350 direct and 2,174 indirect and induced) and will reduce nearly 640,000 tons of CO_2 emissions.

For Step 5 of the RSIP, a "race to the rooftop" target of 10 megawatts or by June 30, 2015, whichever comes sooner was established. We anticipate that 10 megawatts of approved projects for Step 5 will occur in December of 2014. To ensure an orderly, timely and less costly transition, we are proposing that on January 1, 2015 we transition from Step 5 to Step 6 of the RSIP.

Request

The staff proposes the following incentive for Step 6 and Step 7 of the RSIP:

- **Race to the Solar Rooftop** –The total capacity target for Step 6 is 10.0 MW and Step 7 is 10.0 MW – by June 30, 2015, whichever comes sooner.

- **Launch Date** – Step 6 would begin on January 1, 2015 and Step 7 would commence immediately upon 10 MW of approved projects reached in the "Race to the Rooftop" in Step 6.

- **Incentive Level** – we are proposing approximately a 20% reduction of Step 5 incentive levels to Step 6 incentive levels (i.e., $50 to $40 equivalent ZREC) and 25% reduction of Step 6 incentive levels to Step 7 incentive levels (i.e., $40 to $30 equivalent ZREC) – see Table 2.

Table 2. Declining Incentives through the RSIP

RSIP Incentive Step	HOPBI-EPBB ($/W)			PBI ($/kWh)	
	≤5 kW	5 to 10 kW	>10 kW	≤10 kW	>10 kW
Step 1	$2.450	$1.250	$0.000	$0.300	$0.000
Step 2	$2.275	$1.075	$0.000	$0.300	$0.000
Step 3	$1.750	$0.550	$0.000	$0.225	$0.000
Step 4	$1.250	$0.750	$0.000	$0.180	$0.000
Step 5	$0.800		$0.400	$0.125	$0.060
Step 6	$0.675		$0.400	$0.080	$0.060
Step 7	$0.540		$0.400	$0.064	$0.060

- **Customer Choice** – to understand the long-term implications of the RSIP, staff will explore the tax, marketing, and administrative implications of giving customers a choice for how they receive an incentive – upfront (i.e., HOPBI-EPBB), over time (i.e., PBI), at a future point in time (i.e., to the customer after the installation), and REC ownership in lieu of the RSIP. As the market for residential solar PV continues to grow, and the Green Bank transitions away from subsidies and towards financing, this assessment will inform our strategies in order to ensure that the resources of the Green Bank are being used responsibly.

Public Policy

For the 2015 legislative session, the Connecticut Green Bank is proposing the "Solar Homes and Jobs Opportunity Act," which seeks to develop a Solar Home Renewable Energy Credit (SHREC) program to continue the growth of the RSIP. The SHREC will be similar to the Low Emission Renewable Energy Credit (LREC) and Zero Emission Renewable Energy Credit (ZREC) Programs as it creates a fifteen year revenue stream from the sale of the SHRECs to the non-municipal utilities (i.e., CL&P and UI). The SHREC provides a cost effective mechanism to deploy clean energy in the state through an established price ceiling – the Alternative Compliance Payment (ACP) of the Renewable Portfolio Standard (RPS) of $55 – and a declining block schedule. The SHREC will support renewable projects, foster the sustained, orderly development of a state-based solar industry and create jobs all in Connecticut.

It should be noted, that as part of his campaign, Governor Malloy's energy infrastructure policies included:[1]

- **RSIP Expansion** – a 10-time expansion of the of the 30 MW target to 300 MW by 2020 through the use of long-term contracts for the non-municipal utilities to purchase renewable energy credits; and

- **Increased Capitalization** – increase in the capital to the Connecticut Green Bank through collaborations with the Treasurer's Office to issue "green bonds" to provide upfront capital to finance long-term green energy producing assets.

The staff of the Connecticut Green Bank has met with the following stakeholders on the act being proposed:

- **Industry Groups** – Solar Connecticut, Renewable Energy and Efficiency Business Association (REEBA), and the Connecticut Business and Industry Association (CBIA);

- **Government Organizations** – Department of Energy and Environmental Protection and Office of Consumer Counsel; and

- **Utilities** – Connecticut Light & Power and United Illuminating.

In the coming month, we are planning on meeting with environmental organizations (i.e., Acadia Center, Connecticut Fund for the Environment, Clean Water Action, Environment Connecticut, and the Sierra Club), financial institutions, and key leaders of the legislature.

[1] http://www.danmalloy2014.com/energy-and-environment/

It should be noted, that at Step 5, the RSIP subsidy is equivalent to a SHREC price of $50 – or 10% below the ACP of the Class I RPS. For Step 6, we are proposing an RSIP subsidy that is equivalent to a SHREC price of $40 – or about 30% below the ACP of the Class I RPS. And for Step 7, we are proposing an RSIP subsidy that is equivalent to a SHREC price of $30 – or about 45% below the ACP of the Class I RPS.

Cash Flow Implications

The RSIP has current and long-term cash flow implications as a result of when the performance incentive is paid-out – (1) upfront through the HOPBI-EPBB, and (2) over a six-year time period through the PBI. The following analysis is a breakdown of the cash flow implications of Steps 1 through 5 as well as the proposed Step 6 and Step 7 on the Connecticut Green Bank's resources (see Table 3).

Table 3. RSIP Cash Flow Analysis – Expenses

	Commitment	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Steps 1-5									
EPBB/HOPBI	$ 9,042,945.00	$ 7,543,673.00	$ 1,499,272.00						
PBI	$ 29,389,517.00	$ 3,835,006.50	$ 5,050,088.00	$ 5,050,088.00	$ 5,050,088.00	$ 5,025,619.00	$ 4,163,540.00	$ 1,215,087.50	
Step 6									
HOPBI	$ 2,025,000.00	$ 506,250.00	$ 1,518,750.00						
PBI	$ 4,661,680.00		$ 388,475.00	$ 776,946.00	$ 776,946.00	$ 776,946.00	$ 776,946.00	$ 776,946.00	$ 388,475.00
Step 7									
HOPBI	$ 1,620,000.00		$ 1,215,000.00	$ 405,000.00					
PBI	$ 3,729,344.00			$ 621,557.00	$ 621,557.00	$ 621,557.00	$ 621,557.00	$ 621,558.00	$ 621,558.00
		$ 11,884,929.50	**$ 9,671,585.00**	**$ 6,853,591.00**	**$ 6,448,591.00**	**$ 6,424,122.00**	**$ 5,562,043.00**	**$ 2,613,591.50**	**$ 1,010,033.00**

Section 106 of Public Act 11-80 allows the Green Bank to use up to one-third of the surcharge it receives through the Clean Energy Fund a year (i.e., approximately $9 million).Since the program began in fiscal year 2012, RSIP has not utilized the full one-third allocated to it. In FY 2015, we budgeted $14.4 million for the RSIP which takes into account a portion of the unused carryforward amounts from the past years. The analysis above shows that, with the proposed Step 6 and Step 7, the expected expenditures for the RSIP will be $1.5 million below the FY 2015 budget.

It is anticipated that REC revenues received over time, as a result of fixed pricing through long-term contracts proposed under the SHREC policy, and potentially the variable pricing through spot market transactions under the Class I RPS policy,[2] will offset the incentives offered under Step 6 and Step 7.

Business Plan

[2] It should be noted that forward Class I RPS REC prices for 2014 through 2016 are greater than $50. Also, the recent release of the Draft Integrated Resources Plan (IRP) by the Connecticut Department of Energy and Environmental Protection presumes shortages in supply to meet the Class I RPS demand through 2024 – meaning REC prices are anticipated to be near the Alternative Compliance Payment of $55.

In order to ensure the sustained and orderly deployment of the residential solar market in Connecticut beyond Step 6 and Step 7, an analysis is being done to show how the RSIP expenses are offset by the REC revenue received over time. The Green Bank staff is putting together several profit and loss statements that will be discussed at the Deployment Committee meeting.

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 the Connecticut Green Bank ("Green Bank") to design and implement a Residential Solar Photovoltaic ("PV") Investment Program ("Program") that results in a minimum of thirty (30) megawatts of new residential PV installation in Connecticut before December 31, 2022;

WHEREAS, as of December 12, 2014, the Program has thus far resulted in approximately fifty-two megawatts of new residential PV installation application approvals in Connecticut, and when complete and commissioned will achieve the minimum target of thirty megawatts established by Section 106 of Public Act 11-80;

WHEREAS, pursuant to Conn. Gen Stat. 16-245a, a renewable portfolio standard was established that requires that Connecticut Electric Suppliers and Electric Distribution Company Wholesale Suppliers obtain a minimum percentage of their retail load by using renewable energy.

WHEREAS, the Green Bank has been assigned by New England Power Pool Generation Information System an Identification Number NON36589 for the residential solar PV projects it supports through the Program, and subsequently the Public Utility Regulatory Authority assigned a Registration No. CT 00534-13 to the behind-the-meter facilities supported by the Program;

WHEREAS, real-time revenue quality meters are included as part of solar PV systems being installed through the Program that determine the amount of clean energy production from such systems as well as the associated renewable energy credits ("RECs") which, in accordance with Program guidelines, become the property of the Green Bank to hold, manage and sell in the Green Bank's sole discretion;

WHEREAS, the Green Bank Board of Directors (the "Board") approved Guidelines and Procedures for the Green Bank Management of Class I REC Asset Portfolio on December 11, 2013; and

WHEREAS, pursuant to Section 106 of the Act, the Green Bank has prepared a Program plan with a declining incentive block schedule ("Schedule") that offer direct financial incentives, in the form of homeowner performance-based incentives ("HOPBI") or performance-based incentives ("PBI"), for the purchase or lease of qualifying residential solar photovoltaic systems, respectively.

NOW, therefore be it:

RESOLVED, that Board approves of the Schedule of Incentives as set forth in Table 2 of the memo dated December 16, 2014 to achieve 20.0 MW of solar PV deployment – 10.0 MW from Step 6 and 10.0 from Step 7;

RESOLVED, that the Board hereby directs Green Bank staff to assess the tax, marketing, and administrative implications of (1) providing a performance incentive upfront (i.e., HOPBI-EPBB), (2) providing a performance incentive over time (i.e., PBI), (3) proving a performance incentive at a future point in time (i.e., all incentive goes directly to the homeowner as opposed to the contractor, and (4) transferring the REC to the homeowner in lieu of the RSIP by the end of the Fiscal Year 2015.

RESOLVED, that the Board hereby directs Green Bank staff to develop a proposal to address the sustainability of the Program in light of the growing market demand while increasing deployment of clean energy sources in Connecticut and minimizing the cost to the ratepayers by giving consideration to the aggregation and sale of RECs acquired through the Program.

Appendix A
Profit and Loss Statement
Business as Usual Case

Appendix B
Profit and Loss Statement
Governor's Proposal Case