

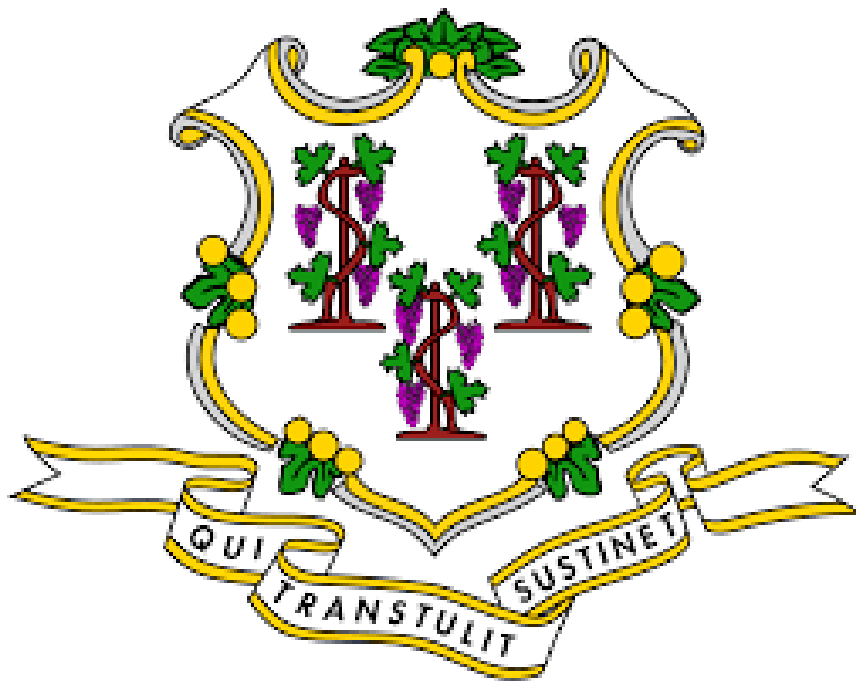


# Energy Storage Solutions

## Multifamily Peer to Peer Network

May 20, 2022





## PUBLIC UTILITIES REGULATORY AUTHORITY

**EVERSOURCE**

  
**CONNECTICUT  
GREEN BANK<sup>SM</sup>**

 **UI**  
An AVANGRID Company

# What is Battery Energy Storage?

## Small / Residential



## Large / Commercial



# What Can Battery Storage Power?

Nice to Have



Low Demand



High Demand



\*Assuming 1-2 battery units

Essentials

# What Can Battery Storage Power?

Device	Load (W)	Service from Battery
Refrigerator	400	33 hours 45 minutes
Central air conditioning	3300	4 hours 5 minutes
Central heating/Gas furnace blower fan	600	22 hours 30 minutes
Clothes washer	700	19 hours 17 minutes
Desktop computer with monitor	200	67 hours 30 minutes
EV - Level 1 Charging	1400	9 hours 39 minutes
Fans	100	135 hours 0 minutes
Chest Freezer	500	27 hours 0 minutes
Electric water heater	4500	3 hours 0 minutes
Internet	10	1350 hours 0 minutes
Laptop	100	135 hours 0 minutes
Incandescent Light Bulb	100	135 hours 0 minutes
Standard LED Light	10	1350 hours 0 minutes
Microwave	1300	10 hours 23 minutes

\*Assuming one 5 kW, 13.5 kWh battery system. Source: Guidehouse, 2021

# What Can Battery Storage Power?

Device	Load (W)	Service from Battery
Window AC	1400	9 hours 39 minutes
Cell phone charger	10	1350 hours 0 minutes
Electric Oven	1800	7 hours 30 minutes
Electric Stove	1800	7 hours 30 minutes
Sump pump	700	19 hours 17 minutes
TV, LCD	100	135 hours 0 minutes
Cable box	100	135 hours 0 minutes
Video game console	100	135 hours 0 minutes
Water pump	700	19 hours 17 minutes
Clothes dryer	3600	3 hours 45 minutes
Ductless minisplit	600	22 hours 30 minutes
Ground source heat pump	2900	4 hours 39 minutes
Heat pump water heater	4500	3 hours 0 minutes
Well pump	700	19 hours 17 minutes

\*Assuming one 5 kW, 13.5 kWh battery system. Source: Guidehouse, 2021

# Why Energy Storage for Your Building?

- 1. Resiliency**
- 2. Produce and consume your own energy with solar PV**
- 3. Reduce on-peak electricity charges\***
- 4. Get reimbursed for your capacity when you're not using it**

\*If you are on a time-of-use rate

# Energy Storage Solutions Benefits

1. **Cost-Effectiveness** – ensure there is net benefit to electric customers
2. **Resilience** – maximize the deployment of battery storage to improve the overall resilience of the participants and the grid
3. **Serve Vulnerable Communities** – deploy no less than 40 percent of residential installations in vulnerable communities
4. **Economic Development** - foster the sustained orderly development of a local battery storage industry

This program is overseen by the Public Utilities Regulatory Authority (PURA), is paid for by ratepayers, and is administered by the Green Bank, Eversource, and UI



# Energy Storage Solutions Overview

- 9-year declining incentives – Goal of 580 MW behind-the-meter storage for residential and non-residential end-use customers
- Statewide goal of 1000 MW, including front-of-the-meter

CUSTOMER CLASS	2022-2024	2025-2027	2028-2030	TOTAL
Residential	50 MW	100 MW	140 MW	290 MW
Commercial and Industrial	50 MW	100 MW	140 MW	290 MW
<b>Total</b>	<b>100 MW</b>	<b>200 MW</b>	<b>280 MW</b>	<b>580 MW</b>

Multifamily Housing

Multifamily Affordable Housing

# Program Design

- Customer Classes:
  - Residential customer classes: Standard, Underserved, and Low-Income Households
  - Commercial/industrial customer classes: Small, Medium, Large (based on demand)
- Systems installed through this program can receive two incentives:

Program Element	Design Item	Summer	Winter
<b>Upfront Incentive (Passive Dispatch)</b>	Events per Season	All non-holiday weekdays (~60)	N/A
	Months	June, July & August	N/A
	Event Duration	5 Hours	N/A
	Anticipated Dispatch Window	3 PM to 8 PM	N/A
<b>Performance-Based Incentive (Active Dispatch)</b>	Events per Season	30 to 60	1 to 5
	Months	June through September	November through March
	Event Duration	1 - 3 hours	1 - 3 hours
	Anticipated Dispatch Window	Noon to 9 PM (All Days)	Noon to 9 PM (All Days)

# Residential Upfront Incentive Levels

## Upfront Incentive Levels (Installed 2022-2024)

Capacity Block (MW)	Standard	Underserved	Low-Income	Weighted Average
<i>Participation Level</i>	60%	30%	10%	
10	\$200/kWh	\$300/kWh	\$400/kWh	
15	\$170/kWh	\$255/kWh	\$340/kWh	\$196.55/kWh
25	\$130/kWh	\$195/kWh	\$260/kWh	

## Performance Incentive Levels (Installed 2022-2024)

Summer, Years 1-5	Winter, Years 1-5	Summer, Years 6-10	Winter, Years 6-10
\$200/kW	\$25/kW	\$115/kW	\$15/kW

\*Residential capacity includes Affordable Multifamily Housing (definition TBD)

*Note: Total incentive values do not include federal ITC, which can be applied to solar PV + storage projects.*

# Commercial Incentive Levels

Upfront Incentive Levels (installed 2022-2024)			
Capacity Block (MW)	Small Commercial	Medium Commercial	Large Commercial
50	\$200/kWh	\$175/kWh	\$100/kWh

Performance Incentive Levels (installed 2022-2024)			
Summer, Years 1-5	Winter, Years 1-5	Summer, Years 6-10	Winter, Years 6-10
\$200/kW	\$25/kW	\$115/kW	\$15/kW

*Note: Total incentive values do not include federal ITC, which can be applied to solar PV + storage projects.*

# Affordable Multi Family Definition

- PA 21-48:

...A multifamily dwelling consisting of **five or more units**, provided in the case of a multifamily dwelling consisting of five or more units, (i) **not less than sixty percent of the units** of the multifamily dwelling are occupied by persons and families with income that **is not more than sixty per cent of the area median income** for the municipality in which it is located, as determined by the United States Department of Housing and Urban Development, **or** (ii) such multifamily dwelling is **determined to be affordable housing by PURA in consultation with the DEEP, DOH, CGB, CHFA and HUD.**

# Affordable Multi Family Definition

May 10 PURA Proposed Decision (RRES Program Review)

<http://www.dpuc.state.ct.us/dockcurr.nsf/All/1B265266342EBE1E8525883E004BE5B0?OpenDocument>

**Tier I.** Multifamily dwellings that participate in the Federal Low-Income Housing Tax Credit (LIHTC) Program or, if such properties contain a majority of households earning 80% or less of AMI as set by CT DOH.

**Tier II.** Multifamily building or complex with five+ units and 66%+ of the residents have a household income at or below 60% of SMI.

**Tier III.** Review process led by DEEP and CT DOH.

# Example Multi Family

Annual Average Demand (kW)	kW	kWh	Cost	Affordable MFH
100.0	130.0	232.0	\$ 225,000	No
Inverter to Demand Ratio	1.3	Small Tier	232.0	
kWh/kW Ratio	1.8	Medium Tier	-	
Customer Class	Small C&I	Large Tier	-	

Small C&I Battery System – 130 kW / 232 kWh	
Total Installed Cost	\$ 225,000
Upfront Incentive	\$ (46,400)
Net Out of Pocket Cost	<b>\$ 178,600</b>
10 Year PBI @ Participation Rate	\$ (112,907)

Performance-Based Incentive	Maximum DoD	100%		
	Participation	80%		
		Summer	Winter	Total
Year 1	\$ 12,373	\$ 1,547	\$ 13,920	
Year 2	\$ 12,373	\$ 1,547	\$ 13,920	
Year 3	\$ 12,373	\$ 1,547	\$ 13,920	
Year 4	\$ 12,373	\$ 1,547	\$ 13,920	
Year 5	\$ 12,373	\$ 1,547	\$ 13,920	
Year 6	\$ 7,733	\$ 928	\$ 8,661	
Year 7	\$ 7,733	\$ 928	\$ 8,661	
Year 8	\$ 7,733	\$ 928	\$ 8,661	
Year 9	\$ 7,733	\$ 928	\$ 8,661	
Year 10	\$ 7,733	\$ 928	\$ 8,661	

Nominal	\$ 112,907
3% Discount	\$ 97,966

Note: Total incentive values do not include federal ITC, which can be applied to solar PV + storage projects.

# Example Multi Family Affordable\*

Annual Average Demand (kW)	kW	kWh	Cost	Affordable MFH
100.0	130.0	232.0	\$ 225,000	Yes
Inverter to Demand Ratio	1.3	Small Tier	232.0	
kWh/kW Ratio	1.8	Medium Tier	-	
Customer Class	Small C&I	Large Tier	-	

Small C&I Battery System – 130 kW / 232 kWh	
Total Installed Cost	\$ 225,000
Upfront Incentive	\$ (69,600)
Net Out of Pocket Cost	<b>\$ 155,400</b>
10 Year PBI @ Participation Rate	\$ (112,907)

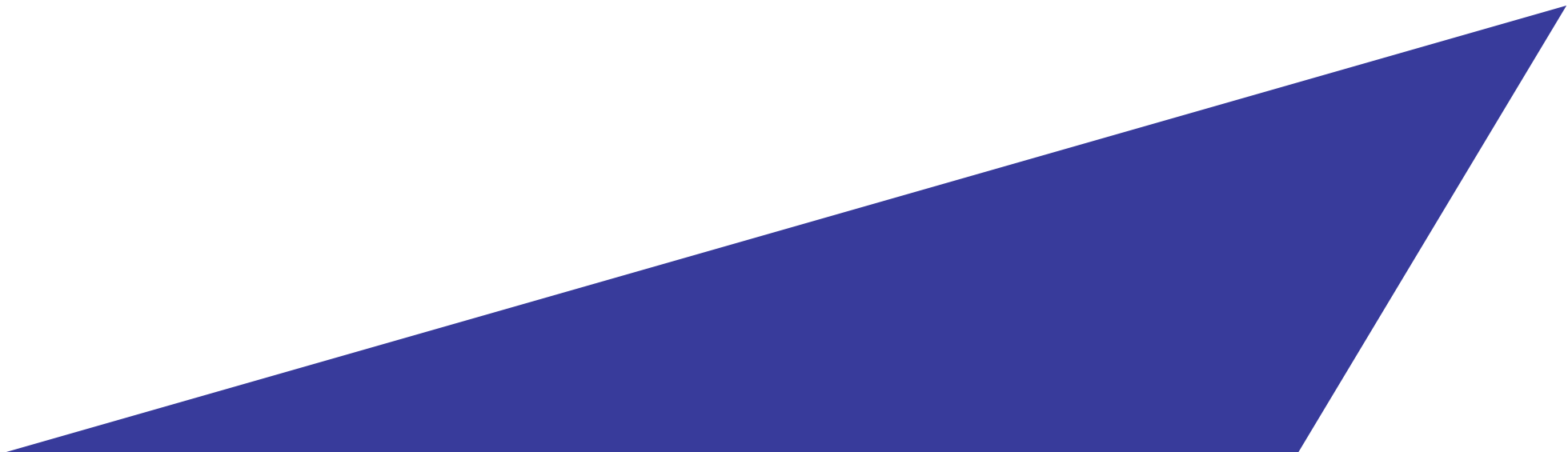
Performance-Based Incentive	Maximum DoD	100%	
	Participation	80%	
	Summer	Winter	Total
Year 1	\$ 12,373	\$ 1,547	\$ 13,920
Year 2	\$ 12,373	\$ 1,547	\$ 13,920
Year 3	\$ 12,373	\$ 1,547	\$ 13,920
Year 4	\$ 12,373	\$ 1,547	\$ 13,920
Year 5	\$ 12,373	\$ 1,547	\$ 13,920
Year 6	\$ 7,733	\$ 928	\$ 8,661
Year 7	\$ 7,733	\$ 928	\$ 8,661
Year 8	\$ 7,733	\$ 928	\$ 8,661
Year 9	\$ 7,733	\$ 928	\$ 8,661
Year 10	\$ 7,733	\$ 928	\$ 8,661

Nominal	\$ 112,907
3% Discount	\$ 97,966

Note: Total incentive values do not include federal ITC, which can be applied to solar PV + storage projects.



# How to Participate

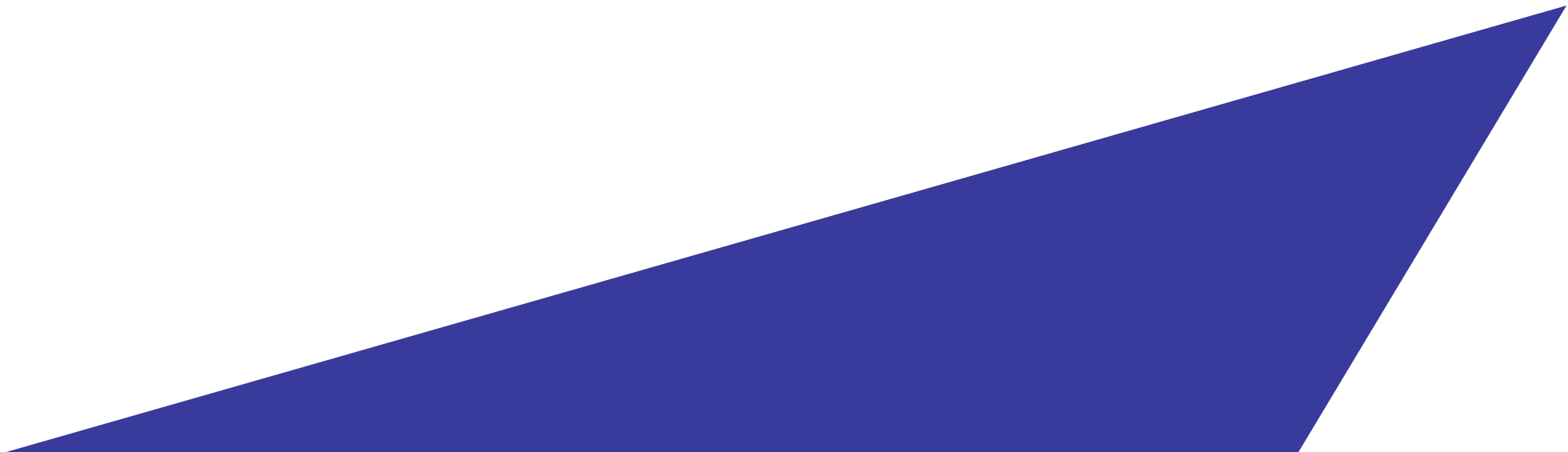


# energystorageCT.com

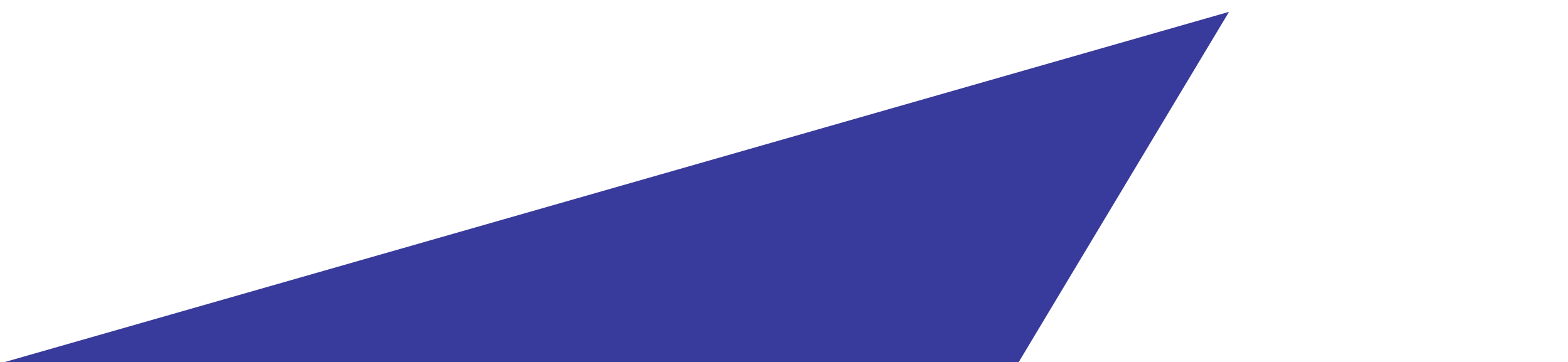
- Find an Eligible Contractor
- Get multiple quotes
- Check Eligible Equipment list
- Questions? Contact us:
  - [www.energystorageCT.com](http://www.energystorageCT.com)
  - [energystorage@ctgreenbank.com](mailto:energystorage@ctgreenbank.com)



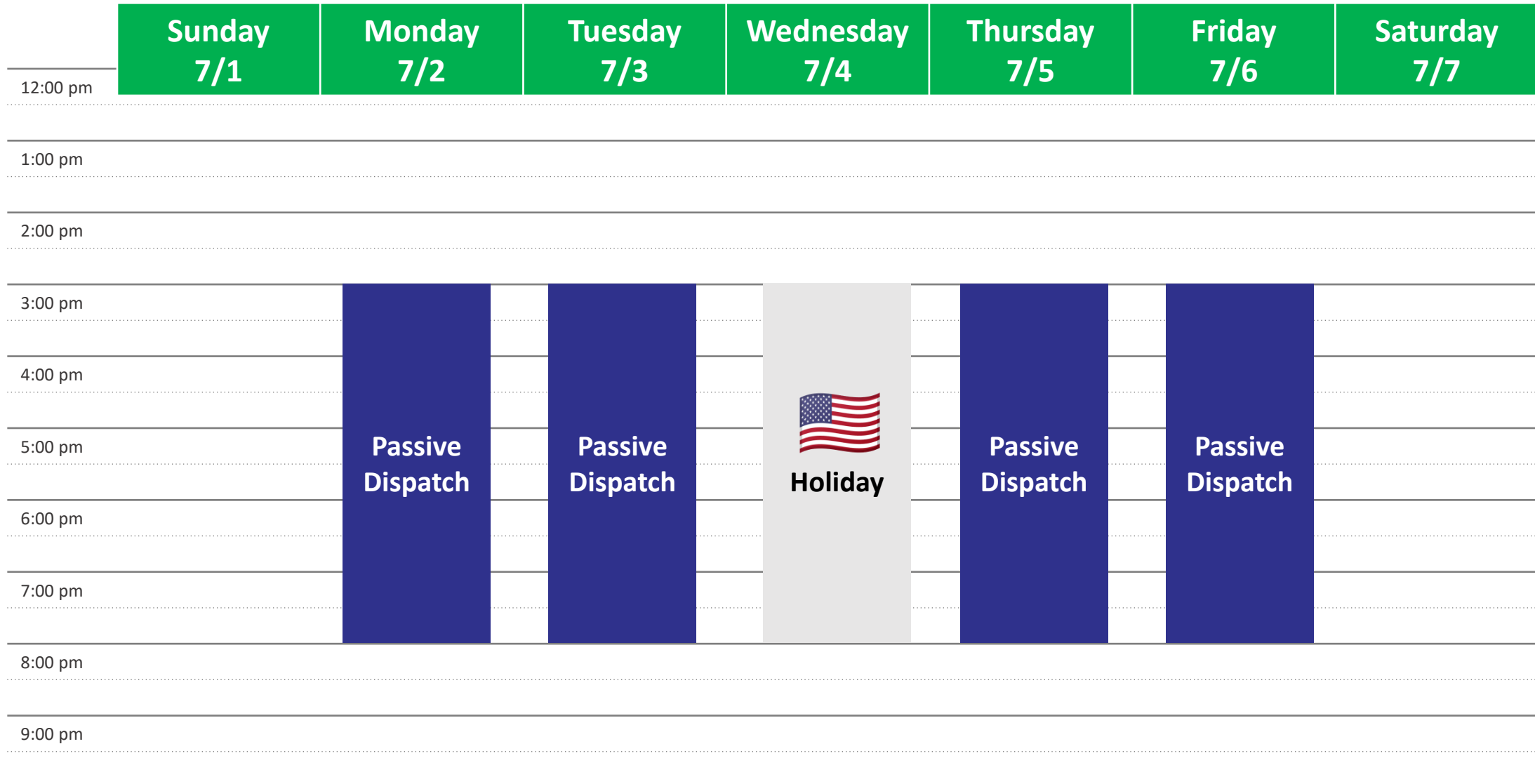
Questions?



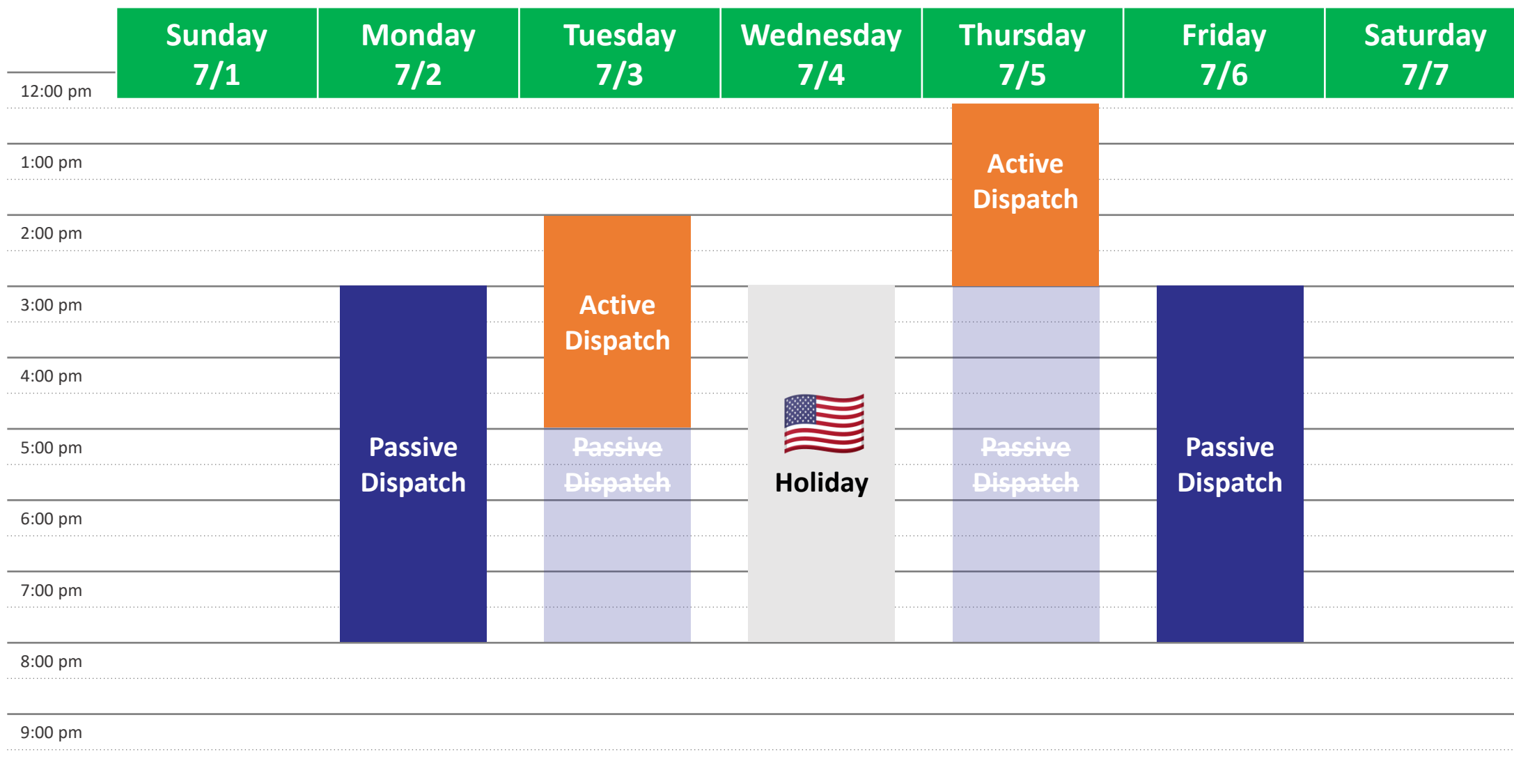
Appendix



# Passive Dispatch Example



# Passive and Active Dispatch Example



# Battery Storage vs Generator - Benefits

**Low upfront cost**

**Portable**



**Silent**

**No fuel or emissions**

**Store and use your solar PV energy**

**On standby**

**Incentives available**



**High output**

**Natural gas or propane**

**On standby**



# Battery Storage vs Generator - Drawbacks

**Buying and transporting fuel**



**Loud**

**High emissions**

**Requires maintenance**

**Not on standby**

**Upfront cost**

**Professional installation**

**Interconnection and permitting**

**Not portable**



**Higher lifetime cost**

**Professional installation with fuel**

**Permitting**

**Requires maintenance**

**Not portable**

