



August 3, 2018

Attn: Melissa Murphy-Rodrigues, Town Manager
Town of Sudbury
278 Old Sudbury Road
Sudbury, MA 01776

Dear Ms. Murphy-Rodrigues,

EDF Renewables Distributed Solutions, Inc. appreciates having had the opportunity to present the Melone Community Solar proposal to the Board of Selectman on July 30, 2018. We wanted to update our NPV calculations presented for our Melone Community Solar proposal to incorporate the value of the land staying under town ownership through the duration of the project life. In doing so, the town would realize appreciation to the value of the property over the 25-year term of the lease and have the ability to realize the value from selling the property following termination of the lease. Attached, please find a revised project NPV calculation reflective a property sale, assuming termination of the lease following year 25. The underlying assumptions to the property sale include a current property value of \$4.0 MM value (aligned with the Cavicchio purchase offer) and a modest annual property appreciation rate of 2%. Please note that the modification results in an increase of approximately **\$2.414 MM** to the 25-year project NPV, from \$6.824 MM to **\$9.238 MM**. This NPV is deemed conservative since appraisals of the property have exceeded the \$4.0MM property value we included in our calculation.

Thank you for this opportunity. Please treat the entirety of this proposal as confidential. Do not hesitate to contact me directly with any questions. Our team looks forward to working with the Town of Sudbury in developing and constructing this exciting project.

Sincerely,

A handwritten signature in black ink that reads "P. Bay".

Peter Bay
Project Developer
peter.bay@edf-re.com
802-272-6519

CORPORATE HEADQUARTERS
15445 Innovation Drive
San Diego, CA 92128
858.521.3300

COLUMBIA, MD
9175 Guilford Rd
Suite 202
Columbia, MD 21046
802.359.6516

MINNEAPOLIS, MN
10 Northeast Second St
Suite 400
Minneapolis, MN 55413
612.476.0700

RUTLAND, VT
67 Merchants Row
Rutland, VT 05701
802.295.4415

WEST LEBANON, NH
5 Commerce Ave
W Lebanon, NH 03784
802.295.4415

800.373.4494
info@edf-re.com
www.edf-re.com

Melone Gravel Pit Community Solar Project Benefit Analysis

Property Appreciation Value

2.00%

Generation	Year	Credit Value	Cost to Subscriber	Total Annual Value	Total Annual Cost	Annual Aggregate			Savings, Lease and PILOT Revenues		Property Value	Annual Appreciation	Appreciated Value at Sale	Total
						Energy Savings	Lease Revenues	PILOT Revenues	PILOT Totals	PILOT Totals				
7,228,000	1	\$ 0.10	\$ 0.09	\$ 722,800	\$ 650,520	\$ 72,280	\$ 292,000	\$ 84,480	\$ 84,480	\$ 448,760	\$ 4,000,000	\$ 4,000,000	\$ 448,760	
7,191,860	2	\$ 0.10	\$ 0.09	\$ 719,186	\$ 647,267	\$ 71,919	\$ 292,000	\$ 84,480	\$ 84,480	\$ 448,399	\$ 4,080,000	\$ 80,000	\$ 448,399	
7,155,901	3	\$ 0.10	\$ 0.09	\$ 715,590	\$ 644,031	\$ 71,559	\$ 292,000	\$ 84,480	\$ 84,480	\$ 448,039	\$ 4,161,600	\$ 81,600	\$ 448,039	
7,120,121	4	\$ 0.10	\$ 0.09	\$ 712,012	\$ 640,811	\$ 71,201	\$ 292,000	\$ 84,480	\$ 84,480	\$ 447,681	\$ 4,244,832	\$ 83,232	\$ 447,681	
7,084,521	5	\$ 0.10	\$ 0.09	\$ 708,452	\$ 637,607	\$ 70,845	\$ 292,000	\$ 84,480	\$ 84,480	\$ 447,325	\$ 4,329,729	\$ 84,897	\$ 447,325	
7,049,098	6	\$ 0.10	\$ 0.09	\$ 704,910	\$ 634,419	\$ 70,491	\$ 292,000	\$ 84,480	\$ 84,480	\$ 446,971	\$ 4,416,323	\$ 86,595	\$ 446,971	
7,013,852	7	\$ 0.10	\$ 0.09	\$ 701,385	\$ 631,247	\$ 70,139	\$ 292,000	\$ 84,480	\$ 84,480	\$ 446,619	\$ 4,504,650	\$ 88,326	\$ 446,619	
6,978,783	8	\$ 0.10	\$ 0.09	\$ 697,878	\$ 628,090	\$ 69,788	\$ 292,000	\$ 84,480	\$ 84,480	\$ 446,268	\$ 4,594,743	\$ 90,093	\$ 446,268	
6,943,889	9	\$ 0.10	\$ 0.09	\$ 694,389	\$ 624,950	\$ 69,439	\$ 292,000	\$ 84,480	\$ 84,480	\$ 445,919	\$ 4,686,638	\$ 91,895	\$ 445,919	
6,909,170	10	\$ 0.10	\$ 0.09	\$ 690,917	\$ 621,825	\$ 69,092	\$ 292,000	\$ 84,480	\$ 84,480	\$ 445,572	\$ 4,780,370	\$ 93,733	\$ 445,572	
6,874,624	11	\$ 0.10	\$ 0.09	\$ 687,462	\$ 618,716	\$ 68,746	\$ 292,000	\$ 84,480	\$ 84,480	\$ 445,226	\$ 4,875,978	\$ 95,607	\$ 445,226	
6,840,251	12	\$ 0.10	\$ 0.09	\$ 684,025	\$ 615,623	\$ 68,403	\$ 292,000	\$ 84,480	\$ 84,480	\$ 444,883	\$ 4,973,497	\$ 97,520	\$ 444,883	
6,806,050	13	\$ 0.10	\$ 0.09	\$ 680,605	\$ 612,544	\$ 68,060	\$ 292,000	\$ 84,480	\$ 84,480	\$ 444,540	\$ 5,072,967	\$ 99,470	\$ 444,540	
6,772,019	14	\$ 0.10	\$ 0.09	\$ 677,202	\$ 609,482	\$ 67,720	\$ 292,000	\$ 84,480	\$ 84,480	\$ 444,200	\$ 5,174,427	\$ 101,459	\$ 444,200	
6,738,159	15	\$ 0.10	\$ 0.09	\$ 673,816	\$ 606,434	\$ 67,382	\$ 292,000	\$ 84,480	\$ 84,480	\$ 443,862	\$ 5,277,915	\$ 103,489	\$ 443,862	
6,704,469	16	\$ 0.10	\$ 0.09	\$ 670,447	\$ 603,402	\$ 67,045	\$ 292,000	\$ 84,480	\$ 84,480	\$ 443,525	\$ 5,383,473	\$ 105,558	\$ 443,525	
6,670,946	17	\$ 0.10	\$ 0.09	\$ 667,095	\$ 600,385	\$ 66,709	\$ 292,000	\$ 84,480	\$ 84,480	\$ 443,189	\$ 5,491,143	\$ 107,669	\$ 443,189	
6,637,591	18	\$ 0.10	\$ 0.09	\$ 663,759	\$ 597,383	\$ 66,376	\$ 292,000	\$ 84,480	\$ 84,480	\$ 442,856	\$ 5,600,966	\$ 109,823	\$ 442,856	
6,604,403	19	\$ 0.10	\$ 0.09	\$ 660,440	\$ 594,396	\$ 66,044	\$ 292,000	\$ 84,480	\$ 84,480	\$ 442,524	\$ 5,712,985	\$ 112,019	\$ 442,524	
6,571,381	20	\$ 0.10	\$ 0.09	\$ 657,138	\$ 591,424	\$ 65,714	\$ 292,000	\$ 84,480	\$ 84,480	\$ 442,194	\$ 5,827,245	\$ 114,260	\$ 442,194	
6,538,525	21						\$ 292,000	\$ 84,480	\$ 84,480	\$ 376,480	\$ 5,943,790	\$ 116,545	\$ 376,480	
6,505,832	22						\$ 292,000	\$ 84,480	\$ 84,480	\$ 376,480	\$ 6,062,665	\$ 118,876	\$ 376,480	
6,473,303	23						\$ 292,000	\$ 84,480	\$ 84,480	\$ 376,480	\$ 6,183,919	\$ 121,253	\$ 376,480	
6,440,936	24						\$ 292,000	\$ 84,480	\$ 84,480	\$ 376,480	\$ 6,307,597	\$ 123,678	\$ 376,480	
6,408,732	25						\$ 292,000	\$ 84,480	\$ 84,480	\$ 376,480	\$ 6,433,749	\$ 126,152	\$ 376,480	

Project NPV	
Discount Rate	4%
NPV	\$9,237,898

Totals \$ 1,378,951 \$ 7,300,000 \$ 2,112,000 \$ 10,790,951 \$ 16,775,940



SMART Program

SMART Program

- 1,600 MWac Program (Solar MAAssachusetts Renewable Target)
 - Developed by MA DOER following lengthy stakeholder engagement process
 - Capacity allocated to utilities based upon load share in MA
- Follows goals to guide development of projects through incentives
 - Location Based (Brownfields, Landfills, Buildings, Canopies, Floating)
 - Off-taker Based (Community Solar, Low Income, Public Entity)
 - Technology (Energy Storage, Dual-Axis Trackers)
 - Greenfield Subcontractors
 - Incentives can be compiled with base compensation rates to increase project revenues
- Incorporates an alternative program to net metering
 - Avoids issues with hitting artificial 'caps' and limiting development
- Projects awarded enrollment via qualification under distinct Block procurements
 - 8 Blocks in total; declining (-4%) \$/kWh incentive pricing in each block
 - 1st 100 MW Block recently completed – established program pricing

Community Solar

- Allows projects to sell discounted energy to residents, businesses, and others throughout the Eversource Service territory
- Potential subscribers would complete an application form, providing information from their electric bills, credit, and energy use
- This project would require a minimum of 112 subscribers but, number could be much higher depending on the type applicants
 - Subscribers obtained via, open houses, project website platform, mailings, etc.
- Similar EDF projects in different jurisdictions – have a set of partners to execute on subscriber onboarding and maintenance for duration of the project SMART Enrollment

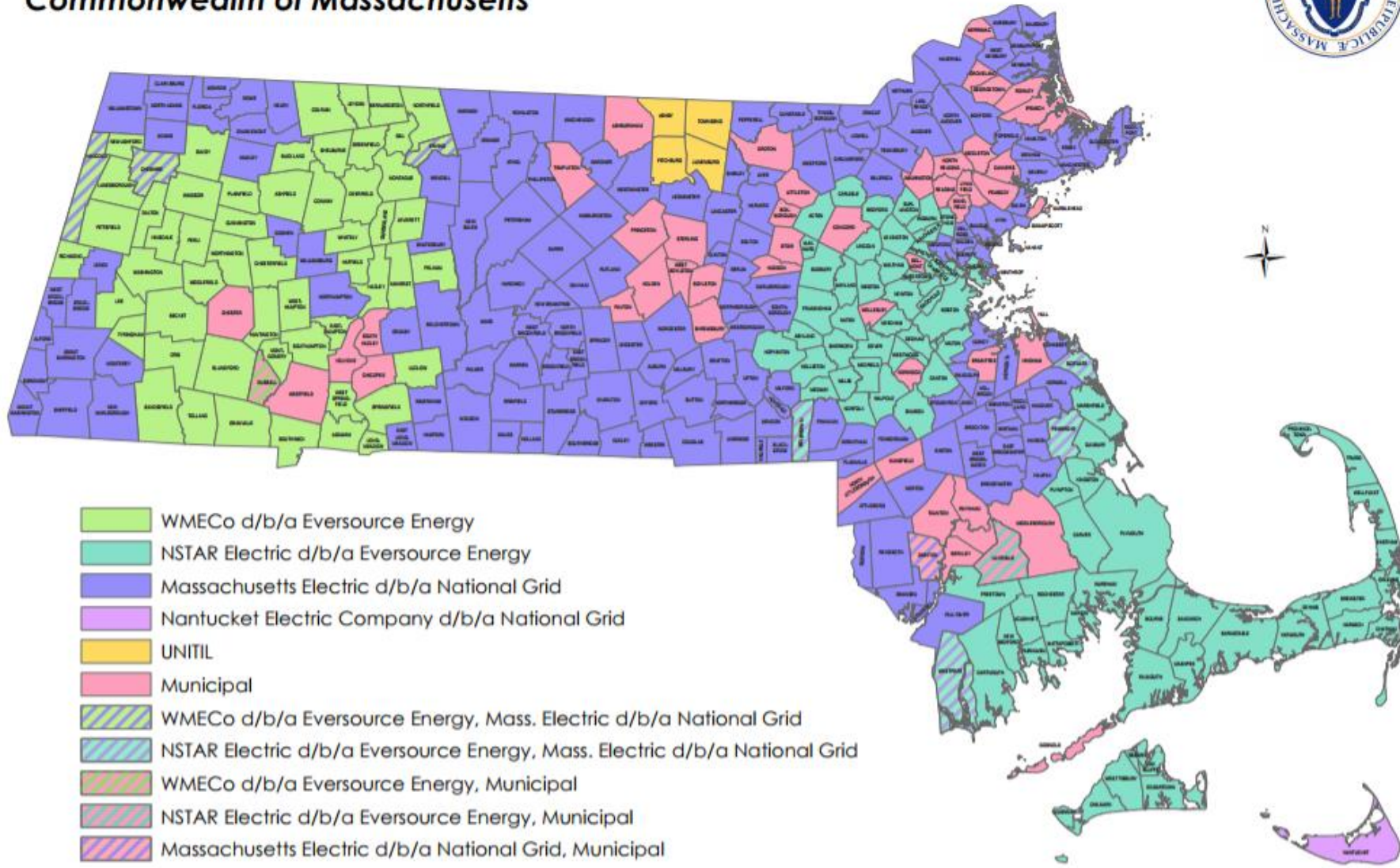
Program Allocation by Utility

Distribution Company	2016 Distribution Load (MWh)	% Share of 2016 Distribution Load	Total MW AC Available Under SMART
Fitchburg Gas & Electric d/b/a Unitil	462,444	1.0%	15.788
Massachusetts Electric d/b/a National Grid	21,094,198	45.0%	720.178
Nantucket Electric d/b/a National Grid	176,964	0.4%	6.042
NSTAR d/b/a Eversource Energy	21,443,702	45.8%	732.110
WMECO d/b/a Eversource Energy	3,687,124	7.9%	125.882
Total	46,864,432	100.0%	1,600.000

Adjusted Capacity Available for All Other Projects (MW AC) ⁴										
Distribution Company	Amount Procured	Adjusted Block 1	Adjusted Block 2	Adjusted Block 3	Adjusted Block 4	Adjusted Block 5	Adjusted Block 6	Adjusted Block 7	Adjusted Block 8	Total
Fitchburg Gas & Electric d/b/a Unitil	0.000	3.158	3.158	3.158	3.158	N/A	N/A	N/A	N/A	12.631
Massachusetts Electric d/b/a National Grid	43.573	28.445	72.018	72.018	72.018	72.018	72.018	72.018	72.018	576.142
Nantucket Electric d/b/a National Grid	0.000	2.417	2.417	N/A	N/A	N/A	N/A	N/A	N/A	4.833
NSTAR d/b/a Eversource Energy	2.000	71.211	73.211	73.211	73.211	73.211	73.211	73.211	73.211	585.688
WMECO d/b/a Eversource Energy	7.700	4.888	12.588	12.588	12.588	12.588	12.588	12.588	12.588	100.706
Total Capacity	53.273	110.118	163.391	160.975	160.975	157.817	157.817	157.817	157.817	1280.000

Electricity Providers by Municipality

Commonwealth of Massachusetts



- WMECo d/b/a Eversource Energy
- NSTAR Electric d/b/a Eversource Energy
- Massachusetts Electric d/b/a National Grid
- Nantucket Electric Company d/b/a National Grid
- UNITIL
- Municipal
- WMECo d/b/a Eversource Energy, Mass. Electric d/b/a National Grid
- NSTAR Electric d/b/a Eversource Energy, Mass. Electric d/b/a National Grid
- WMECo d/b/a Eversource Energy, Municipal
- NSTAR Electric d/b/a Eversource Energy, Municipal
- Massachusetts Electric d/b/a National Grid, Municipal

Source: Massachusetts Department of Public Utilities, September 2015



Map by MassGIS, 5/31/2016

Block Pricing by Utility

Distribution Company	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
Fitchburg Gas & Electric d/b/a Unitil	\$0.15563	\$0.14193	\$0.12944	\$0.11805				
Massachusetts Electric d/b/a National Grid	\$0.15563	\$0.14940	\$0.14343	\$0.13769	\$0.13218	\$0.12690	\$0.12182	\$0.11695
Nantucket Electric d/b/a National Grid	\$0.17000	\$0.14280						
NSTAR d/b/a Eversource Energy	\$0.17000	\$0.16320	\$0.15667	\$0.15041	\$0.14439	\$0.13861	\$0.13307	\$0.12775
WMECO d/b/a Eversource Energy	\$0.14288	\$0.13716	\$0.13168	\$0.12641	\$0.12135	\$0.11650	\$0.11184	\$0.10737

Adder Values by Tranche

Adder Type ¹	Generation Unit Type	Adder Tranche and Value (\$/kWh) ²							
		Adder Tranche 1 (80 MW)	Adder Tranche 2 (TBD)	Adder Tranche 3 (TBD)	Adder Tranche 4 (TBD)	Adder Tranche 5 (TBD)	Adder Tranche 6 (TBD)	Adder Tranche 7 (TBD)	Adder Tranche 8 (TBD)
Location Based	Building Mounted Solar Tariff Generation Unit	\$0.02000	\$0.01920	\$0.01843	\$0.01769	\$0.01699	\$0.01631	\$0.01566	\$0.01503
	Floating Solar Tariff Generation Unit	\$0.03000	\$0.02880	\$0.02765	\$0.02654	\$0.02548	\$0.02446	\$0.02348	\$0.02254
	Solar Tariff Generation Unit on a Brownfield	\$0.03000	\$0.02880	\$0.02765	\$0.02654	\$0.02548	\$0.02446	\$0.02348	\$0.02254
	Solar Tariff Generation Unit on an Eligible Landfill	\$0.04000	\$0.03840	\$0.03686	\$0.03539	\$0.03397	\$0.03261	\$0.03131	\$0.03006
	Canopy Solar Tariff Generation Unit	\$0.06000	\$0.05760	\$0.05530	\$0.05308	\$0.05096	\$0.04892	\$0.04697	\$0.04509
	Agricultural Solar Tariff Generation Unit	\$0.06000	\$0.05760	\$0.05530	\$0.05308	\$0.05096	\$0.04892	\$0.04697	\$0.04509
Off-taker Based	Community Shared Solar Tariff Generation Unit	\$0.05000	\$0.04800	\$0.04608	\$0.04424	\$0.04247	\$0.04077	\$0.03914	\$0.03757
	Low Income Property Solar Tariff Generation Unit	\$0.03000	\$0.02880	\$0.02765	\$0.02654	\$0.02548	\$0.02446	\$0.02348	\$0.02254
	Low Income Community Shared Solar Tariff Generation Unit	\$0.06000	\$0.05760	\$0.05530	\$0.05308	\$0.05096	\$0.04892	\$0.04697	\$0.04509
	Public Entity Solar Tariff Generation Unit	\$0.02000	\$0.01920	\$0.01843	\$0.01769	\$0.01699	\$0.01631	\$0.01566	\$0.01503
Energy Storage ³	Energy Storage Adder	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable
Solar Tracking	Solar Tracking Adder	\$0.01000	\$0.00960	\$0.00922	\$0.00885	\$0.00849	\$0.00815	\$0.00783	\$0.00751

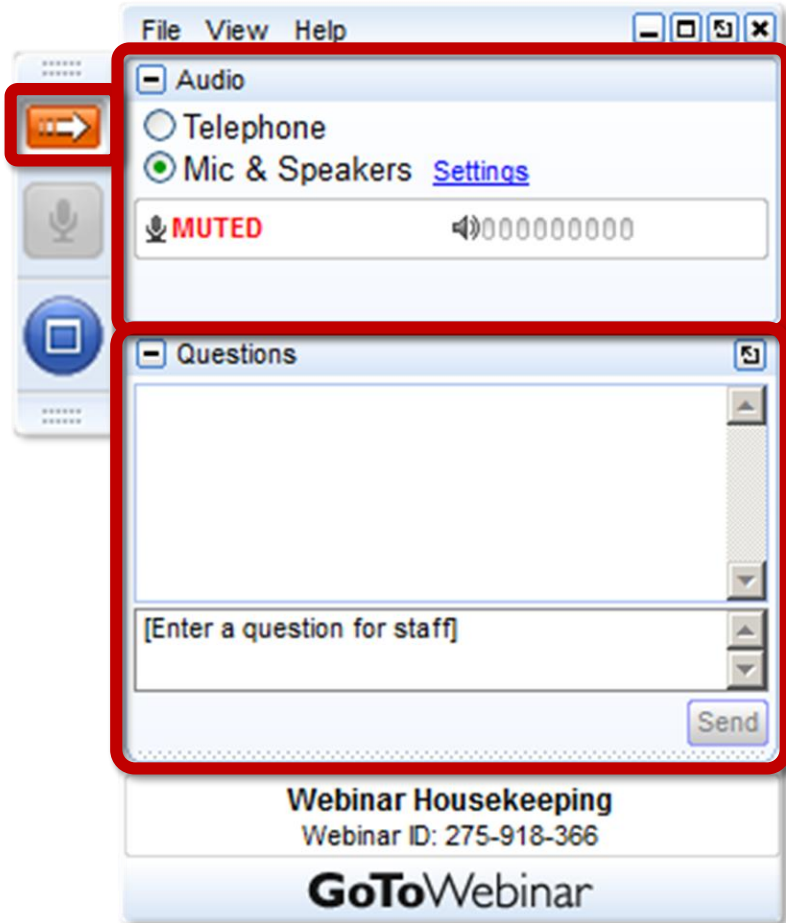
RPS Collaborative Webinar

The Solar Massachusetts Renewable Target (SMART) Program

Hosted by
Warren Leon, Executive Director, CESA

April 12, 2017

Housekeeping



Use the red arrow to open and close your control panel

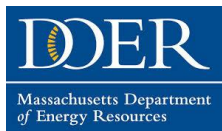
Join audio:

- Choose Mic & Speakers to use VoIP
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Submit questions and comments via the Questions panel

This webinar is being recorded. We will email you a webinar recording within 48 hours. CESA's webinars are archived at www.cesa.org/webinars

Clean Energy States Alliance



www.cesa.org

RPS Collaborative

- With funding from the Energy Foundation and the US Department of Energy, CESA facilitates the **Collaborative**.
- Includes **state RPS administrators, federal agency representatives**, and other stakeholders.
- Advances dialogue and learning about RPS programs by **examining the challenges and potential solutions** for successful implementation of state RPS programs, including **identification of best practices**.
- To sign up for the Collaborative listserv to get the **monthly newsletter** and announcements of **upcoming events**, see: www.cesa.org/projects/state-federal-rps-collaborative

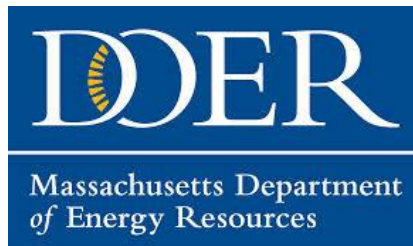


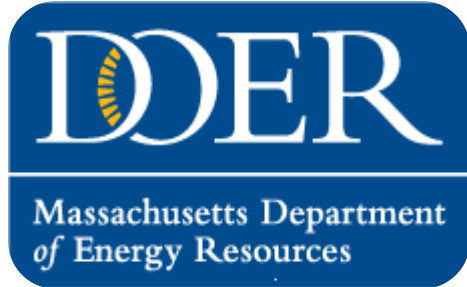
U.S. DEPARTMENT OF
ENERGY



Today's Guest Speaker

- **Kaitlin Kelly**, RPS Program Coordinator, Massachusetts Department of Energy Resources (DOER)





COMMONWEALTH OF MASSACHUSETTS

Charles D. Baker, Governor

Karyn E. Polito, Lt. Governor

Matthew A. Beaton, Secretary

Judith Judson, Commissioner

**Solar Massachusetts Renewable Target
(SMART)
Final Program Design**

**Final Solar Incentive
Program Design**

April 12, 2017

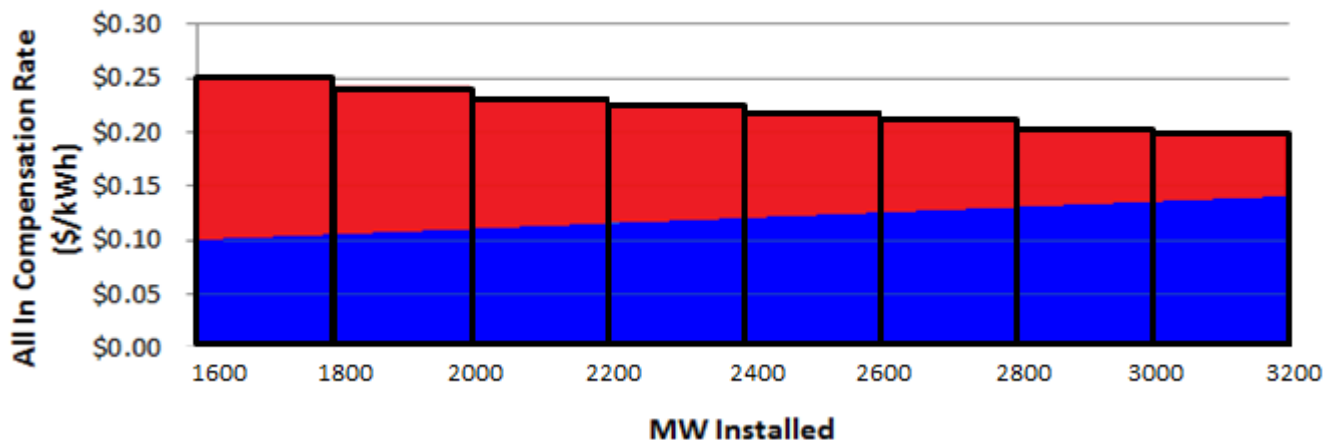
Boston, MA

**Kaitlin Kelly
RPS Program Coordinator**

Basic Features of New Program

- 1,600 MW AC declining block program
- Applies to all electric distribution companies
- Same compensation rates across state
- 10 or 20-year fixed price term depending on project capacity (10-year for small, 20-year for large)
- Compensation structure differentiated between sized-to-load and standalone systems
- Base compensation rates set according to project size
- Adders based on location, and those that provide unique benefits, including community solar, low-income, public, and energy storage projects
- Base compensation rates decline by set percentages in each block following Block 1
- Maximum project size of 5 MW per parcel

Illustrative Declining Block Model



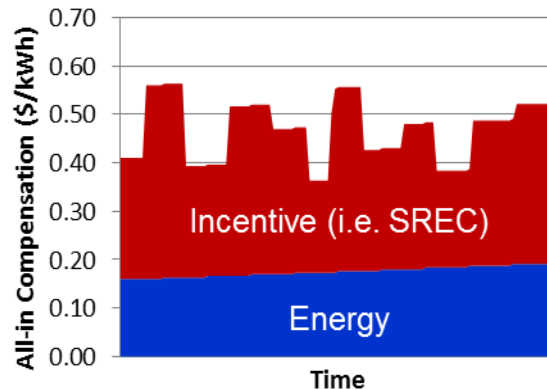
Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth

SRECs vs. SMART

SREC

- SRECs are a tradable commodity with a value that fluctuates based on market conditions:
 - Long-term revenue uncertainty leads to higher financing costs,
 - A large portion of the program costs are going to a 3rd party to pay for financing,
 - Total program costs and ratepayer impacts are difficult to predict.
- SRECs are an additional revenue stream independent of the value of the energy.

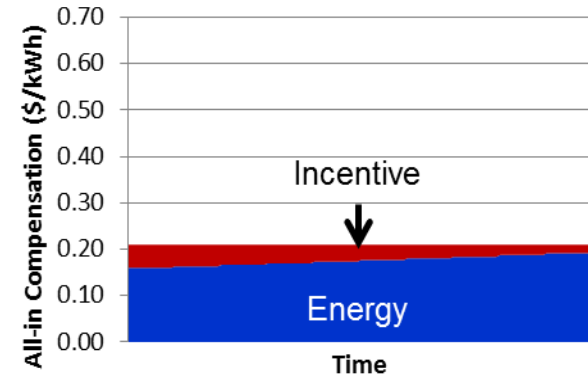
Example of the incentive level in a SREC program



Declining Block Program

- This program provides long-term revenue certainty (10-20 years) which reduces financing risks and in turn, lowers soft costs
 - Total program costs can be predicted with certainty.
 - Incentive declines with the declining cost of solar.
- A solar facility receives a single compensation rate that accounts for both the energy and the incentive.
 - The resulting value of the incentive is the net difference between the all in rate and the value of the energy.

Example of the incentive level in the new program



Additional Program Features

- Initial compensation rates will be set via a competitive procurement for larger projects (> 1 MW)
 - Procurement will determine capacity based compensation for projects > 1 MW
 - Indices will be used to set capacity based compensation for projects <= 1 MW
- Projects eligible for the incentive may elect to receive compensation for energy through one of three mechanisms:
 - Net metering
 - Qualifying via additional on-bill crediting mechanism
 - Buy-all, sell-all rate for standalone facilities that do not seek qualification under net metering or additional
- Additional on-bill crediting mechanism is a new option that is intended to be an additional option to net metering

Additional Program Features

- Standalone and Behind-the-Meter systems will have their incentives calculated using different methodologies
- New program will do more to steer projects towards optimal locations by providing location based incentives
 - Greenfield “subtractor” will be applied to the compensation rate of any facility sited on open space that does not meet the criteria to receive the full incentive
- Energy storage will be compensated via variable adder that is based on the ratio of storage capacity to solar capacity as well as the duration of the storage
 - Minimum performance standards will apply to ensure grid benefits are realized

Project Categories

- Incentive values primarily based on project size:
 - Rates set based on index following initial procurement
 - Less than 25 kW AC (Low Income)
 - Less than 25 kW AC
 - 25 – 250 kW AC
 - 250 – 500 kW AC
 - 500 kW AC – 1,000 kW AC
 - Competitively Set Rates for Block 1, with fixed percentage declines thereafter
 - 1,000 – 2,000 kW AC
 - 2,000 – 5,000 kW AC
- Adders for different project types:
 - Location Based:
 - Brownfields
 - Building Mounted
 - Landfills
 - Solar Canopies
 - Off-taker Based:
 - Community Shared Solar (CSS)
 - Low Income CSS
 - Low Income Property
 - Public
 - Solar + Storage
- Unlike SREC II, adders can be combined together from different categories to encourage optimal siting of projects and further policy goals
- All capacity based rates and adders will decrease by 4% per block

Initial Competitive Procurement

- Program will commence with a competitive procurement seeking 100 MW of projects larger than 1 MW each
- Bids will be exclusively for the capacity based compensation rate that a project wishes to receive and will not be inclusive of adders
- DOER will establish two ceiling prices:
 - A \$0.15/kWh price for projects sized between 1 and 2 MW; and
 - A \$0.14/kWh price for projects sized larger than 2 MW
- Each EDC will procure an amount of capacity equal to their proportion of distribution load
- Projects will be ranked within each subcategory from lowest to highest price
- After project ranking has been determined, a statewide clearing price for each subcategory will be established, which shall be equal to a weighted average of all the clearing prices according to utility service territory
- All projects selected shall receive a compensation rate equal to the clearing price
- Indices will be used to establish the capacity based compensation rates for all other project size categories in Block 1 and will be based on the clearing price for projects sized between 1 and 2 MW
- Projects larger than 1 MW not selected through the procurement process will immediately fall under Block 2, for which the capacity based compensation rate shall be 4% less than the clearing price
- Compensation provided to projects selected via the RFP process shall be proportionally paid for by the distribution companies according to their respective percentage shares of the overall program capacity, regardless of the service territory in which the projects are located

Capacity Based Compensation Indices for Solar Generation Units equal to or less than 1 MW AC

Capacity Based Compensation Rates (kW AC)		
Generation Unit Capacity	Capacity Based Rate Factor (% of Clearing Price)	Term Length
Low income less than or equal to 25 kW AC ¹	230%	10-year
Less than or equal to 25 kW AC	200%	10-year
Greater than 25 kW AC to 250 kW AC	150%	20-year
Greater than 250 kW AC to 500 kW AC	125%	20-year
Greater than 500 kW AC to 1,000 kW AC	110%	20-year
Greater than 1,000 kW AC to 2,000 kW AC	100%	20-year
Greater than 2,000 kW AC to 5,000 kW AC	TBD	20-year

1. Must be an R-2 customer to qualify

Example: How Indices will be Used to set Rates for Different Project Types

- If clearing price of competitive procurement is \$0.15/kWh the following will be the Capacity Based Compensation Rates for Block 1

Capacity Based Compensation Rates (kW AC)			
Generation Unit Capacity	Capacity Based Rate Factor (% of Clearing Price)	Capacity Based Rate (\$/kWh)	Term Length
Low income less than or equal to 25 kW AC	230%	\$0.3450	10-year
Less than or equal to 25 kW AC	200%	\$0.3000	10-year
Greater than 25 kW AC to 250 kW AC	150%	\$0.2250	20-year
Greater than 250 kW AC to 500 kW AC	125%	\$0.1875	20-year
Greater than 500 kW AC to 1,000 kW AC	110%	\$0.1650	20-year
Greater than 1,000 kW AC to 2,000 kW AC	100%	\$0.1500	20-year
Greater than 2,000 kW AC to 5,000 kW AC	TBD	<=\$0.1400	20-year

Adder Values

All adder values will decline by 4% per capacity block

Location Based Adders	
Type	Adder Value (\$/kWh)
Building Mounted	\$0.02
Brownfield	\$0.03
Landfill	\$0.04
Solar Canopy	\$0.06

Off-taker Based Adders	
Type	Adder Value (\$/kWh)
Public Entity	\$0.02
Community Shared Solar (CSS)	\$0.05
Low Income Property Owner	\$0.03
Low Income CSS ¹	\$0.06

Solar + Energy Storage	
Type	Adder Value (\$/kWh)
Storage + PV	Variable

1. Must be at least 50% R-2 customers

Standalone vs. Behind-the-Meter

- Standalone facilities will be defined as facilities with no associated load other than parasitic or station load
- A standalone facility that is net metered or approved under a similar DPU structure will have its incentive calculated by subtracting the value of the energy it generates from its all-in compensation rate established under the incentive program
- A standalone facility that is not net metered or approved under a similar DPU structure must be qualified as a Qualifying Facility, and receive a single payment from the utility equal to its all-in compensation rate, which will provide bundled compensation for energy, capacity, and incentive
- This will result in the value of the incentive changing over time as energy value increases or decreases
- Behind-the-meter facilities will be any facility that does not meet the definition of standalone
- A behind-the-meter facility will have a fixed incentive payment value that is determined at the time it is interconnected

Behind-the-Meter Incentive Calculation

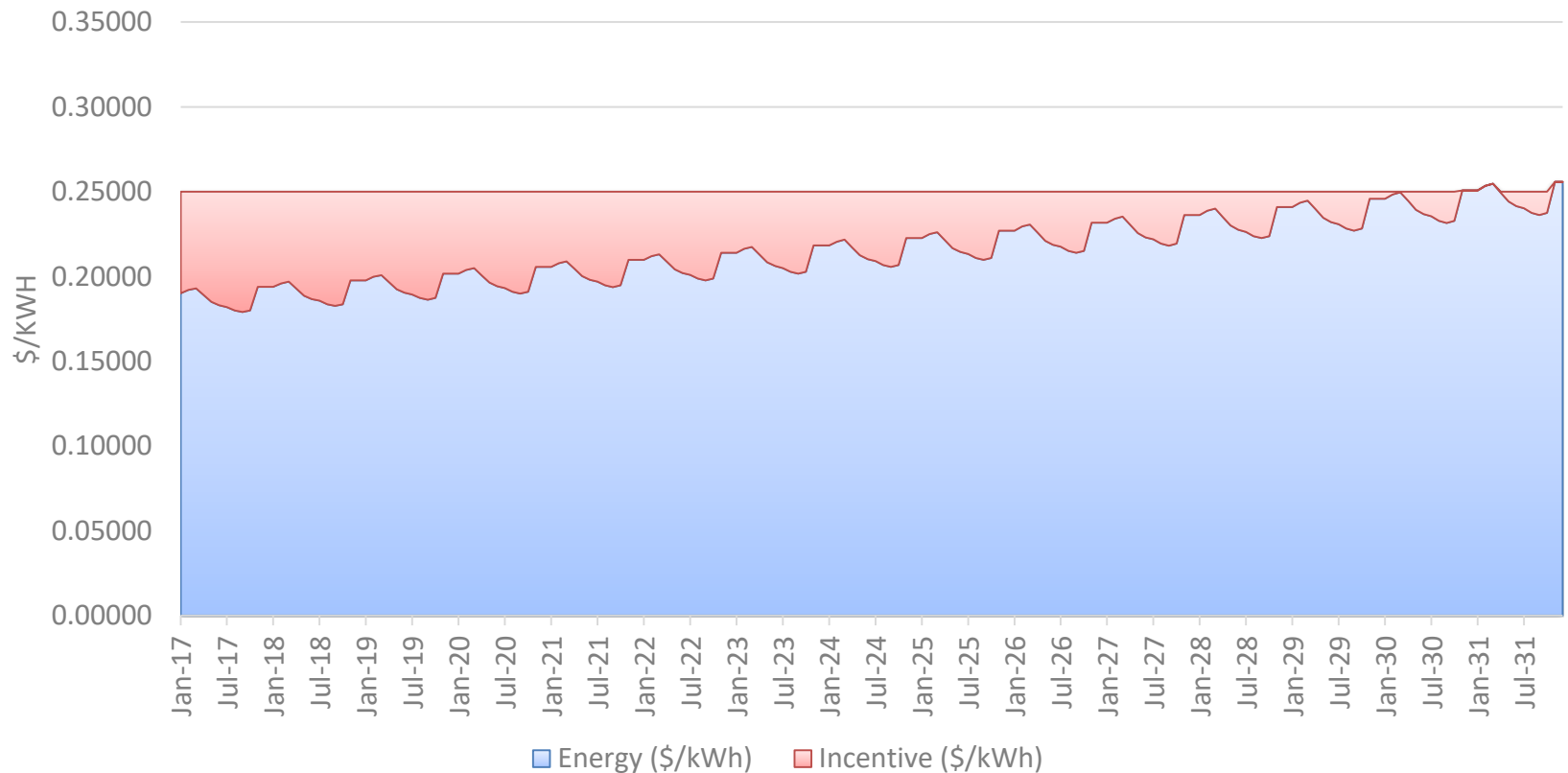
Behind the Meter Solar Tariff Generation Unit Compensation Rate
= (Capacity Based Rate + Adders)
– (Three year average of Volumetric Delivery Rates
+ Three year average of Basic Service Rate)

- **Example:**

- A 10 kW facility qualifies under Block 1 at a \$0.30/kWh all-in compensation rate
- Project is interconnected behind a meter on the R-1 rate class
- The volumetric distribution + transmission + transition + 3-year average basic service rate for this particular rate class is \$0.18/kWh
- The incentive rate would be set at \$0.12/kWh and would remain in effect for 10 years, regardless of what happens to energy values

Standalone Generator Example

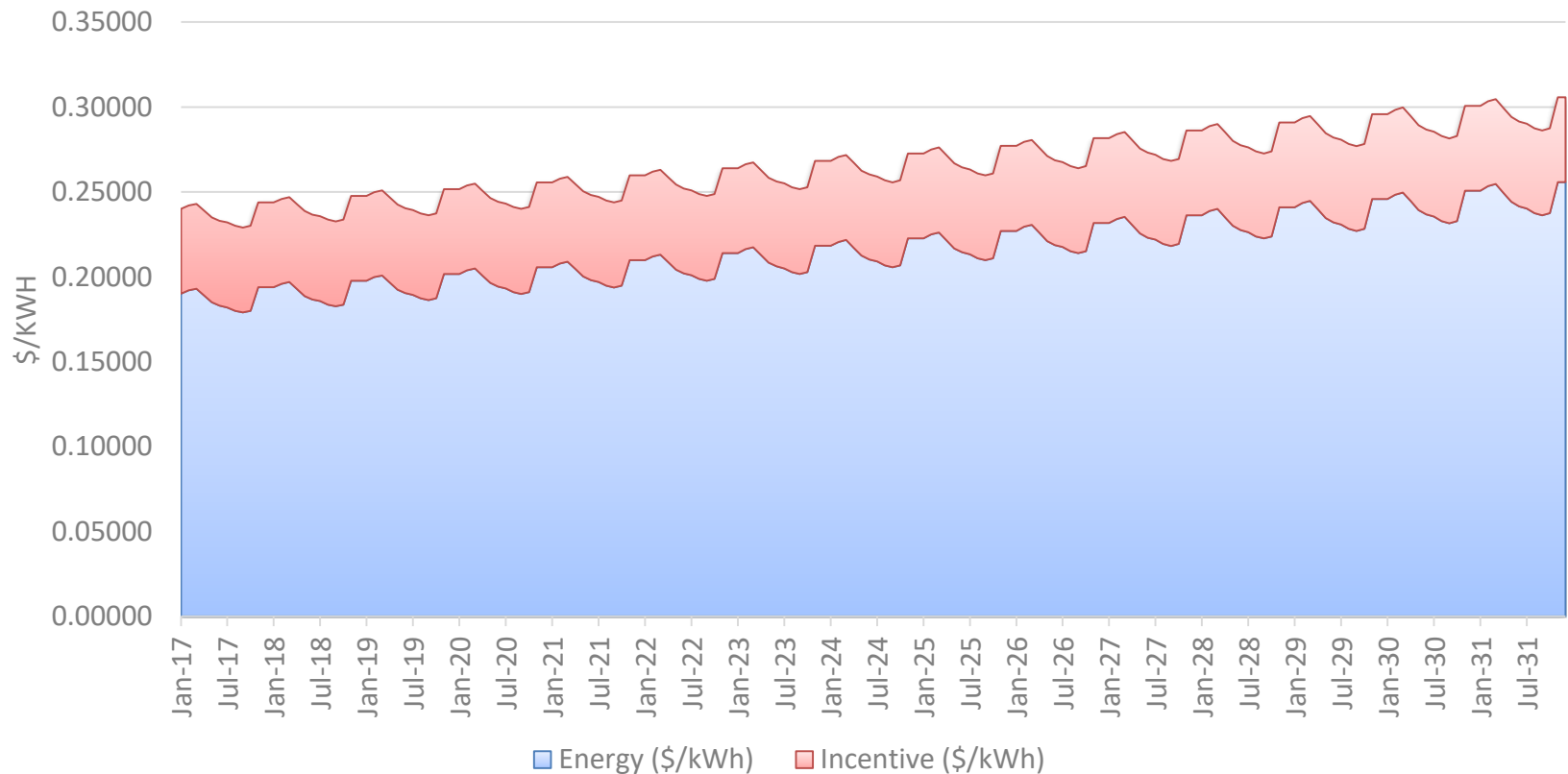
20-year NEM Medium System (25-250 kW) Payments
(Standalone)



Note: Graph is illustrative of how payments would be determined and does not reflect projected values

Behind-the-Meter Generator Example

20-year NEM Medium System (25-250 kW) Payments
(Behind-the-Meter)



Note: Graph is illustrative of how payments would be determined and does not reflect projected values

Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth



Massachusetts Department of Energy Resources

Capacity Block Allotments

- Blocks will be divided proportionally using distribution load data:

Distribution Company	2015 Distribution Load (MWh)	% Share of Distribution Load
Mass Electric	21,750,244	45.3%
Nantucket	176,717	0.4%
NSTAR (Eversource)	21,896,222	45.6%
WMECO (Eversource)	3,708,396	7.7%
Unitil	476,026	1.0%
Total	48,007,605	100.0%

- Initial competitive procurement will be for a total of 100 MW and will be divided proportionally amongst the distribution companies
- National Grid, NSTAR, and WMECO will have 8 blocks, with a 4% decrease between blocks
- Unitil and Nantucket could have less blocks, for example, 4 blocks with a 8% decrease in between blocks, or 2 blocks, with a 16% decrease between blocks
- All blocks will have a minimum of 20% reserved for projects ≤ 25 kW AC
- Could also consider maximum amounts for certain project types

Illustrative Block Capacity Allotments

Capacity Available to All Project Sizes

Distribution Company	Competitive Procurement	Block 1 (only projects <1 MW)	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8	Total
Massachusetts Electric	45.3	27.2	72.5	72.5	72.5	72.5	72.5	72.5	72.5	580
Nantucket Electric	0.4	2.2	2.2	N/A	N/A	N/A	N/A	N/A	N/A	4.8
NSTAR	45.6	27.4	73	73	73	73	73	73	73	584
WMECO	7.7	4.7	12.4	12.4	12.4	12.4	12.4	12.4	12.4	99.2
Unitil	1	2.95	2.95	2.95	2.95	N/A	N/A	N/A	N/A	12.8
										1280.8

Minimum Capacity Available to Projects <=25kW

Distribution Company	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8	Total
Massachusetts Electric	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	144.8
Nantucket Electric	0.4	0.4	N/A	N/A	N/A	N/A	N/A	N/A	0.8
NSTAR	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	145.6
WMECO	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	24.8
Unitil	0.8	0.8	0.8	0.8	N/A	N/A	N/A	N/A	3.2
									319.2

Solar Program Administrator

- The solar program administrator may be responsible for:
 - Reviewing applications, qualifying facilities, and managing block reservations
 - Determining the total amount to be paid/credited to the facility owner and off-takers every month
 - Issuing incentive payments to owners on behalf of the distribution companies
 - Acting as NEPOOL GIS independent verifier for all eligible systems
- The administrator would contract with the distribution companies, but DOER would have oversight
- Aim to issue the RFP for the administrator shortly after DOER files emergency regulation
 - There will be a single entity selected, which may have subcontractors for separate tasks
- Proposed RFP schedule (subject to change):
 - DOER files emergency regulation
 - Distribution companies jointly issue an RFP within 60 business days of filing
 - Solicitation stays open for 30 business days
 - Distribution companies make recommendation within 15 business days
 - DOER makes final selection within 10 business days
 - Administrator must be capable of executing all required responsibilities within a defined time period following days of final selection by DOER

Land Use

- Original proposal on land use and siting criteria would have precluded significant portions of the state from receiving incentives for ground mounted projects
- Also relied heavily on GIS data layers
- Revised proposal provides exclusions from incentives for far fewer areas
- Under revised proposal, ground mounted projects that are larger than 500 kW, not sited on a brownfield or landfill, and are on land that has not been previously developed, will be subject to a \$/kWh subtractor that changes based on the number of acres impacted
- All ground mounted projects will also be subject to a set of performance standards developed in consultation with the Department of Agricultural Resources

Project Type	Ground Mounted and not C&I Zoned	Ground Mounted, C&I Zoned, and NOT Previously Developed	Ground Mounted, C&I Zoned, and Previously Developed	Rooftop	Brownfields	Landfill	Parking Lot Canopy
Compensation Rate (\$/kWh)	X - \$0.001/acre	X - \$0.0005/acre	X	X + \$0.02	X + \$0.03	X + \$0.04	X + \$0.06



Land Use Categories

Category	Description	Incentive Level
Category 1	<ul style="list-style-type: none"> • All ground-mounted projects greater than 500 kW AC and less than or equal to five (5) MW AC that are zoned for commercial/industrial use or specifically for solar/power generation, but have been previously developed • All projects on brownfields, landfills, rooftops, canopies, and all other ground-mounted projects not sited on brownfields or landfills that are equal to or less than 500 kW AC, including: <ul style="list-style-type: none"> ➤ Low Income Projects ➤ Community Solar Projects ➤ Projects serving Municipal/Governmental Entities • Non-canopy projects on Land in Agricultural Use or on Prime Agricultural Farmland Soils sized to meet no greater than 200% of annual operation load 	Base Incentive + Applicable Adder(s)
Category 2	<ul style="list-style-type: none"> • All ground-mounted projects greater than 500 kW AC and less than or equal to five (5) MW AC that are not sited on brownfields or landfills and are zoned for commercial/industrial use or specifically for solar/power generation, which have not been previously developed, including: <ul style="list-style-type: none"> ➤ Low Income Projects ➤ Community Solar Projects ➤ Projects serving Municipal/Governmental Entities 	Base Incentive – Half Greenfield Subtractor + Applicable Adder(s)
Category 3	<ul style="list-style-type: none"> • Ground-mounted projects greater than 500 kW AC and less than or equal to five (5) MW AC that are not sited on brownfields or landfills and are not zoned for commercial/industrial use <ul style="list-style-type: none"> ➤ Low Income Projects ➤ Community Solar Projects ➤ Projects serving Municipal/Governmental Entities 	Base Incentive – Full Greenfield Subtractor + Applicable Adder(s)
Category 4	<ul style="list-style-type: none"> • Ground-mounted projects not meeting the Category 1, 2, or 3 criteria • Projects on permanently protected open space that do not meet the criteria of category 4 • Projects sited on Wetland Resource Areas (not including Buffer Zones), as defined in the Massachusetts Wetland Protection Act, except as authorized by regulatory bodies • Historical/Archaeological Sites listed on the National/State Register of Historic Places, except as authorized by regulatory bodies 	No Incentive

^[1] Full Greenfield Subtractor = \$0.001/kWh per acre of land impacted

^[2] Half Greenfield Subtractor = \$0.0005/kWh per acre of land impacted

Land Use Performance Standards

- No stripping of soils
- For conventional ground mounted systems, ballasts or screw-type pilings that do not require footings or other permanent penetration of soils for mounting are required
- For agricultural integrated systems using canopies, any soil penetrations that may be required for providing system foundations necessary for structural loading shall do so with minimal soils disturbance, with any displaced soils to be temporary and recovered and returned after the penetration is completed.
- Absolute minimum soils/site disturbance; any soil penetrations that may be required for providing system trenching necessary for electrical routing shall be done with minimal soils disturbance, with any displaced soils to be temporary and recovered and returned after the penetration and trenching is completed
- No concrete or asphalt in the mounting area
- Address existing soil and water resource concerns that may be impacted
- Limited use of geotextile fabrics
- Where not practical to also use the area for agricultural production, maintain vegetative cover to prevent soil erosion, etc.

Additional On-bill Crediting Option

- The vast majority of solar facilities today are compensated for energy via net metering
- The stakeholder meetings convened by DOER involved extensive discussion regarding developing another option for solar generators
- This option would function in a manner similar to net metering, but would only be available to participants in the new incentive program
- Would not be part of DOER regulation, but would be established via a DPU approved process that would be filed by the distribution companies in conjunction or in parallel with the filing for the incentive program
- Compensation rate for exported energy would likely be set at basic service rate

Benefits of Additional On-bill Credit

- Single rate for all facilities
- Allows for credits to be transferred to off-takers without net metering
- No cap
- No “single parcel” rule
- No 10 MW public entity cap
- Cap on number of credits that can be transferred to a off-taker (based on off-taker’s kWh consumption)
- Potential for fewer limitations on the number of times off-takers can be changed or re-allocated within a year
- Opportunity for streamlining administrative aspects of credit transfers
- All details for the On Bill Credit are subject to approval by the DPU

System Type Definitions

- Definitions for Landfills, Brownfields, Building Mounted, and Low Income Properties will remain largely unchanged from SREC II
- Definition for Solar Canopies will be slightly modified
- New definitions will be added for:
 - Low Income Residential
 - Low Income Community Shared Solar
 - Public Facilities
 - Energy Storage

Solar Canopies

- Solar Canopy definition from 225 CMR 14.02 will be modified slightly as follows:
 - Solar Canopy Generation Unit. A solar photovoltaic Generation Unit with at least 100% of the nameplate capacity of the solar modules used for generating power installed on top of a parking surface, pedestrian walkway, agricultural land, or canal in a manner that maintains the function of the area beneath the canopy.
- New definition allows for canopies to be installed on agricultural land and over canals in response to inquiries received during the implementation of the SREC II program and recent listening sessions.
- Eligibility of canopies sited on agricultural land will be determined in consultation with Massachusetts Department of Agricultural Resources.

Low Income

- DOER intends to maintain SREC II criteria and Guideline for qualifying facilities that serve low income properties
- New program will provide additional support for projects directly serving low income residents in two ways:
 - Projects ≤ 25 kW that serve R-2 utility customers will be eligible for a higher incentive rate
 - Community Shared Solar projects with at least 50% of off-takers on an R-2 rate will receive a higher level incentive than normal CSS projects

Public Facilities

- The definition of Public Entity Generation Unit will be established as follows:
 - Public Entity Generation Unit. A solar photovoltaic Generation Unit sited on property owned by a Municipality or Other Governmental Entity that is either:
 - (a) owned or operated by a Municipality or Other Governmental Entity; or
 - (b) has assigned 100% of its output to Municipalities or Other Governmental Entities.
- Definition tracks closely with the definition of a Net Metering Facility of a Municipality or Other Governmental Entity from net metering regulation, but differs in that it requires facilities to be sited on property owned by a Municipality or Other Governmental Entity

Energy Storage

- Original straw proposal distinguished between Standalone and Behind-the-Meter Energy Storage facilities
- DOER now intends to have a single adder category for all energy storage
- Adder will be variable and will be primarily based on the ratio of the storage capacity to solar capacity, as well as the duration of the storage
- Base adder of \$0.045/kWh will be a component of a formula designed to provide more value to higher capacity and longer duration storage
- Adder will decrease by 4% per block
- Facilities smaller than 25 kW will also be able to receive a storage adder
- Possibility for projects receiving energy storage adder to also generate Alternative Energy Certificates (AECs) that will be transferred to the distribution companies to be used towards APS compliance if DOER amends APS regulation to include storage

Energy Storage Adder Benefits

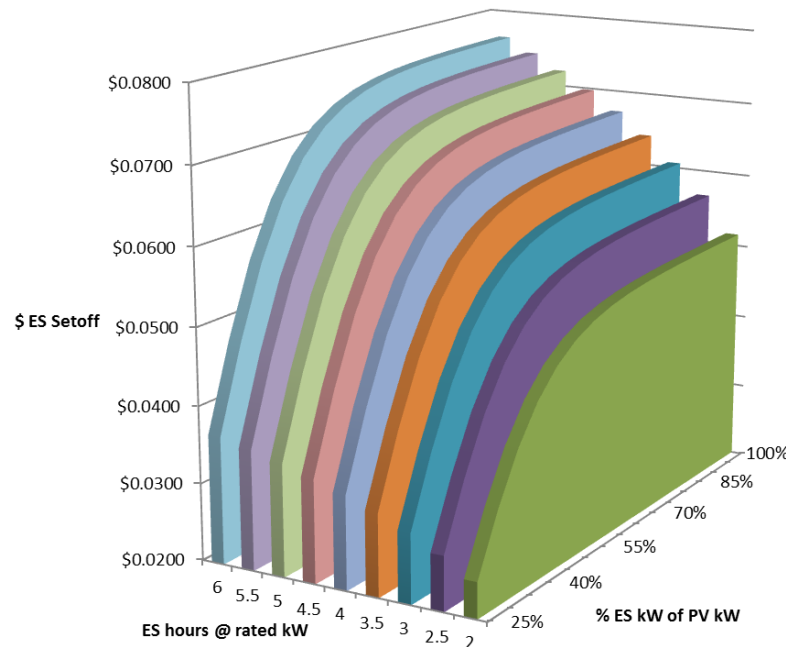
- Pairing solar with storage provides many benefits to the electric grid:
 - Improves power quality support (e.g. cloud induced voltage flicker support)
 - Allows for rapid ramping to reduce intermittency of solar
 - Allows for energy generation to be shifted to reduce peak demand
 - Reduces strain on distribution system during times of minimum load and high PV output
- Adder is structured to realize these benefits in ways that are consistent with DOER's *State of Charge* report
- Adder provides greater value to projects with higher storage capacity and longer duration

Energy Storage Adder Formula

$$\text{Energy Storage Adder} = \left[\frac{\left(\frac{ESkW}{PVkW} \right)}{\left(\left(\frac{ESkW}{PVkW} \right) + \exp \left(0.7 - \left(8 * \left(\frac{ESkW}{PVkW} \right) \right) \right) \right)} \right] * \left[0.8 + \left(0.5 * \ln \left(\frac{ESkWh}{ESkW} \right) \right) \right] * \text{Base Adder}$$

Where ESkW represents the nominal rated power of the energy storage system and ESkWh represents the nominal rated useful energy of the energy storage system

Formula Outputs



Energy Storage Adder Matrix

Storage kW as % of Solar	Storage Hours @ Rated Capacity								
	Minimum					Maximum			
	2	2.5	3	3.5	4	4.5	5	5.5	6
25%	\$0.0247	\$0.0271	\$0.0291	\$0.0307	\$0.0321	\$0.0334	\$0.0345	\$0.0356	\$0.0365
30%	\$0.0321	\$0.0352	\$0.0377	\$0.0399	\$0.0418	\$0.0434	\$0.0449	\$0.0462	\$0.0474
35%	\$0.0382	\$0.0419	\$0.0450	\$0.0476	\$0.0498	\$0.0517	\$0.0535	\$0.0551	\$0.0565
40%	\$0.0428	\$0.0470	\$0.0504	\$0.0533	\$0.0558	\$0.0579	\$0.0599	\$0.0617	\$0.0633
45%	\$0.0460	\$0.0504	\$0.0541	\$0.0572	\$0.0599	\$0.0622	\$0.0643	\$0.0663	\$0.0680
50%	\$0.0481	\$0.0527	\$0.0565	\$0.0598	\$0.0626	\$0.0650	\$0.0673	\$0.0692	\$0.0711
55%	\$0.0494	\$0.0542	\$0.0581	\$0.0614	\$0.0643	\$0.0668	\$0.0691	\$0.0712	\$0.0730
60%	\$0.0502	\$0.0551	\$0.0591	\$0.0625	\$0.0654	\$0.0680	\$0.0703	\$0.0724	\$0.0743
65%	\$0.0507	\$0.0557	\$0.0597	\$0.0631	\$0.0661	\$0.0687	\$0.0710	\$0.0731	\$0.0750
70%	\$0.0511	\$0.0560	\$0.0601	\$0.0635	\$0.0665	\$0.0691	\$0.0715	\$0.0736	\$0.0755
75%	\$0.0513	\$0.0562	\$0.0603	\$0.0638	\$0.0667	\$0.0694	\$0.0717	\$0.0739	\$0.0758
80%	\$0.0514	\$0.0564	\$0.0605	\$0.0639	\$0.0669	\$0.0696	\$0.0719	\$0.0740	\$0.0760
85%	\$0.0515	\$0.0565	\$0.0606	\$0.0640	\$0.0670	\$0.0697	\$0.0720	\$0.0742	\$0.0761
90%	\$0.0515	\$0.0565	\$0.0606	\$0.0641	\$0.0671	\$0.0697	\$0.0721	\$0.0742	\$0.0762
95%	\$0.0515	\$0.0566	\$0.0607	\$0.0641	\$0.0671	\$0.0698	\$0.0721	\$0.0743	\$0.0762
100%	\$0.0516	\$0.0566	\$0.0607	\$0.0641	\$0.0671	\$0.0698	\$0.0722	\$0.0743	\$0.0763

Reflects value for year 1 projects based on size & duration

Energy Storage Requirements

- Minimum and Maximum Nominal Rated Power: The nominal rated power capacity of the Energy Storage System paired with a solar photovoltaic Generation Unit must be at least 25 per cent and shall be incentivized for no more than 100 per cent of the rated capacity, as measured in direct current, of the solar photovoltaic Generation Unit.
- Minimum and Maximum Nominal Useful Energy: The nominal useful energy capacity of the Energy Storage System paired with the solar photovoltaic Generation Unit must be at least two hours and shall be incentivized for no more than six hours.
- Minimum Efficiency Requirement: The Energy Storage System paired with the solar photovoltaic Generation Unit must have at least a 65% round trip efficiency in normal operation.
- Data Provision Requirements: The Owner of the Energy Storage System must provide historical 15-minute interval performance data to the Solar Program Administrator for the first year of operation and upon request for the first five years of operation.
- Operational Requirements: The Energy Storage System must discharge at least 52 complete cycle equivalents per year and must remain functional and operational in order for the solar photovoltaic Generation Unit to continue to be eligible for the Energy Storage Adder.

Qualification Process

- All projects will be required to submit an application to the Solar Program Administrator
- Projects may submit an application before interconnection and reserve a position within a block, but will be required to provide additional documentation:
 - A project ≤ 25 kW must submit its executed turnkey contract between the installer and customer
 - A project > 25 kW must submit:
 - Its executed interconnection service agreement (ISA)
 - Proof of site control
 - All non-ministerial permits
- In order to remain qualified and begin receiving compensation, a project must submit a copy of its authorization to interconnect by the end of its block reservation period

Block Reservations and Management

- Other than the initial competitive procurement for projects larger than 1 MW, block reservations will be provided on a first-come, first-served basis
- Incomplete applications will be given an opportunity to hold their position in the queue for a defined period of time until deficiencies are resolved
- Initial reservation periods assigned to non-operational projects will be 12 months, but may be extended for the following reasons:
 - Indefinite extension for mechanical completion
 - 6-month extension for pending legal challenges
 - One-time 6-month extension for a fee
 - Exceptions for good cause
- If a project does not meet its required deadlines, its reserved capacity will be added to the block that is currently open
- Projects that trigger the move to a new block will receive a blended rate, proportional to the amount of capacity that falls under each block

Example: 1 MW project has 500 kW under Block 1 at a rate of \$0.20/kWh and 500 kW under Block 2 at a rate of \$0.19/kWh. Its all-in compensation rate would be set at \$0.195/kWh.

Metering and Reporting

- Metering
 - Two separate meters
 - Utility customer meter
 - Production meter
 - Distribution company will own production meter and will report both production and utility meter data to program administrator on a monthly basis
 - Technical requirements for meters still need to be refined, but would likely mirror existing standards
 - Process will be established to ensure that production meter data can be accessed by the system owner
 - System owner may own redundant production meter if they choose to do so
 - Data Acquisition System (DAS) may be required for all systems

Class I REC Ownership

- The ownership rights to Class I RECs generated by a facility will be automatically transferred to distribution company
- Each distribution company will be required to establish and maintain a generator account at the NEPOOL GIS and register individual facilities as assets within that account
- Distribution companies shall retain the asset ownership and rights to all Class I RECs associated with a facility for as long as the facility is eligible to receive payment for the RECs under the program
- Following a project's eligibility period, ownership rights to assets and the RECs will revert to the owner of the facility

DOER Regulation vs. DPU Proceeding

- Implementing new program requires DOER rulemaking and DPU proceeding:
 - DOER regulation will contain:
 - Program eligibility criteria
 - Incentive values
 - Block sizes
 - Program qualification procedures
 - Metering requirements
 - DPU proceeding will require approval for:
 - Cost recovery for distribution companies
 - Approval of additional on-bill crediting mechanism
- Process is loosely modeled on net metering (e.g. rates are specified in statute/regulation, cost recovery mechanism is approved by DPU)

Municipal Light Plants (MLPs)

- DOER has had several meetings with MLP operators and their associations since releasing its straw proposal in September
- Several productive meetings have led to an interest in working with the administration to create a framework for voluntary MLP solar program
- DOER will provide more information as soon as it becomes available

Implementation Process

- DOER plans to file an emergency regulation as quickly as possible
- Rulemaking to make the emergency regulation permanent must conclude within 90 days
 - Public hearing(s) and comment period will occur within this window
- Three processes would need to take place following the filing of the regulation and would be developed in parallel with the rulemaking:
 1. Distribution companies jointly issue RFP for Solar Program Administrator
 2. Distribution companies jointly issue RFP for 100 MW of facilities larger than 1 MW
 3. Distribution companies jointly file for approval of program and cost recovery with Department of Public Utilities
- Filing at DPU will trigger the start of a proceeding there, the schedule for which will be established by the DPU following the filing
- Upon DPU approval of program structure at the DPU, the program will become effective

Anticipated Timeline

- January 2017
 - DOER releases final program design
- May 2017
 - DOER files emergency regulation
 - Public hearing and comment period on regulation
- July 2017
 - DOER promulgates final regulation
- August 2017
 - Distribution companies file tariff(s) with DPU and issue RFP Block 1 procurement
- October 2017
 - Competitive procurement results announced, compensation rates established
- Spring 2018
 - DPU approves distribution company filing
 - Program goes into effect

Note: Timeline is illustrative. All dates are subject to change.

SREC II Transition

- DOER approved an extension of SREC II projects until the start of the next program
- Systems over 25kW that are mechanically complete by March 31, 2018 will receive a 30% SREC Factor Reduction

Market Sector	SREC Factor
A	0.7
B	0.6
C	0.55
Managed Growth	0.5

- If the SMART program is not in effect by March 31, 2018, and systems do not achieve mechanical completion by that deadline, they will receive a further reduced SREC Factor

Next Steps

- DOER hopes to file an emergency regulation with the Secretary of the Commonwealth in mid May
- Dates for public hearing(s) and the deadline for the written comment period will be announced at the time the regulation is filed

Thank you for attending our webinar

Warren Leon

RPS Project Director, CESA Executive Director

wleon@cleanegroup.org

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The Value Proposition for Energy Storage at the Sterling Municipal Light Department

April 27, 2—3:30pm ET

Bringing the Benefits of Solar to Low-Income Residents through Nonprofit Solar Crowd-Financing

May 25, 1—2pm ET

www.cesa.org/webinars