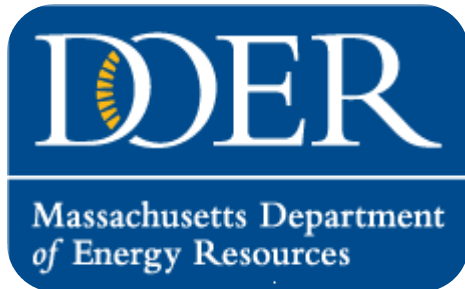


Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth



COMMONWEALTH OF MASSACHUSETTS

Charles D. Baker, Governor

Karyn E. Polito, Lt. Governor

Matthew A. Beaton, Secretary

Judith Judson, Commissioner

**Boston Bar
Association Brown
Bag**

October 31, 2017

Boston, MA

Solar Massachusetts Renewable Target (SMART) Program Overview

Agenda

- SMART Program Overview
- Final regulation summary
- Tariff filing summary
- Next steps and timing

Basic Features of SMART Program

- 1,600 MW AC declining block tariff program
- Applies to all electric distribution companies
- 10 or 20-year fixed price term depending on project capacity (10-year for ≤ 25 kW AC, 20-year for > 25 kW AC)
- Compensation structure differentiated between behind-the-meter and standalone systems
- Base compensation rates set according to project size following initial competitive procurement
- Adders based on location, off-taker type (community solar, public, low income, etc.) and those that provide unique benefits, including solar tracking systems and energy storage projects
- Base compensation rates decline by 4% in each block following Block 1
- Maximum project size of 5 MW per parcel

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 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 (via Net Metering Tariffs)
 - Qualifying facility tariff (via QF Tariffs)
 - Alternative on-bill crediting mechanism (via SMART Tariffs)
- Alternative on-bill crediting mechanism is a new energy compensation option that is designed to be an alternative to virtual net metering
- Alternative on-bill credit is not proposed to be made available to facilities with on-site load

Additional Program Features

- New program will do more to steer projects towards optimal locations by providing location based adders and subtractors
 - 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

Key Changes to Final Regulation

- Following its review of public comments, DOER promulgated the final SMART regulation on 8/25/17, making the following notable changes:
 - Distribution company specific compensation rates vs. uniform statewide rates
 - Increased ceiling price for initial procurement from \$0.15/kWh to \$0.17/kWh
 - Block 1 base compensation rates now established based on mean selected bid price from initial procurement
 - Adder caps eliminated
 - Adders decline by 4% after first 80 MW
 - DOER may establish different adder block tranche sizes after first 80 MW
 - Changes to project segmentation rules
 - Changes and clarifications to land use and performance standards
 - Established 35% limit per Capacity Block for facilities ≤ 25 kW AC
 - Added Floating Solar Tariff Adder of \$0.03/kWh
 - Added language prohibiting capacity expansions, with exceptions
 - Modified formula for Behind-the-Meter Solar Tariff Generation Unit incentive calculation

Initial Competitive Procurement

- One time procurement, run individually by each distribution company
- Equal to one-half of each distribution company's initial Capacity Block (approximately 100 MW statewide)
- In order to qualify, facilities must:
 - Be Non-metered Facilities (i.e. Qualifying Facilities)
 - Not seek Compensation Rate Adders
 - Provide executed ISA, site control, and non-ministerial permits with bid
- Selected projects will not be eligible to withdraw their proposal and reapply under a Capacity Block until 800 MW of Statements of Qualification have been issued
- Provide a performance guarantee deposit
 - Equal to no more than \$25/kW of capacity
 - Refunded if project is constructed within 12 months
- Projects granted an award will receive the Clearing Price (i.e. marginal bid price in applicable distribution company service territory)
- Block 1 Compensation Rates for declining block will be equal to the mean bid price of selected projects, unique to each distribution company service territory
- Block 1 Compensation Rates for projects ≤ 1 MW set according to Base Compensation Rate Factors
- DOER, in consultation with distribution companies, reserves right to determine if solicitation non competitive
- DOER reserves right to establish Block 1 Base Compensation Rates for each distribution company service territory
- RFPs to be issued by EDCs very soon
- Final results and compensation rates likely will be announced in early January

Capacity Based Compensation Factors for Facilities Equal to or Less Than 1 MW AC

Capacity Based Compensation Rates (kW AC)		
Generation Unit Capacity	Capacity Based Rate Factor (% of Average Bid 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 5,000 kW AC	100%	20-year

1. Must be an R-2 customer to qualify

Sample Compensation Rates with \$0.15/kWh Average Price

Capacity Based Compensation Rates (kW AC)			
Generation Unit Capacity	Capacity Based Rate Factor (% of Average Bid Price)	Capacity Based Rate (\$/kWh)	Term Length
Low income less than or equal to 25 kW AC ¹	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 5,000 kW AC	100%	\$0.1500	20-year

1. Must be an R-2 customer to qualify

Adder Values

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

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

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

Solar Tracking Adder	
Type	Adder Value (\$/kWh)
Solar Tracking	\$0.01

Capacity Block Allotments

- Blocks will be divided proportionally using 2016 distribution load data:

Distribution Company	2016 Distribution Load (MWh)	% Share of Distribution Load	Approximate Block Size (MW)
Mass Electric	21,094,198	45.0%	90.0
Nantucket	176,964	0.4%	0.8
NSTAR (Eversource)	21,443,702	45.8%	91.6
WMECO (Eversource)	3,708,396	7.9%	15.8
Unitil	462,444	1.0%	2.0
Total	46,864,431	100.0%	200.0

- Initial competitive procurements will be for half of the first capacity block for each distribution company (approximately 100 MW)
- National Grid, NSTAR, Unitil, and WMECO will have 8 blocks, with a 4% decrease between blocks
- Nantucket may have fewer than 8 blocks, with larger decrease between blocks
- All blocks will have a minimum of 20%, and maximum of 35% reserved for projects ≤ 25 kW AC

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	45.0	27.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	576.0
Nantucket Electric	0.4	2.2	2.2	N/A	N/A	N/A	N/A	N/A	N/A	4.8
NSTAR	45.8	27.5	73.3	73.3	73.3	73.3	73.3	73.3	73.3	586.4
WMECO	7.9	4.7	12.6	12.6	12.6	12.6	12.6	12.6	12.6	100.8
Unitil	1	0.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	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	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	144.0
Nantucket Electric	0.4	0.4	N/A	N/A	N/A	N/A	N/A	N/A	0.8
NSTAR	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	146.4
WMECO	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	25.6
Unitil	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.2
									320.0

Incentive Payments:

Standalone vs. Behind-the-Meter

- **Standalone facilities:** Facilities with no associated load other than parasitic or station load
 - Net Metered, Alternative On-bill Credit, and Non-net Metered Solar Tariff Generation Units
 - Incentive payment varies over life of project and is equal to all-in compensation rate (i.e. base + adders) *minus* the value of the energy
- **Behind-the-Meter Facilities:** Any facility that does not meet the definition of standalone
 - Fixed incentive payment value determined at the time it is interconnected

Standalone Incentive Calculation

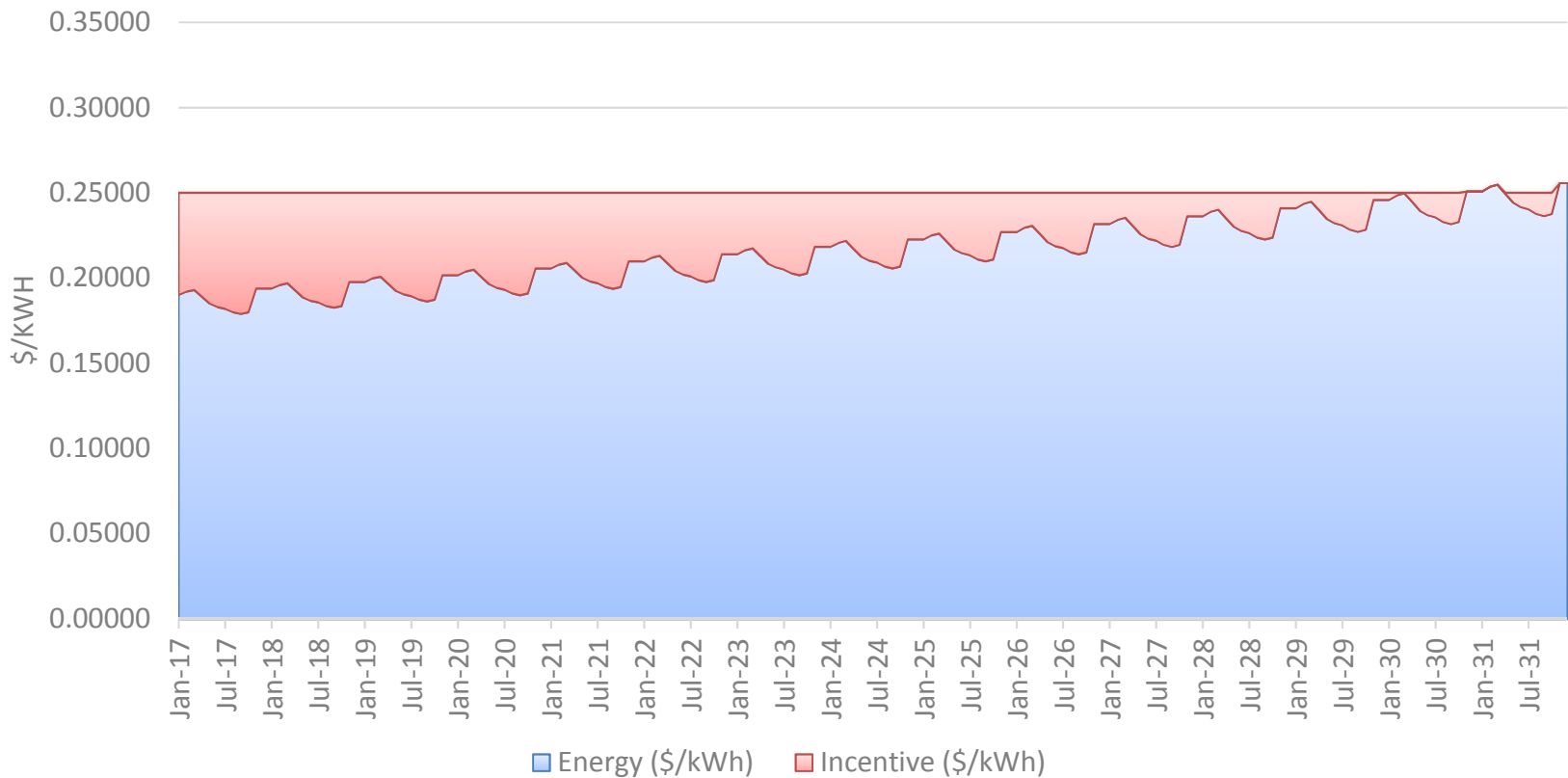
$$\begin{aligned} & \text{Standalone Solar Tariff Generation Unit Incentive Payment} \\ & = (\text{Capacity Based Rate} + \text{Adders} - \text{Greenfield Subtractor}) * \text{kWh} \\ & - \text{Value of Energy Generated} \end{aligned}$$

- **Example:**

- A 500 kW Net Metered Building Mounted facility qualifies under Block 1 at a \$0.1875/kWh all-in compensation rate
- Adder is \$0.02/kWh
- Greenfield Subtractor is \$0.00/kWh
- Net metering credit value is \$0.11/kWh
- Initial incentive payment would be approximately \$0.0975/kWh (\$0.2075 - \$0.11), but will vary as net metering credit value fluctuates
- Total compensation value will always be \$0.2075/kWh for entire 20-year tariff term

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

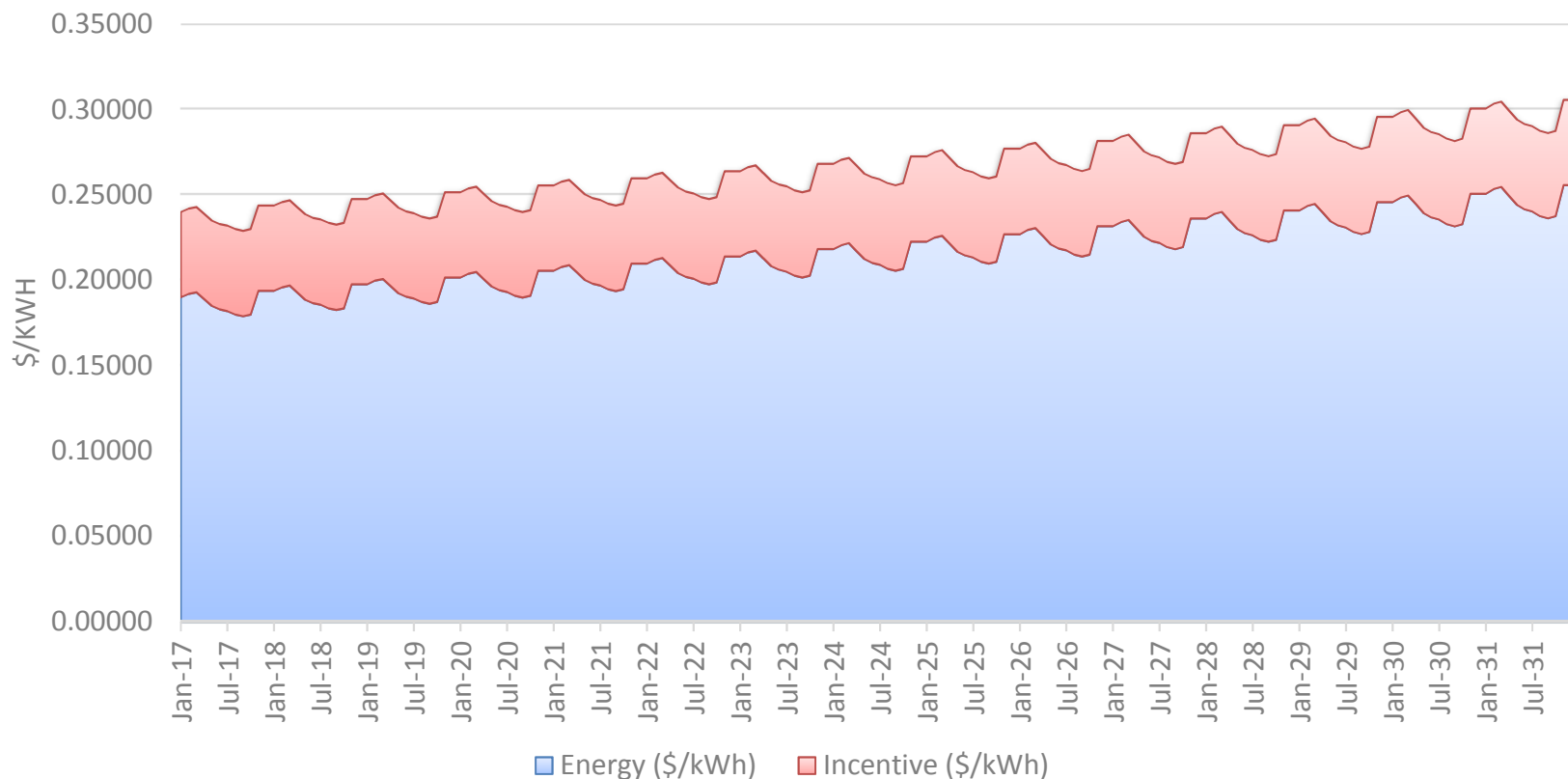
Behind-the-Meter Incentive Calculation

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

- **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

Behind-the-Meter Generator Example

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



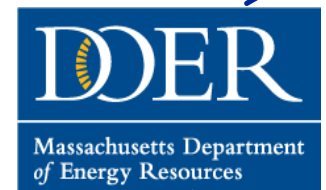
Note: Graph is illustrative of how payments would be determined and does not reflect projected values

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Land Use

- All projects are categorized according to land use
- Category 1- No Greenfield Subtractor
 - Category 1 Agricultural (facilities located on Land in Agricultural Use or Prime Agricultural Farmland)
 - Agricultural Solar Tariff Generation Units
 - Building Mounted Solar Tariff Generation Units
 - Solar Tariff Generation Units sized to meet no greater than 200% of annual operational load of an agricultural facility
 - Category 1 Non-Agricultural
 - Ground mounted ≤ 500 kW
 - Ground mounted > 500 kW and $\leq 5,000$ kW that are (1) on land that has been previously developed or (2) on land in a solar overlay district or zoned for solar or power generation
 - Building Mounted, Brownfield, Landfill, Canopy, and Floating Solar Generation Units
- Category 2- Half Greenfield Subtractor
 - Zoned Commercial/ Industrial and not previously developed
- Category 3- Full Greenfield Subtractor
 - All other project types
- Ineligible Land Use
 - Article 97 Land (unless it meets Category 1 criteria)
 - Wetland Resource Areas
 - Historical register sites (except as authorized by regulatory bodies)
- Previously Developed is defined as having pre-existing paving, construction, or altered landscapes excluding alterations resulting from ag use, forestry, or use as a preserved natural area

Project Type	Category 3	Category 2	Category 1	Rooftop	Brownfields	Landfill	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



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

Land Use Performance Standards

- All ground mounted facilities must comply with the following performance standards:
 - No removal of all field soils
 - existing leveled field areas left as is without disturbance
 - where soils need to be leveled and smoothed, such as filling potholes or leveling, this shall be done with minimal overall impact with all displaced soils returned to the areas affected;
 - ballasts, screw-type, or post driven pilings and other acceptable minimal soil impact methods that do not require footings or other permanent penetration of soils for mounting are required, unless the need for such can be demonstrated;
 - any soil penetrations that may be required for providing system foundations necessary for additional structural loading or 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 penetration and trenching work is completed;
 - no concrete or asphalt in the mounting area other than ballasts or other code required surfaces, such as transformer or electric gear pads;
 - address existing soil and water resource concerns that may be impacted to ensure the installation does not disturb an existing soil and water conservation plan or to avoid creating a negative impact to soil and water conservation best management practices, such as stimulating erosion or water run-off conditions;
 - limited use of geotextile fabrics; and
 - maintain vegetative cover to prevent soil erosion

Project Segmentation and Capacity Expansion Limitations

- No more than one Building Mounted Generation Unit on a single building, or one ground-mounted Solar Tariff Generation Unit on a single parcel or contiguous parcels of land, shall be eligible to receive a Statement of Qualification as a Solar Tariff Generation Unit, with the following exceptions:
 - Projects ≤ 25 kW can be located on contiguous parcels
 - ≤ 25 kW, canopies, and building mounted projects can be located on the same parcel provided they are separately metered
 - ≤ 25 kW or building mounted located on the same building, provided they are separately metered and serve separate tenants
 - Any facility located on the same or contiguous parcel as another unit, provided the application for the new facility is submitted 12 months after the application for the existing
 - Facilities located across multiple parcels, provided they are behind a single meter, interconnection point, and are less than 5 MW
 - Facilities that can demonstrate they should receive an exception for good cause
- Both direct current (DC) and alternating current (AC) capacity expansions to the capacity listed in a Solar Tariff Generation Unit's Statement of Qualification are not permitted except under the following circumstances:
 - A DC expansion that occurs within a facility's block reservation period (i.e. in between approval and final interconnection)
 - Post-interconnection DC and AC capacity expansions may be allowed if the facility can demonstrate to the DOER's satisfaction that the expansion is *de minimis* and is required for equipment replacement or reconfiguration necessary to ensure the continued operation of the facility

Public Facilities

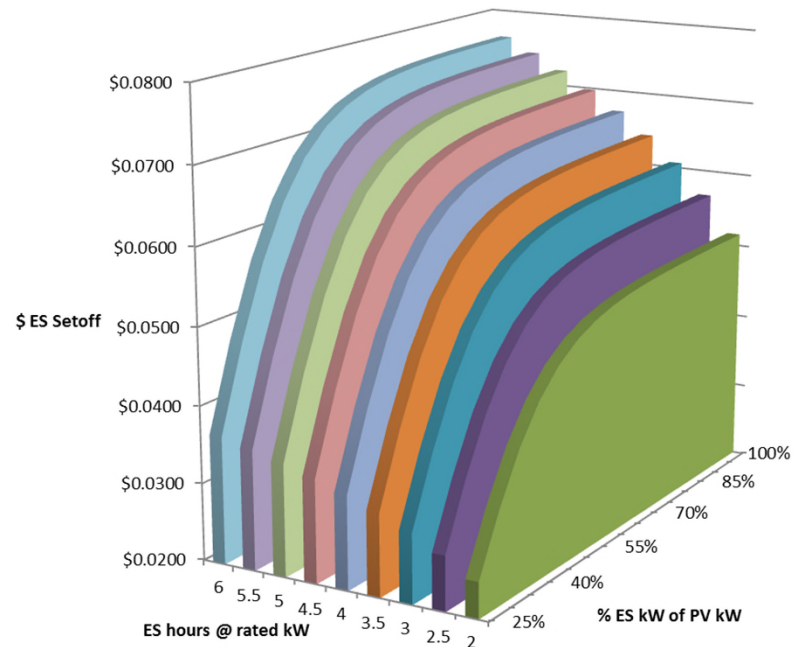
- The definition of Public Entity Generation Unit will be established as follows:
 - Public Entity Generation Unit. A solar photovoltaic Generation Unit sited on property owned by a Municipality or Other Governmental Entity that is either:
 - (a) owned or operated by a Municipality or Other Governmental 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 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's online application platform
- 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 the following:
 - Executed turnkey contract between the installer and customer
 - Customer disclosure form (under development by DOER)
 - Copy of executed lease (if 3rd party owned)
 - Evidence that a customer is low income utility customer (if low income)
 - A project > 25 kW must submit:
 - Its executed interconnection service agreement (ISA)
 - Proof of site control
 - All non-ministerial permits
 - If seeking adders, any other relevant information for DOER to make an eligibility determination as detailed in 225 CMR 20.06(1)
- 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

- Process is detailed in DOER's proposed SQ Reservation Period Guideline
- 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.

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

Solar Program Administrator

- The solar program administrator will 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
 - Developing and reviewing bids for the initial 100MW Competitive Procurement
 - Making recommendations to DOER and EDCs on project eligibility
 - Acting as public interface for SMART program, though updated website and application portal
- RFP issued in July 2017
- Responses received in August 2017
- Distribution companies executing contract soon

Proposed Model Tariff Summary

- On September 12, 2017, the distribution companies jointly filed a model tariff and accompanying testimony with the DPU (docketed as DPU 17-140)
- Filing kicks off a proceeding that will allow the SMART Program to go into effect once DPU reviews and approves the model tariff
- Companies explain that filing is designed to track closely to DOER regulatory requirements, but contains several items specifically highlighted by the companies for DPU review including, but not limited to:
 - Alternative On-Bill Credit mechanism
 - Cost recovery mechanism
 - Processes for issuing payments to generators
 - Metering requirements
 - Tariff enrollment requirements for generators
- Filing only represents a joint company proposal at this point in time
- No final decisions will be made until the DPU conducts a full proceeding and issues an order
- DPU held a public hearing and procedural conference on October 24, 2017
- Exact timing for proceeding is uncertain as DPU has not yet set a procedural schedule for the docket

Next Steps

- DOER is working closely with the distribution companies to ensure that:
 1. Solar Program Administrator selection is finalized and work on developing application, website, etc. gets underway
 2. RFPs for facilities larger than 1 MW to be issued soon
- Timing of DPU proceeding is uncertain at this time, but will become clearer once a procedural schedule is established
- Following model tariff approval, each distribution company will file compliance tariffs with the DPU, which will contain more details regarding specific cost recovery details and other company specific provisions
- DOER will provide more details regarding timing of transition from SREC program as the DPU proceeding unfolds

Municipal Light Plants (MLPs)

- DOER had several meetings with MLPs last fall regarding the development of a program specific to their service territories
- Several productive meetings have led to an interest in working with the administration to create a framework for voluntary MLP solar program
- Framework is being developed and will be presented to MLPs for discussion soon
- DOER will provide more information as soon as it becomes available