



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration

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October 19, 2018

VIA HAND DELIVERY & EMAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: PUC Docket No. 4892 - The Rhode Island Distributed Generation Board's Report and Recommendations Relating to the 2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets

Dear Ms. Massaro:

In accordance with R.I. Gen. Laws § 39-26.6-4(a)(1), the Rhode Island Distributed-Generation Board ("DG Board"), acting in consultation with the Rhode Island Office of Energy Resources ("OER"), hereby submits its recommendations to the Public Utilities Commission ("PUC") regarding the 2019 Renewable Energy ("RE") Growth Program year. The DG Board and OER ask the PUC to consider the enclosed recommendations using the process and standards described in the Distributed Generation Standard Contracts Act, R.I. Gen. Laws § 39-26.2-5(b)¹.

On behalf of the DG Board and OER, please find an original and nine copies of the enclosed packet for filing in the above-referenced docket. The packet contains the following documents:

- Report and Recommendations of the Rhode Island Distributed Generation Board on 2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets ("Report") – In accordance with R.I. Gen. Laws §§ 39-26.6-4(a)(1) and 39-26.6-5(d)², this Report sets forth the DG Board's recommended renewable energy classes, ceiling prices, target allocations, and tariff term lengths for the 2019 RE Growth Program year.
- Pre-filed direct testimony of Christopher Kearns, OER – This testimony provides an overview of the RE Growth Program; describes OER's perspective on the recommendations made by the DG Board relating to the 2019 RE Growth Program year; and addresses how such recommendations advance the goals contained within the

¹ The Renewable Energy Growth Program Act, R.I. Gen. Laws § 39-26.6-5(d), references the Distributed Generation Standard Contracts Act, R.I. Gen. Laws § 39-26.2-5 ("DG Program"). This reference suggests that the process and standards for considering the DG Board's recommendations for the DG Program should also apply to the DG Board's recommendations for the RE Growth Program.

² R.I. Gen. Laws § 39-26.6-5(d) directs the DG Board to use the same standards for setting ceiling prices as set forth in the Distributed Generation Standard Contracts Act, R.I. Gen. Laws § 39-26.2-5. R.I. Gen. Laws § 39-26.2-5 requires the DG Board to issue a report. Accordingly, the Report serves as the RE Growth Program's version of the report referenced in R.I. Gen. Laws § 39-26.2-5.

guidance document entitled *Public Utilities Commission's Guidance on Goals, Principles and Values for Matters Involving the Narraganset Electric Company d/b/a National Grid* ("Docket 4600 Goals").

- Pre-filed direct testimony of Kenneth Payne, DG Board – This testimony describes the DG Board's perspective on the recommendations made by DG Board relating to the 2019 RE Growth Program year.
- Pre-filed direct testimony of Jim Kennerly, Sustainable Energy Advantage, LLC ("SEA") – This testimony outlines the task assigned to SEA, describes the process and tools utilized by SEA, and provides SEA's perspective on the recommendations made by DG Board relating to the 2019 RE Growth Program year.
- Presentation by SEA made to the DG Board on September 24, 2018 – This is a copy of the final of three power point presentations that was made by SEA regarding ceiling prices.
- Presentation by SEA made to stakeholders on August 20, 2018 – This is a copy of the second of three power point presentations that was made by SEA regarding ceiling prices.
- Presentation by SEA made to stakeholders on July 17, 2018 – This is a copy of the first of three power point presentations that was made by SEA regarding ceiling prices.
- Meeting minutes for the DG Board meeting held on September 24, 2018 – This is a copy of the minutes for the meeting during which the DG Board voted to approve the recommendations contained within the Report.³
- Meeting minutes for the DG Board meeting held on August 28, 2018 – This is a copy of the minutes for the DG Board meeting held on August 28, 2018.
- Meeting minutes for the DG Board meeting held on July 23, 2018 – This is a copy of the minutes for the DG Board meeting held on July 23, 2018.
- Meeting minutes for the DG Board meeting held on June 25, 2018 – This is a copy of the minutes for the DG Board meeting held on June 25, 2018.
- SEA survey 1 – This is a copy of the first of three surveys sent to various stakeholders by SEA.
- SEA survey 2 – This is a copy of the second of three surveys sent to various stakeholders by SEA.

³ The minutes have not yet been formally approved because the DG Board has not convened since its September 24th meeting. If the DG Board makes any edits to the minutes, we will file the revised minutes in this docket.

- SEA survey 3 – This is a copy of the third of three surveys sent to various stakeholders by SEA.

The DG Board and OER support the enclosed recommendations for the 2019 RE Growth Program year and ask that they be approved by the PUC.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andrew S. Marcaccio', with a long horizontal flourish extending to the right.

Andrew S. Marcaccio
Deputy Chief of Legal Services

Enclosures

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: THE RHODE ISLAND DISTRIBUTED	:	
GENERATION BOARD'S REPORT AND	:	DOCKET NO. 4892
RECOMMENDATIONS RELATING TO THE 2019	:	
RENEWABLE ENERGY GROWTH CLASSES,	:	
CEILING PRICES, AND CAPACITY TARGETS	:	

Packet of Recommendations
Regarding the 2019 Renewable Energy Growth Program Year

Rhode Island Distributed-Generation Board &
Rhode Island Office of Energy Resources

October 19, 2018

Packet of Recommendations
Regarding the 2019 Renewable Energy Growth Program Year

- **Tab 1** - Report and Recommendations of the Rhode Island Distributed Generation Board on 2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets **(DG 2019 Packet – Page 003)**
- **Tab 2** - Pre-filed direct testimony of Christopher Kearns, Rhode Island Office of Energy Resources (“OER”) **(DG 2019 Packet – Page 026)**
- **Tab 3** - Pre-filed direct testimony of Kenneth Payne, Rhode Island Distributed Generation Board (“DG Board”) **(DG 2019 Packet – Page 034)**
- **Tab 4** - Pre-filed direct testimony of Jim Kennerly, Sustainable Energy Advantage, LLC (“SEA”) **(DG 2019 Packet – Page 040)**
- **Tab 5** - Presentation by SEA made to the DG Board on September 24, 2018 **(DG 2019 Packet – Page 056)**
- **Tab 6** - Presentation by SEA made to stakeholders on August 20, 2018 **(DG 2019 Packet – Page 083)**
- **Tab 7** - Presentation by SEA made to stakeholders on July 17, 2018 **(DG 2019 Packet – Page 100)**
- **Tab 8** - Meeting minutes for the DG Board meeting held on September 24, 2018 **(DG 2019 Packet – Page 148)**
- **Tab 9** - Meeting minutes for the DG Board meeting held on August 28, 2018 **(DG 2019 Packet – Page 151)**
- **Tab 10** - Meeting minutes for the DG Board meeting held on July 23, 2018 **(DG 2019 Packet – Page 154)**
- **Tab 11** - Meeting minutes for the DG Board meeting held on June 25, 2018 **(DG 2019 Packet – Page 157)**
- **Tab 12** - SEA survey 1 **(DG 2019 Packet – Page 160)**
- **Tab 13** - SEA survey 2 **(DG 2019 Packet – Page 169)**
- **Tab 14** - SEA survey 3 **(DG 2019 Packet – Page 171)**

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: THE RHODE ISLAND DISTRIBUTED	:	
GENERATION BOARD'S REPORT AND	:	DOCKET NO. 4892
RECOMMENDATIONS RELATING TO THE 2019	:	
RENEWABLE ENERGY GROWTH CLASSES,	:	
CEILING PRICES, AND CAPACITY TARGETS	:	

**Report and Recommendations of the Rhode Island Distributed Generation Board for the
2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets**

October 19, 2018

I. INTRODUCTION

The Rhode Island Distributed-Generation Board (“DG Board”)¹ hereby submits its recommendations to the Public Utilities Commission (“PUC”) regarding the renewable energy classes, ceiling prices, target allocations, and tariff term lengths for the 2019 Renewable Energy (“RE”) Growth Program year in accordance with R.I. Gen. Laws §§ 39-26.6-4(a)(1), 39-26.6-5(d), and 39-26.2-52. The recommendations set forth herein were approved by the DG Board at its meeting on September 24, 2018 and were endorsed by the Rhode Island Office of Energy Resources (“OER”). For a summary of the recommendations, please see attached Schedule 2 and Schedule 3.

II. GOALS AND OBJECTIVES

The purpose of the RE Growth Program is “to facilitate and promote installation of grid-connected generation of renewable-energy; support and encourage development of distributed renewable energy generation systems; reduce environmental impacts; reduce carbon emissions that contribute to climate change by encouraging the siting of renewable energy projects in the load zone of the electric distribution company; diversify the energy generation sources within the load zone of the electric distribution company; stimulate economic development; improve distribution system resilience and reliability within the load zone of the electric distribution company; and reduce distribution system costs.” See R.I. Gen. Laws § 39-26.6-1. Consistent with such purpose, the anticipated outcomes for the 2019 RE Growth Program are the following:

- (1) A diversified renewable energy program with a portion of the megawatt (“MW”)

¹ Please see attached Schedule 1 for a list of the DG Board members.

² The Renewable Energy Growth Program Act, R.I. Gen. Laws § 39-26.6-5(d), references the Distributed Generation Standard Contracts Act, R.I. Gen. Laws § 39-26.2-5 (“DG Program”) and directs the DG Board to use the DG Program’s standards when setting forth its recommendations for the RE Growth Program.

capacity to support each sector.

(2) As appropriate, continued decreases in ceiling prices in each renewable energy class – signaling increased program cost effectiveness.

(3) Economic development with the State’s renewable energy market.

(4) Maintaining a consistent and predictable RE Growth Program and associated capacity targets from year-to-year for both residential and commercial associated renewable energy companies allowing such companies to operate, maintain staffs, and develop complex projects that may have potential multiple year lead times before submitting a proposal to The Narragansett Electric Company d/b/a National Grid (“National Grid”).

III. RENEWABLE ENERGY CLASSES

Consistent with R.I. Gen. Laws §§ 39-26.6-3(15), 39-26.6-4(a)(1), 39-26.6-7(b), and 39-26.6-7(c), the DG Board has set forth in Table 1 below the recommended renewable energy classes and eligible system sizes for the 2019 RE Growth Program year. With the exception of the addition of the Commercial Solar – Carport class and the Large Solar – Carport class, the recommended 2019 classes are the same as the classes and sizes that were approved by the PUC for the 2018 RE Growth Program year.

Table 1	
Renewable Energy Classes and Eligible System Sizes	
Renewable Energy Class	Eligible System Sizes
Small Solar I	1 to10 kW DC
Small Solar II	11 to 25 kW DC
Medium Solar	26 to 250 kW DC
Commercial Solar	251 to 999 kW DC
Commercial Solar - Carport	251 to 999 kW DC

Table 1	
Renewable Energy Classes and Eligible System Sizes	
Renewable Energy Class	Eligible System Sizes
Large Solar	1 to 5 MW DC
Large Solar - Carport	1 to 5 MW DC
Small Wind	10 to 999 kW DC
Large Wind	1.0 to 5.0 MW DC
Anaerobic Digestion	≤ 5 MW DC
Small Scale Hydropower II	≤ 5 MW DC
Community Remote – Commercial Solar	251 to 999 kW DC
Community Remote – Large Solar	1 to 5 MW DC
Community Remote – Large Wind	1.0 to 5.0 MW DC

IV. CEILING PRICES

R.I. Gen. Laws §§ 39-26.6-5(d) and 39-26.2-5 set forth the standards for the DG Board to apply when developing and recommending ceiling prices to the PUC. As they have done for prior RE Growth program years, the DG Board and OER had Sustainable Energy Advantage, LLC (“SEA”) develop recommended ceiling prices for review and approval by the DG Board. The DG Board, with SEA and OER, considered the following data when developing the recommend ceiling prices:

- (1) State or federal incentives including, but not limited to, tax incentives;
- (2) Pricing for newly developed renewable energy resources, by technology and size, in the ISO-New England region and the northeast corridor;
- (3) Pricing for Distributed Generation Standard Contracts executed between 2011 and 2014 and first four years (2015, 2016, 2017 and 2018) of the RE Growth Program;
- (4) 2016 State Law - Residential Renewable Energy Systems/Local Tax Exemption;

- (5) 2016 State Law - Statewide Renewable Tangible Taxes State Law;
- (6) 2017 State Law - Statewide Solar Permit (Building/Electric) Application;
- (7) Rhode Island and Massachusetts Interconnection Costs (from National Grid);
- (8) Cost effectiveness for the eligible technologies; and
- (9) Public comments and data received from stakeholders, including estimates of the cost and performance of their projects currently under development.

The DG Board developed ceiling price recommendations for each technology and size class listed in Table 1 above. The DG Board recommends that all of the solar ceiling prices include the benefit of the thirty percent (30%) federal investment tax credit (“ITC”), as the full value of this credit is available for projects achieving commercial operation or deemed to have “begun construction” by December 31, 2019.³ A prescribed phasedown of the ITC for one calendar year (to 26%) commences on January 1, 2020. While the Production Tax Credit (“PTC”) was also extended through the end of 2019, the wind PTC (or ITC in lieu thereof) is subject to an earlier phasedown than the solar ITC. As a result, the DG Board recommends that the wind ceiling prices include a benefit equal to 40% of the (30%) full value of the ITC (12%), the maximum available value to projects taking the ITC in lieu of the PTC in tax year 2019. The DG Board recommends ceiling prices for the anaerobic digestion and small-scale hydropower classes without the federal production tax credit (or ITC in lieu thereof) because this incentive is not currently available. The recommended prices further assume that standard federal accelerated depreciation benefits (with the exception of the 100% bonus depreciation election permitted under the Tax Cuts and Jobs Act

³ See IRS Notice 2018-59, *Beginning of Construction for the Investment Tax Credit under Section 48*, 22 June 2018. Available at: <https://www.irs.gov/pub/irs-drop/n-18-59.pdf>. The Notice outlines two tests (the Physical Work test and Five Percent Safe Harbor test) that taxpayers can choose to apply to determine if a project has “begun construction” in a given tax year (and thus is eligible for the Investment Tax Credit (ITC) value available for that year).

of 2017) are captured by eligible projects either placed in service (or, if taking the ITC, deemed to have begun construction) during calendar year 2019.⁴

2019 Ceiling Price Development - SEA has previously advised the development of the 2011, 2012, 2013 and 2014 Distributed Generation Standard Contracts Program (“DG Program”) and the 2015, 2016, 2017 and 2018 RE Growth Program ceiling prices. As in prior years, SEA used the Cost of Renewable Energy Spreadsheet Tool (“CREST”) Model to evaluate potential 2019 ceiling prices and prior years ceiling price development. The CREST Model was developed by SEA as both a report and transparent, publicly-available pricing tool that the National Renewable Energy Laboratory (“NREL”), a national laboratory of the United States Department of Energy, Office of Renewable Energy and Energy Efficiency, intended for use in multilateral stakeholder processes, such as the RE Growth Program ceiling price stakeholder process.⁵

To generate ceiling prices with the CREST Model, SEA collected data from renewable energy programs in Rhode Island, Massachusetts, Connecticut, Vermont, and New York. SEA also requested from National Grid the bid and cost data (including interconnection data) from the DG Program and RE Growth Program applications submitted from 2011 to 2017, as well as the first enrollment period of 2018. SEA, on behalf of the DG Board, also issued a survey to stakeholders at the beginning of the 2019 ceiling price development process (May 2018). SEA further requested data and comments from stakeholders to inform the development of a first,

⁴ See P.L.115-97 (2017). Available at: <https://www.congress.gov/115/plaws/publ97/PLAW-115publ97.pdf>.

Feedback from affected stakeholders continues to suggest that the key tax equity investors (which tend to be taxpayers with very large tax liabilities, such as banks and major multinational corporations) will continue to choose to spread their relatively scarce tax equity capital over more projects – thereby maximizing aggregate returns - rather than attempting to maximize tax benefits (and thus their returns) associated with a smaller number of projects.

⁵ For more information on the CREST model, as well as free copies of the models to download by technology, please see NREL’s CREST Cost of Energy Models page, which can be found at: <https://financere.nrel.gov/finance/content/crest-cost-energy-models>.

second, and final draft of the ceiling prices. SEA staff was made available to OER, DG Board members, and stakeholders during the development of the ceiling prices. SEA attended and participated in three (3) meetings to discuss the research conducted and data submitted, the analysis completed, and the ceiling prices recommended – the last of which occurred at the September 24th DG Board meeting, where the 2019 RE Growth Program technologies, classes and ceiling prices were approved. Please see [Table 2](#) and [Table 3](#) below for the recommended ceiling prices for the 2019 RE Growth Program year.

Table 2	
Ceiling Prices	
Renewable Energy Class	Ceiling Prices (¢/kWh)
Small Solar I (15-Year Tariff)	28.45
Small Solar I (20-Year Tariff)	24.95
Small Solar II (11-25)	27.65
Medium Solar (26-250)	23.55
Commercial Solar	17.85
Commercial Solar - Carport	29.95
Large Solar	15.15
Large Solar - Carport	23.95
Small Wind	24.05
Large Wind	19.35
Anaerobic Digestion	20.85
Small Scale Hydropower II	27.15

[Table 3 begins on next page]

Table 3	
Ceiling Prices - Community Remote Distributed Generation Classes	
Renewable Energy Class	Ceiling Prices (¢/kWh)
Community Remote – Commercial Solar	20.53
Community Remote – Large Solar	17.42
Community Remote – Large Wind	21.65

Solar (Modeling Inputs Sources) - The CREST modeling relied upon information provided by stakeholders, as well as data from the Rhode Island Renewable Energy Fund, past DG Program and RE Growth Program enrollments, National Grid, the Massachusetts Solar Carve-Out II Qualified Units List, the New York State Energy Research and Development Authority (“NYSERDA”) PowerClerk Database, the National Renewable Energy Laboratory (“NREL”), the Lawrence Berkeley National Laboratory (“LBNL”), and the United States Department of Energy to determine inputs used in modeling. National Grid also provided interconnection cost data.

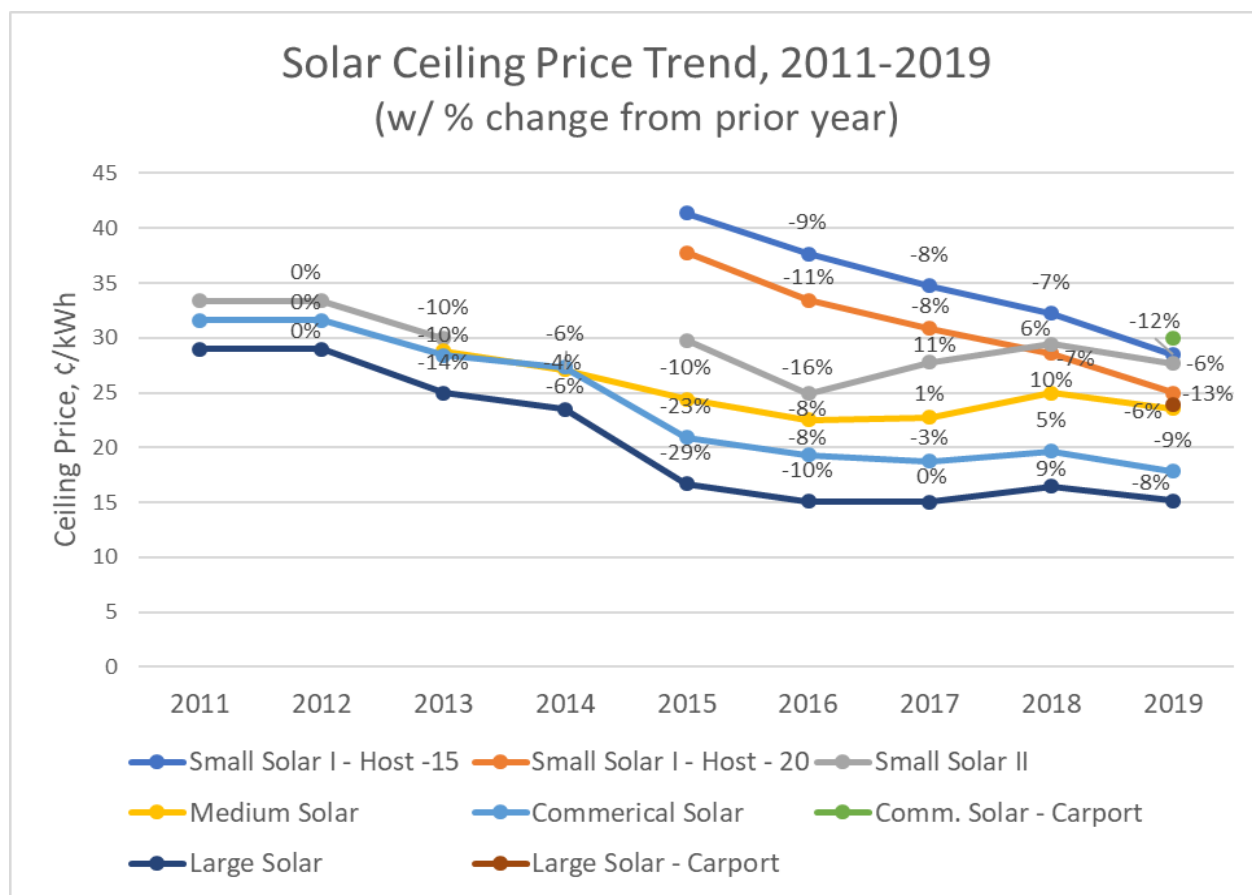
Please see Table 4 below which shows the change between 2018 actual ceiling prices and the 2019 recommended ceiling prices for the solar categories.

Table IV - Proposed 2019 Solar Ceiling Prices (Comparison to 2018 Approved Prices):

Table 4	
Proposed 2019 Solar Ceiling Prices - Comparison to 2018 Actual Prices	
Solar Ceiling Price Category	Change between 2018 Actual and 2019 Proposed Ceiling Prices
Small Solar I (15-Year Tariff)	-12%
Small Solar II	-6%
Medium Solar	-6%
Commercial Solar	-9%
Large Solar	-8%

Please see Chart 1 below which illustrates the ceiling price trend for the solar categories from 2011 to 2019 (proposed), and includes the percentage change from year to year:

Chart 1



Changes in solar ceiling prices are based on updates to installed capital costs (including interconnection) and operating expenses and changes to tax and financing assumptions. The ceiling prices for Commercial Solar – Carport and Large Solar – Carport projects also include estimates intended to account for the added cost of Trump Administration duties on imported steel and aluminum associated with the cost of canopy structures.⁶

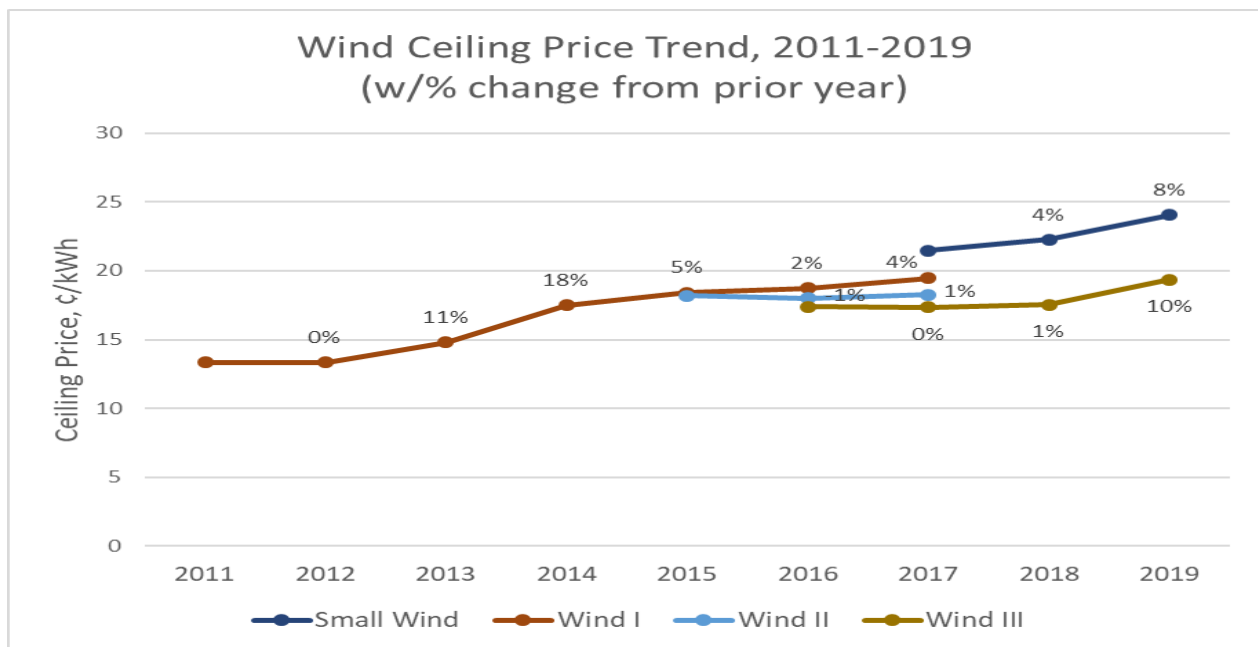
⁶ See U.S. Customs and Border Protection (CBP). *Duty on Imports of Steel and Aluminum Articles under Section 232 of the Trade Expansion Act of 1962*. Effective 23 March 2018. Available at: <https://www.cbp.gov/trade/programs->

Wind (Modeling Inputs Sources, and Comparison to Past DG Program Ceiling Prices) –

The CREST modeling relied upon information provided by stakeholders, as well as data from the Massachusetts Clean Energy Center and LBNL to determine inputs used in modeling. National Grid also provided historical interconnection cost data. The 2019 proposed ceiling prices would provide an 8 percent increase for the Small Wind class compared to its 2018 ceiling price, and a 10 percent increase for Large Wind compared to its 2018 ceiling price. The increase in ceiling prices for the Small Wind and Large Wind classes are due to the scheduled reduction in the eligible ITC value projects can monetize in lieu of the PTC (from 18% to 12%) from 2018 to 2019, as well as to other changes in tax and financing assumptions common to all ceiling price categories.

Please see Chart 2 below which illustrates the ceiling price trend for the wind categories from 2011 to 2019 (proposed), and includes the percentage change from year to year:

Chart 2

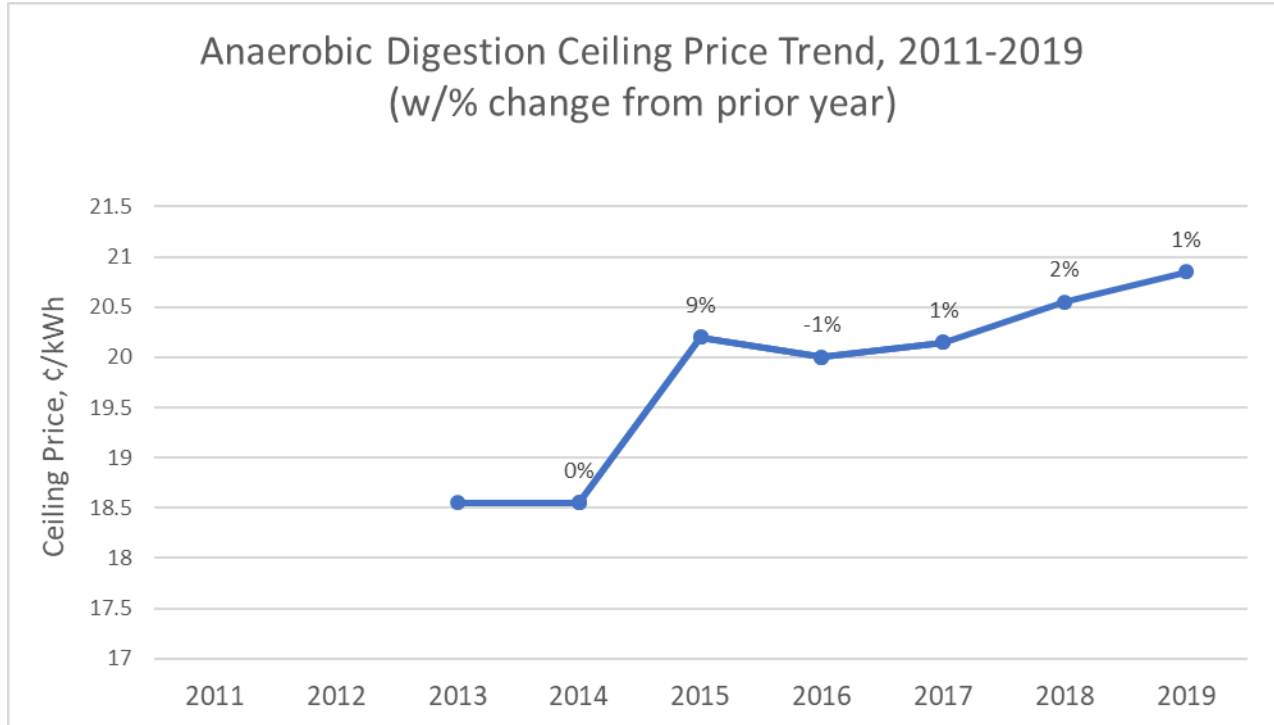


The DG Board and SEA recommend these proposed ceiling prices as necessary to support wind development in Rhode Island, which account for the difficulty of wind project siting and permitting with municipalities, and the significant cost of developing, financing, constructing and operating wind projects that cannot benefit from the economies of scale that support the cost reduction trend demonstrated in other parts of the country.

Anaerobic Digestion (Comparison to Past DG Program Ceiling Prices) – The proposed Anaerobic Digestion ceiling price would provide a 1 percent increase compared to 2018 due to changes in tax and financing assumptions.

Please see [Chart 3](#) below which illustrates the ceiling price trend for the anaerobic digestion category from 2011 to 2019 (proposed), and includes the percentage change from year to year:

Chart 3

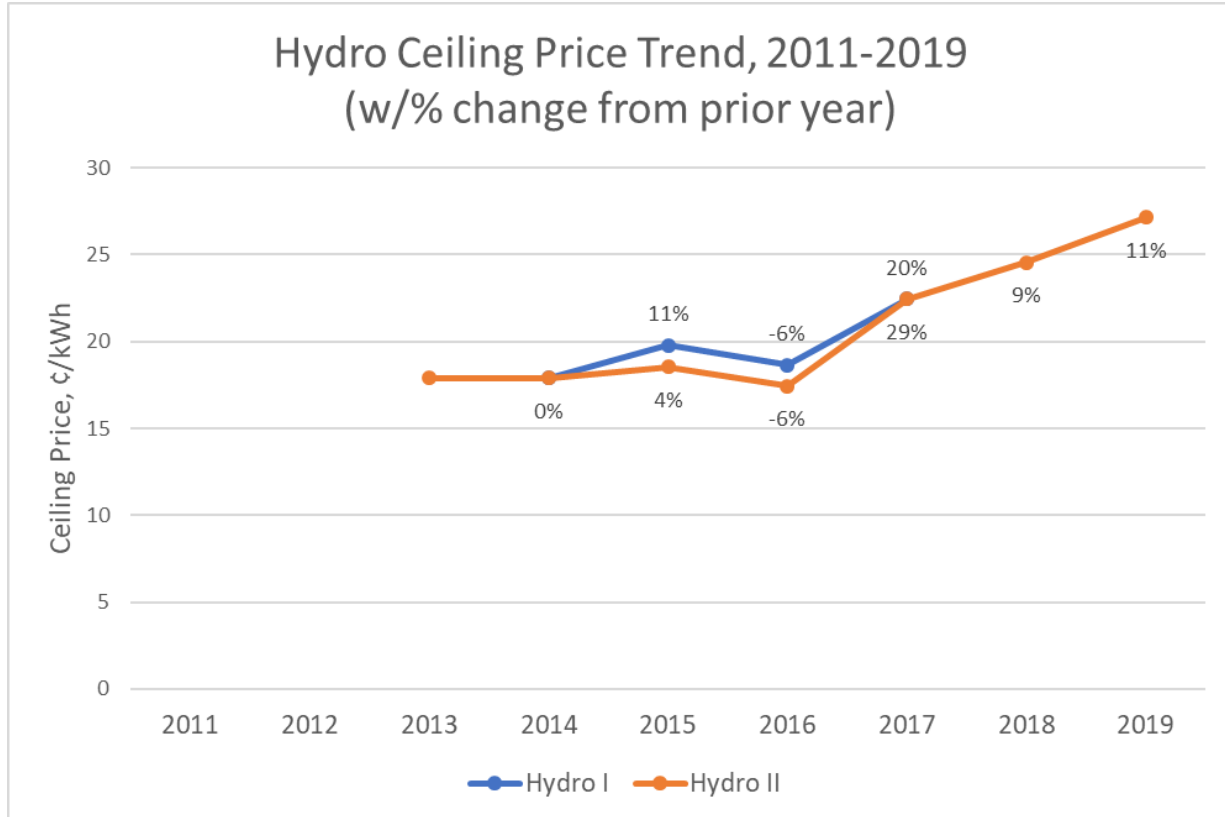


Small Scale Hydropower (Comparison to Past DG Program Ceiling Prices) -

Hydroelectric development generally requires longer lead-times and is subject to more site-specific cost variation than other renewable energy technologies. As a mature technology, where available resources have largely been developed over the last 100+ years, there are limited opportunities for incremental distributed-scale hydro development. The increase in the recommended ceiling prices represents reduced expected post-contract revenue from selling output into wholesale energy markets, as well as information gathered from small hydropower developers regarding the impact of Trump Administration duties on imported steel and aluminum. The recommended 2019 ceiling price would result in an 11 percent increase from the 2018 ceiling prices for hydro.

Please see [Chart 4](#) below which illustrates the ceiling price trend for the hydropower category from 2011 to 2019 (proposed), and includes the percentage change from year to year:

Chart 4



Please see Table 5 below which provides a comparison of the proposed 2019 ceiling prices to those approved by the PUC for the 2018 RE Growth Program:

Table 5				
2019 RE Growth Program Recommended Ceiling Prices v. 2018 RE Growth Program Approved Ceiling Prices (¢/kWh)				
Renewable Energy Class	2018		2019	
	Size	Price (¢/kWh)	Size	Price (¢/kWh)
Small Solar I (15-Year Tariff)	1-10 kW	32.25	1-10 kW	28.45
Small Solar I (20-Year Tariff)	1-10 kW	28.55	1-10 kW	24.95
Small Solar II	11-25 kW	29.45	11-25 kW	27.65
Medium Solar	26-250 kW	24.95	26-250 kW	23.55
Commercial Solar	251-999 kW	19.65	251-999 kW	17.85
Large Solar	1-5 MW	16.45	1-5 MW	15.15
Small Wind	< 1 MW	22.25	< 1 MW	24.05
Large Wind	N/A	17.55	1-5 MW	19.35
Anaerobic Digestion	501-1000 kW	20.55	≤ 5 MW	20.85
Small Scale Hydropower II	250-1000 MW	24.55	≤ 5 MW	27.15

V. ALLOCATION & ENROLLMENT PLANS

As of this Report's filing, the 2019 RE Growth Program will provide 55.562 MW of total nameplate capacity for fixed price and competitively bid projects. There will be 11.162MW of capacity available for fixed priced projects with the small solar program and 44.4 MW available through a competitive bidding process. Overall, approximately 80% of the 2019 RE Growth Program would be competitively bid. The total MW capacity for the 2019 RE Growth Program reflects the capacity made available for the program year, in addition to capacity from terminated projects that were awarded contracts from the 2011-2014 DG Program and terminated tariff

capacity from the 2015-2017 RE Growth Program years.

Please see Table 6 below for the DG Board's recommended allocation plan for the 2019 RE Growth Program year. The allocation plan will continue one of the DG Board's primary objectives in having a consistent and predictable program for the renewable market and interested homeowners, businesses, municipalities, farmers and others to plan projects and participate in.

Table 6	
Allocation Plan	
Renewable Energy Class	Megawatt/Kilowatt Allocation
Small Solar I & II	11.162 MW DC
Medium Solar	5.5 MW DC
Commercial Solar	6.0 MW DC
Commercial Solar - Community Remote	5 MW DC
Large Solar	10 MW DC
Large Solar - Community Remote	4 MW DC
Commercial Solar - Carport and Large Solar - Carport	6.5 MW DC
Small Wind	0.400 kW DC
Community Remote and Non-Community Remote Wind I, II and III	6.0 MW DC
Anaerobic Digestion I	1.0 MW DC
Anaerobic Digestion II	
Small Scale Hydropower I	
Small Scale Hydropower II	
Total	55.562 MW DC

2019 RE Growth Enrollment Plan Recommendations – The DG Board recommends the following for the 2019 RE Growth Small Solar and Commercial Renewable Programs:

- (1) Allow the MW rollover rule for anaerobic digestion, small scale hydropower and wind

classes to occur during the first and second enrollments in 2019. If there are no projects submitted in the third enrollment to National Grid for these technologies or other eligible technologies, then the MW capacity can be redirected to where there is the greatest demand for the overall program.

(2) Continuous open enrollment for the Small Solar Program that will open on April 1st. This is how the 2015-2018 RE Growth Program have operated and will allow homeowners, businesses, and solar companies the ability to submit their tariff applications on a rolling basis to National Grid and would allow small solar project customers to participate when they are ready.

First Enrollment – Please see Table 7 below which shows the DG Board's recommendations for the first commercial enrollment in April 2019:

Table 7	
First Commercial Enrollment in April 2019	
Renewable Energy Class	Megawatt/Kilowatt Allocation
Small Solar I & II	11.162 MW DC ⁷
Medium Solar	5.5 MW DC
Commercial Solar	6.0 MW DC
Commercial Solar - Community Remote	5 MW DC
Large Solar	10 MW DC
Large Solar - Community Remote	4 MW DC
Commercial Solar – Carport and Large Solar - Carport	6.5 MW DC
Small Wind	0.400 kW DC
Community Remote and Non-Community Remote Wind I, II and III	6.0 MW DC

⁷ The continuous Small Solar Program is from April 2019 to March 31, 2020.

Table 7	
First Commercial Enrollment in April 2019	
Renewable Energy Class	Megawatt/Kilowatt Allocation
Anaerobic Digestion I	1.0 MW DC
Anaerobic Digestion II	
Small Scale Hydropower I	
Small Scale Hydropower II	
Total	55.562 MW DC

Second and Third Enrollments – The second (July) and third (September) enrollment quantities will be dependent on the results of the first enrollment.

VI. SOLAR QUALITY ASSURANCE

OER has engaged a consultant, the Cadmus Group, to provide a study and report on quality assurance for the RE Growth Program. Cadmus completed the report entitled *Study of Renewable Energy Installation Quality in the Renewable Energy Growth Program* in April 2017 (“QA Report”). The QA Report summarized the findings of 88 small scale RE Growth projects as well as two medium solar and one wind inspection. Several recommendations for improving solar photovoltaic (“PV”) quality in the small scale RE Growth program were included in the conclusions of the QA Report.

Cadmus has continued quality assurance work in 2018, with the added addition in the scope of work to include a customer survey of RE Growth customers. An interim report entitled *Study of Renewable Energy Installation Quality in Rhode Island – Round 2* was provided to OER in June 2018. Additional time was granted to Cadmus for inspections in 2018 for larger scale PV projects. These larger projects needed more time to become operational and interconnected before inspections could be scheduled. Cadmus will present a final report at the October DG Board

meeting. This report will also include the findings from the survey as well as the inspections.

On January 10, 2018, the PUC held a technical session related to docket 4774. During this session, the PUC requested that Cadmus, OER, and National Grid go through the recommendations in the 2017 QA Report and provide a verbal update on what work each entity had completed towards the recommendations. The PUC requested that OER and National Grid provide an update on implementation of the recommendations at a future 2018 technical session.

OER created several recommendations based from the 2017 QA Report, with the goal of at least one recommendation from each of the major categories: Educational, Programmatic, and Ongoing Review Work. These new recommendations for the 2019 RE Growth Program year were based on conversations with National Grid, DG Board members and Cadmus staff, feedback from the solar PV industry through surveys, and internal discussions. During the DG Board meetings, quality assurance recommendations were discussed. The DG Board approved the following four recommendations at the September DG Board meeting.

(1) New State Licensing Requirement Disclosure

Per R.I. Gen. Laws § 5-65-1, a registered contractor or firm with a contractor's registration shall perform the work associated with the installation of solar energy systems or equipment (i.e. racking systems, in ground mounting or anchoring).

Recommendation: National Grid shall incorporate and require that renewable energy firms holding R.I. General Contractors registration provide their license number.

Action: OER shall perform a check on at least 10-20 projects on the monthly small solar spreadsheets provided by National Grid to OER and also the three (3) competitive commercial enrollment results to ensure that firms follow this requirement. In addition, OER will follow up with any awarded REG tariff project that leaves this field blank to ensure that they have a

contractor's registration number. If a firm is not in compliance, OER will send both an email to the firm as well as National Grid.

Note: This new disclosure aspect of the 2019 RE Growth applicable documents will not be required in order to move onto the next field on the interconnection application with RE Growth projects. OER will collect data on non-compliance with this new requirement and will report back to the DG Board and the PUC in late 2019 as part of the 2020 RE Growth Program filing.

(2) Total Project Cost Data Reporting

Currently a data field for total project cost is included on the interconnection application. Some installers are not filling this section out accurately. Total project cost is an important component of the RE Growth program, as OER and SEA use cost data for annual ceiling price development.

Recommendation: Total project cost shall need to be filled out by all developers and can no longer be unfilled in application filings to National Grid. Language defining what should be included and reported in the total project cost field will be added to the applicable RE Growth applications.

Action: OER will work with National Grid on defining what needs to be included in "Total Project Cost". National Grid shall deny all 2019 applications that leave this field blank from moving forward during the application review process

(3) Contracted through OER-- Independent Quality Inspector - Inspections of Solar System Sites

Inspections for the RE Growth Program are not currently mandatory for participation in the program. It can be challenging to schedule inspections because there is no language in the RE Growth program tariff stating that inspections may be required if participating in the RE Growth program.

Recommendation and Action: OER and National Grid will review and determine if disclaimer language can be added to the applicable RE Growth tariff documents and National Grid website providing that anyone seeking to participate in the RE Growth Program may have their system subject to inspection by an OER contracted third-party solar quality inspector.

(4) Self-Installers and New Program Participants

Self-installers and new installers utilizing the RE Growth Program for the first time have consistently scored poorly in both the 2017 and preliminary 2018 QA Reports. The primary reason for these low scores is a lack of education about solar PV, the RE Growth program in general, and the interconnection requirements. The 2017 QA Report recommended providing a training to these two groups.

Recommendation: Self-installers and new installers who have not installed a RE Growth small scale project prior to the 2019 program year will be required to sit through a mandatory training via webinar prior to submitting an interconnection application. A larger sample size of the new installer solar installations would require mandatory inspections. The training would be a recorded webinar which discusses the minimum technical requirements and the unique interconnection requirements of the program.

Action: This training would be developed by Cadmus, OER, and National Grid and available on the RE Growth and interconnection websites prior to April 1, 2019. National Grid would require that a Certificate of Completion, indicating that the installer has completed the training, be submitted at the time of interconnection application. OER will develop in coordination with National Grid the Certificate of Completion as part of National Grid's RE Growth tariff document filings in November.

Note: An inspection of the completed system in the case of self-installers would also be

mandatory. This would be subject to legal review by OER and National Grid.

In addition to the above recommendations, OER and National Grid will continue discussions of adopting minimum technical requirements (“MTR”), referenced as a programmatic recommendation in the QA Report for the 2019 RE Growth program. OER will, through a separate reconciliation funding request, outline the need for additional funding to have Cadmus help both entities with the development of the MTR.

Lastly, OER will provide the DG Board and the PUC with a copy of the 2018 Cadmus Quality Assurance report when it is final and provide a separate presentation to the PUC this fall or winter.

VII. CONCLUSION

After an extensive and transparent development process, the DG Board voted at its September 24, 2018 to approve the recommendations made in this Report. The DG Board and OER respectfully request the PUC to approve the recommendations contained in this Report.

DG Board Report - Schedule 1

DG Board Members		
Name	Representing	Voting or Non-Voting Member
Carol Grant	Office of Energy Resources	Non-Voting
Ian Springsteel	National Grid	Non-Voting
Kenneth Payne (Chair)	Energy Regulation and Law	Voting
Laura Bartsch	Construction of Renewable Generation	Voting
William Ferguson	Large Commercial/Industrial Users	Voting
Sam Bradner	Small Commercial/Industrial Users	Voting
Karen Stewart	Residential Users	Voting
Vacant	Low Income Users	Voting
Sheila Dormody	Environmental Issues Pertaining to Energy	Voting

DG Board Report - Schedule 2

Recommended Classes, Sizes, and Ceiling Prices for 2019 RE Growth Program Year		
Renewable Energy Class	Eligible System Sizes	Ceiling Prices (¢/kWh)
Small Solar I (15 Year Tariff)	1 to 10 kW DC	28.45
Small Solar I (20 Year Tariff)		24.95
Small Solar II	11 to 25 kW DC	27.65
Medium Solar	26 to 250 kW DC	23.55
Commercial Solar	251 to 999 kW DC	17.85
Commercial Solar - Carport	251 to 999 kW DC	29.95
Large Solar	1 to 5 MW DC	15.15
Large Solar - Carport	1 to 5 MW DC	23.95
Small Wind	10 to 999 kW DC	24.05
Large Wind	1.0 to 5.0 MW DC	19.35
Anaerobic Digestion	≤ 5 MW DC	20.85
Small Scale Hydropower II	≤ 5 MW DC	27.15
Community Remote – Commercial Solar	251 to 999 kW DC	20.53
Community Remote – Large Solar	1 to 5 MW DC	17.42
Community Remote – Large Wind	1.0 to 5.0 MW DC	21.65

DG Board Report - Schedule 3

Recommended Allocation Plan for 2019 RE Growth Program Year	
Renewable Energy Class	Megawatt/Kilowatt Allocation
Small Solar I & II	11.162 MW DC
Medium Solar	5.5 MW DC
Commercial Solar	6.0 MW DC
Commercial Solar - Community Remote	5 MW DC
Large Solar	10 MW DC
Large Solar - Community Remote	4 MW DC
Commercial Solar - Carport and Large Solar - Carport	6.5 MW DC
Small Wind	0.400 kW DC
Community Remote and Non-Community Remote Wind I, II and III	6.0 MW DC
Anaerobic Digestion I	1.0 MW DC
Anaerobic Digestion II	
Small Scale Hydropower I	
Small Scale Hydropower II	
Total	55.562 MW DC

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
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IN RE: THE RHODE ISLAND DISTRIBUTED	:	
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RECOMMENDATIONS RELATING TO THE 2019	:	
RENEWABLE ENERGY GROWTH CLASSES,	:	
CEILING PRICES, AND CAPACITY TARGETS	:	

Pre-Filed Direct Testimony of Christopher Kearns

October 19, 2018

1 **I. Introduction**

2 **Q. Please state your name and business address.**

3 A. My name is Christopher Kearns. My business address is One Capitol Hill, Providence,
4 RI 02908.

5 **Q. By whom are you employed and what is your title?**

6 A. I am employed by the Rhode Island Office of Energy Resources (“OER”) and my title
7 is Interdepartmental Manager.

8 **Q. What is the purpose of your testimony?**

9 A. My testimony is designed to: (1) Provide an overview of the Renewable Energy (“RE”)
10 Growth Program; (2) Describe OER’s perspective on the recommendations made by
11 the Rhode Island Distributed-Generation Board (“DG Board”) relating to the 2019 RE
12 Growth Program year; and (3) Address how such recommendations advance the goals
13 contained within the guidance document entitled *Public Utilities Commission’s*
14 *Guidance on Goals, Principles and Values for Matters Involving the Narraganset*
15 *Electric Company d/b/a National Grid* (referred to herein as the “Docket 4600 Goals”).

16 **II. RE Growth Program Overview**

17 **Q. What is the RE Growth Program?**

18 A. The RE Growth Program is a tariff-based, renewable-energy distributed-generation
19 financing program which was established pursuant to R.I. Gen. Laws § 39-26.6-2.

20 **Q. What is the RE Growth Program designed to do?**

21 A. Pursuant to R.I. Gen. Laws § 39-26.6-2, the RE Growth Program is designed to finance
22 the development, construction, and operation of renewable-energy distributed-
23 generation projects through a performance-based incentive system that is designed to

1 achieve specified megawatt targets at reasonable cost through competitive processes.

2 **Q. Who is responsible for implementing the RE Growth Program?**

3 A. In accordance with R.I. Gen. Laws § 39-26.6-2, the RE Growth Program is
4 implemented by the Narraganset Electric Company d/b/a National Grid (“National
5 Grid”), and guided by the DG Board, in consultation with OER, subject to the review
6 and supervision of the Rhode Island Public Utilities Commission (“PUC”).

7 **Q. What role does the DG Board play in establishing the terms and conditions for a
8 particular RE Growth Program year?**

9 A. For each RE Growth Program year, the DG Board, in consultation with OER, makes
10 recommendations to the PUC regarding various aspects of the RE Growth Program.
11 Upon PUC approval, such recommendations are incorporated into National Grid’s RE
12 Growth tariffs and become fixed terms and conditions for the correlating RE Growth
13 Program year.

14 **Q. What are some of the RE Growth Program components on which the DG Board
15 is authorized to make recommendations to the PUC?**

16 A. Specifically, the DG Board is authorized to make recommendations to:

- 17 • Add, eliminate, or adjust renewable-energy classes in
18 accordance with R.I. Gen. Laws § 39-26.6-3(15);
- 19 • Establish the make-up of renewable-energy classifications in
20 accordance with R.I. Gen. Laws § 39-26.6-4(a)(1);
- 21 • Add classifications of solar projects other than as prescribed by
22 R.I. Gen. Laws § 39-26.6-7(a) in accordance with R.I. Gen.
23 Laws § 39-26.6-7(c);

- Adopt ceiling prices and annual targets in accordance with R.I. Gen. Laws § 39-26.6-4(a)(1);
- Establish the tariff term for each renewable-energy class in accordance with R.I. Gen. Laws § 39-26.6-5(c);
- Adjust the size categories of the solar classes in accordance with R.I. Gen. Laws § 39-26.6-7(c);
- Establish the annual megawatt (“MW”) target in accordance with R.I. Gen. Laws § 39-26.6-12(b);
- Establish the MW target for each enrollment within a RE Growth Program year in accordance with R.I. Gen. Laws § 39-26.6-12(b); and
- Establish the MW target for each renewable-energy class in accordance with R.I. Gen. Laws § 39-26.6-12(b).

Q. What is OER’s role in the DG Board’s recommendations process?

A. OER is inherently involved in the DG Board’s recommendations process. In accordance with R.I. Gen. Laws § 39-26.6-2, the DG Board acts in consultation with OER. In addition, the OER commissioner serves an ex officio non-voting member of the DG Board pursuant to R.I. Gen. Laws § 39-26.2-11(a). OER also provides staffing and assistance to the DG Board.

III. OER’s Perspective - Recommendations made by DG Board

Q. Are you familiar with the *Report and Recommendations of the Rhode Island Distributed Generation Board on 2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets* (“Report”) that was submitted by the DG Board to

1 **the PUC?**

2 A. Yes

3 **Q. Does OER support the recommendations contained within the Report?**

4 A. Yes.

5 **Q. Are there any recommendations within the Report that you would like to**
6 **highlight?**

7 A. Yes. The DG Board is recommending adding commercial solar-carport and large solar-
8 carport as new renewable-energy classes with their own ceiling prices for the 2019 RE
9 Growth Program year.

10 **Q. What is the legal authority to add large scale solar carports and commercial scale**
11 **solar carports as new renewable-energy classes?**

12 A. R.I. Gen. Laws § 39-26.6-7(a) sets forth four renewable-energy classes: small-scale
13 solar projects; medium-scale solar projects; commercial-scale solar projects; and large-
14 scale solar projects. R.I. Gen. Laws § 39-26.6-7(c) and R.I. Gen. Laws § 39-26.6-3(15)
15 permits the adoption of renewable-energy classes in addition to those four classes. R.I.
16 Gen. Laws § 39-26.6-7(c) provides that “[o]ther classifications of solar projects may
17 also be proposed by the [DG Board], subject to the approval of the [PUC].” R.I. Gen.
18 Laws § 39-26.6-3(15) provides that “[f]or each program year, in addition to the classes
19 of solar distributed generation specified in § 39-26.6-7, the [DG Board] shall determine
20 the renewable-energy classes as are reasonably feasible for use in meeting distributed-
21 generation objectives from renewable-energy resources and are consistent with the goal
22 of meeting the annual target for the program year.” R.I. Gen. Laws § 39-26.6-3(15)
23 further provides that “[t]he [DG Board] may make recommendations to the [PUC] to

1 add, eliminate, or adjust renewable-energy classes for each program year.” These
2 provisions are consistent with R.I. Gen. Laws § 39-26.6-4(a)(1) which provides that
3 the DG Board may make recommendations as to “the make-up of renewable-energy
4 classifications.”

5 **Q. What is the rationale for adding commercial and large solar carports as their own**
6 **renewable-energy classes as opposed to including them within the existing**
7 **commercial and large solar classes?**

8 A. In general, it is more expensive to install solar carports than to install traditional roof
9 and ground mount solar structures. If the DG Board were to factor in the additional
10 costs associated with the installation of solar carports into the existing commercial and
11 large solar classes, the ceiling price for that existing solar class would increase.
12 Furthermore, a higher ceiling price for the existing commercial and large solar class
13 may not result in the installation of solar carports as developers would be incentivized
14 to install the less-expensive traditional roof and ground mount solar structures.

15 **Q. Is it prudent to incentive the installation of solar carports?**

16 A. Yes. Solar carports possess a space-utilization element that other commercial and large
17 solar projects may lack. Based on stakeholder feedback, including municipal planning
18 board and town council officials, those stakeholders that may be concerned about the
19 siting of solar projects in undeveloped parcels or located with significant tree cover
20 would be supportive of launching solar carport canopy project in 2019.

21 **Q. You mentioned stakeholder input. Could you describe the stakeholder process to**
22 **which you are referring?**

23 A. Yes. I am referring to the various community solar outreach events that OER has led

1 or attended since June. These events are held in different parts of the the state.
2 Specifically, we have held these presentations and engaged with various municipal
3 officials, constituents and stakeholder groups in Cranston, Charlestown, Hopkinton,
4 Providence, Coventry, Burrillville, Bristol, Jamestown, Westerly and Warwick since
5 mid-June. By attending these events, we obtained a better understanding of local solar
6 siting concerns, challenges and goals regarding different scales of solar development.
7 This stakeholder process is separate from and in addition to the stakeholder process
8 utilized by the DG Board's consultant, Sustainable Energy Advantage, LLC ("SEA").
9 SEA's stakeholder process is described in the direct testimony of Jim Kennerly.

10 **Q. Do you believe the recommended 2019 RE Growth Program year accurately**
11 **reflects the feedback from both the municipal solar siting outreach meetings**
12 **across the state and SEA stakeholder process?**

13 **A. Yes**

14 **IV. Docket 4600 Goals**

15 **Q. Are you familiar with the PUC guidance document entitled *Public Utilities***
16 ***Commission's Guidance on Goals, Principles and Values for Matters Involving The***
17 ***Narragansett Electric Company d/b/a National Grid ("PUC Guidance Document")?***

18 **A. Yes**

19 **Q. Beginning on page 3 and continuing onto page 4 of the PUC Guidance Document,**
20 **there are eight goals for what the state's electric system should seek to accomplish.**
21 **Have you had a chance to read these goals?**

22 **A. Yes**

23 **Q. Is it fair to say that the PUC's acceptance of the DG Board's recommendations**

1 **for the 2019 RE Growth Program year would advance these goals?**

2 A. Yes

3 **Q. Could you explain?**

4 A. Yes. OER believes that the acceptance of the DG Board's recommendations for the
5 2019 RE Growth Program year achieves some of the goals identified in the PUC
6 Guidance Document, while achieving the statutory requirements of the law adopted by
7 the General Assembly. Specifically, OER believes that elements are achieved through
8 diversifying the state's energy resources with a variety of scale and eligible distributed
9 generation renewable resources; strengthens the state's economy through jobs
10 associated with renewable energy development; assists in achieving the state's climate
11 change objectives in reducing greenhouse gas emissions through distributed generation
12 deployment of systems across the state; compensates the value that distributed energy
13 resources provide through the recommended 2019 ceiling prices developed by SEA;
14 and appropriately compensates the distribution utility for administering and overseeing
15 all of the pending and active projects over the next fifteen to twenty years through its
16 remuneration compensation, which is a requirement of the law.

17 **V. Conclusion**

18 **Q. Does that conclude your testimony?**

19 A. Yes

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CEILING PRICES, AND CAPACITY TARGETS	:	

Pre-Filed Direct Testimony of Kenneth F. Payne

October 19, 2018

1 **I. Introduction and Qualifications**

2 **Q. Please state your name, employer and title.**

3 A. My name is Kenneth F. Payne, I am the Chairperson of the Rhode Island Distributed-
4 Generation Board (“DG Board”).

5 **Q. Please provide your background in the area of renewable technologies.**

6 A. I have been actively involved in renewable energy issues in Rhode Island for more
7 than a decade. As senior policy advisor to the Rhode Island Senate, I was directly
8 involved in drafting the Renewable Energy Standard Act of 2004; the Comprehensive
9 Energy Conservation, Efficiency, and Affordability Act of 2006; and the Net
10 Metering Amendments of 2007. In late 2007, I joined the research faculty of the
11 University of Rhode Island (“URI”), where I helped organize the Energy Fellows and
12 was asked to serve as chairperson of the stakeholders process for the Ocean Special
13 Area Management Plan, which facilitated offshore siting of wind turbines. In 2010, I
14 was appointed to lead the Rhode Island Office of Energy Resources (“OER”). During
15 2011, I represented the Chafee Administration in drafting the comprehensive
16 overhaul of the State’s renewable energy financing laws, the package of bills included
17 the Distributed-Generation Standard Contracts Act; and as Administrator I oversaw
18 the development of the distributed generation contracts, ceiling prices and allocation
19 plan. I have been a member and the Chairperson of the Distributed Generation
20 Standard Contracts Board, now called the Distributed Generation Board (“DG
21 Board”), since 2013.

22 **Q. What was your role in the development of the 2018 Renewable Energy (“RE”)**
23 **Growth Program?**

1 A. I was, and am, a member and the chairperson of the DG Board. In that capacity, I
2 presided at DG Board meetings, represented the DG Board interactions with the
3 consultant retained by the OER and the DG Board, and attended community review
4 meetings jointly convened by the DG Board and OER.

5 **II. DG Board Meeting**

6 **Q. In a public meeting on September 24, 2018 did the DG Board vote to approve the**
7 **recommended ceiling prices and allocation plan for the 2019 RE Growth**
8 **Program?**

9 A. Yes.

10 **Q. Did the DG Board have a quorum?**

11 A. Yes.

12 **Q. Were there any dissenting votes?**

13 A. No.

14 **Q. Are the recommendations voted on by the DG Board reflected in the *Report and***
15 ***Recommendations of the Rhode Island Distributed Generation Board on 2019***
16 ***Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets***
17 **(“Report”) that was submitted to the Rhode Island Public Utilities Commission**
18 **(“PUC”)?**

19 A. Yes.

20 **Q. Is it your understanding that the OER and SEA on behalf of the DG Board**
21 **considered and reviewed the stakeholder feedback given during the period of the**
22 **development of the 2019 RE Growth Program recommendations prior to the DG**
23 **Board voting on the recommendations?**

1 A. Yes.

2 **III. 2019 RE Growth Program - DG Board Perspective**

3 **Q. In your estimation has anything changed in the manner in which ceiling prices**
4 **are developed?**

5 A. Yes, there now has been more than five years of experience with the Distributed
6 Generation program in Rhode Island with the result that we have much more Rhode
7 Island specific information. In the past the calculation of proposed ceiling prices was
8 more dependent on data from other jurisdictions in the Northeast and assessments
9 from the community about how things might work here in Rhode Island. Now
10 installers can and do provide the DG Board, OER, and our consultant, Sustainable
11 Energy Advantage, LLC (“SEA”), information about the market functions in Rhode
12 Island. This strengthens the process as locally specific data informs the judgments
13 that must be made in making the ceiling price calculations. Thus, there is stability in
14 the manner of the ceiling price calculations, the CREST model is still being used and
15 the consultant running the model is the same, while the process is more robust as a
16 result of greater experience.

17 **Q. Can you please provide the DG Board’s reasoning for adopting the**
18 **recommendations for the various ceiling prices and allocations of renewable**
19 **energy technologies?**

20 A. The DG Board reached a collective understanding that the recommendations
21 contained within the Report should be made to the PUC. The DG Board discussed
22 the requirements and implications of the requirements of the RE Growth Program
23 statute, looked at experience with the Distributed Generation Standard Contracts

1 program and, especially, the RE Growth program, received recommendations from
2 OER staff, took extensive input from SEA on what the CREST model runs showed,
3 and received comments on various drafts of the ceiling prices and allocation plan
4 through community review meetings. The DG Board, or SEA on behalf of the DG
5 Board, received and discussed public and renewable energy developer comments, and
6 the DG Board decided that these recommendations for 2019 RE Growth Program
7 should be submitted to the PUC for its consideration and approval. The decision
8 process was conducted in public meetings at which public comment was allowed and
9 welcomed.

10 **Q. Are there any significant changes in the 2019 RE Growth Program year?**

11 A. Yes. First, there is the addition of ceiling price categories for Commercial Solar
12 Parking Lot Canopies and Large Solar Parking Lot Canopies. For more than two
13 years there has been substantial interest in the community about use of parking lots as
14 a location for solar arrays. In 2017 the DG Board signaled its interest in this to the
15 OER and SEA. Experience was being gained in other jurisdictions, as a densely
16 populated state with small land area where siting is a major challenge, and with the
17 ability to use capacity carried forward from previous years, program 2019 looked to
18 be the optimum year in which to launch ceiling prices for parking lot canopies.
19 Second, by statute, 2019 is the year in which the DG Board can allocate megawatt
20 capacity that was not used in prior years from the Distributed Generation Standard
21 Contracts Program and RE Growth Program. The total megawatt allocation being
22 recommended for 2019 is 55.562MW DC, not the standard 40MW DC allocation of
23 last year. In addition to adding Solar Parking Lot Canopies and megawatts to support

1 those project in 2019, the DG Board is recommending increases in the megawatt
2 allocation to technology classes where demand has been the greatest, for instance
3 Small Solar I & II was substantially over subscribed last year, and the program closed
4 with more than a calendar quarter of the program year remaining. In sum, the DG
5 program continues to evolve and be responsive, consistent with statute, to conditions
6 in Rhode Island.

7 **IV. Conclusion**

8 **Q. Does this conclude your testimony?**

9 **A. Yes.**

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CEILING PRICES, AND CAPACITY TARGETS	:	

Pre-Filed Direct Testimony of Jim Kennerly

October 19, 2018

I. Introduction and Qualifications

Q. Please state your name and business address?

A. My name is Jim Kennerly. My business address is 161 Worcester Road, Suite 503, Framingham, MA 01701.

Q. By whom are you employed and what is your title?

A. I am employed by Sustainable Energy Advantage, LLC (“SEA”) and my title is Consultant.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Rhode Island Office of Energy Resources (“OER”) and Rhode Island Distributed-Generation Board (“DG Board”) in relation to the *Report and Recommendations of the Rhode Island Distributed Generation Board on 2019 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets* (“Report”) that was submitted by the DG Board to the Rhode Island Public Utilities Commission (“PUC”).

Q. Please describe your professional experience and education.

A. I have ten years of experience with climate and energy policy and its impact on markets for clean energy technologies. Of those ten years, I have seven years of professional experience directly related to renewable energy market and policy development. At SEA, I serve as the deputy lead for SEA’s distributed energy practice; lead for SEA’s Northeast Eyes and EarsSM services, which provides regulatory, legislative and policy tracking services related to Class I renewable energy markets in New England and New York; and co-lead for SEA’s Massachusetts Solar Market Study. My main areas of expert consulting services include distributed renewable energy cost, price and

1 deployment forecasting in the northeastern United States and market entry, due
2 diligence and policy advisory services. In addition to leading SEA's support to OER
3 and the DG Board in developing ceiling prices, I previously served as co-author and
4 analysis lead for *Developing a Post-1,600 MW Solar Incentive Program*¹, a report
5 commissioned (and used extensively) by the Massachusetts Department of Energy
6 Resources ("MA DOER") as the basis for key aspects of the design of the Solar
7 Massachusetts Renewable Target ("SMART") declining-block incentive program. In
8 addition to MA DOER and OER, our distributed energy team has consulted for the
9 Massachusetts Clean Energy Center, the New York State Energy Research and
10 Development Authority ("NYSERDA"), the New Hampshire Office of Consumer
11 Advocate, the Massachusetts Attorney General's Office, the Connecticut Green Bank,
12 and a wide variety of buy-side and sell-side solar and distributed energy market
13 participants.

14 Prior to working at SEA, I was a Senior Policy Analyst at the North Carolina Clean
15 Energy Technology Center ("NCCETC"), where I served as the senior analyst for the
16 energy policy team, which manages the Database of State Incentives for Renewables
17 and Efficiency ("DSIRE"), and where I led the NCCETC's participation in a national
18 technical assistance and research grant for the United States Department of Energy's
19 SunShot Initiative. Prior to that, I was a Regulatory and Policy Analyst at the North
20 Carolina Sustainable Energy Association, where I managed the organization's

¹ Michelman, T., Kennerly, J., Grace, R., Gifford, J. and Hamilton, N. *Developing a Post-1,600 Solar Incentive Program: Evaluating Needed Incentive Levels and Potential Policy Alternatives*. Prepared for the Massachusetts Department of Energy Resources, 11 October 2016. Available at: <https://www.mass.gov/files/documents/2016/10/nf/developing-a-post-1600-mw-solar-incentive-program.pdf>

1 regulatory, legislative and utility rates analysis, and was an Associate on the ENERGY
2 STAR Labeling and Residential team at ICF International.

3 I have a Master of Public Affairs degree from the Lyndon B. Johnson School of
4 Public Affairs at the University of Texas at Austin, and a Bachelor's Degree in Politics
5 from Oberlin College.

6 **Q. What is SEA's background related to renewable energy technologies?**

7 A. SEA is a consulting advisory firm that has been a national leader on renewable energy
8 policy analysis, market analysis and program design since 1998. In that time, SEA has
9 supported the decision-making of more than two hundred (200) clients, including more
10 than forty (40) governmental entities, through the analysis of renewable energy policy,
11 strategy, finance, projects and markets. SEA is known and respected widely as an
12 independent analyst, a reputation earned through the firm's ability to identify and assess
13 all stakeholder perspectives, conduct analysis that is objective and valuable to all
14 affected, and provide advice and recommendations that are in touch with market
15 realities and dynamics.

16 **Q. What is the purpose of your testimony?**

17 A. My testimony is designed to: (1) Describe the task assigned to SEA and the process
18 and tools utilized by SEA in assisting OER and the DG Board; and (2) Provide SEA's
19 perspective on the recommendations contained within the Report.

20 **II. SEA's Task & Process**

21 **Q. What was SEA's task in relation to the 2019 RE Growth Program year?**

22 A. SEA was hired by OER and the DG Board to conduct detailed research and analysis of
23 regional distributed renewable energy markets, collect additional insight through public

1 meetings, written comments, and interviews, and then to recommend ceiling prices for
2 each technology-, ownership- and size-specific class established by OER and the DG
3 Board.

4 **Q. Has SEA provided OER and the DG Board with ceiling price services in the past?**

5 A. Yes. Since 2011, SEA has served as a technical consultant to OER and, beginning in
6 2014, to the DG Board in their implementation of the Distributed-Generation Standard
7 Contracts Program (“DG Program”), R.I. Gen. Laws § 39-26.2-1 et seq., and the RE
8 Growth Program, R.I. Gen. Laws § 39-26.6-1 et seq. SEA’s role has been and is to
9 advise OER and the DG Board on the path to making informed recommendations with
10 respect to technology- and size-specific ceiling prices based on detailed research and
11 analysis.

12 **Q. Could you describe the process that SEA utilizes to develop recommended ceiling**
13 **prices?**

14 A. Yes. SEA acted as a joint facilitator of a lengthy process, reproduced each year, to
15 request, gather and analyze cost and performance data from current and prospective
16 market participants and other interested parties. Throughout the process, SEA solicits
17 empirical evidence from stakeholders regarding market trends and practices and offers
18 multiple opportunities for interested parties to participate in public meetings and submit
19 written comments which are encouraged to address both general market observations
20 and to respond directly to draft proposed ceiling price recommendations. Interviews
21 with active market participants and regional energy regulators are also conducted each
22 year. SEA utilized the National Renewable Energy Laboratory (“NREL”) Cost of
23 Renewable Energy Spreadsheet Tool (“CREST”) model to generate recommended

1 ceiling prices through multiple rounds of analysis. The process included three
2 presentations to the DG Board. At the final presentation, the DG Board discussed and
3 approved the recommendations proposed by SEA which are reflected in the Report.

4 **Q. When were the presentations made to the DG Board?**

5 A. SEA's first presentation was at a DG Board public meeting on July 17, 2018 in Lincoln,
6 RI, during which it presented the first draft of proposed ceiling price inputs and results
7 for all technology categories. SEA presented the second draft of proposed inputs and
8 results at a stakeholder meeting in Providence, RI on August 20, 2018. The final ceiling
9 price recommendations for all technology categories were presented at a DG Board
10 public meeting in Providence, RI on September 24, 2018. A copy of each presentation
11 is attached to the Report.

12 **Q. Can you explain what the CREST model is?**

13 A. Yes. The CREST model is a discounted cash flow analysis tool published by NREL.
14 SEA was the primary architect of the CREST model, which was developed under
15 contract to NREL. The CREST model is available to the public without charge, and is
16 fully transparent (that is, all formulas are visible to, and traceable by, all users). CREST
17 was created to help policymakers develop cost-based renewable energy incentives and
18 has been peer reviewed by both public and private sector market participants. The
19 model is designed to calculate the cost of energy, or minimum revenue per unit of
20 production, necessary for the modeled project to cover its expenses, service its debt
21 obligations (if any), and meet its equity investors' assumed minimum required after-
22 tax rate of return. CREST was developed in Microsoft Excel, so it offers the user a high
23 degree of flexibility and transparency, including full comprehension of the underlying

1 equations and model logic. Beginning in 2015, NREL re-released CREST models that
2 allow the user to edit formulas, without limit.

3 **Q. Were the CREST models that SEA utilized made available to stakeholders?**

4 A. Yes. The CREST models are always available to the public. Any stakeholder may
5 download a CREST model from NREL's website, without charge, and enter any
6 number of different input configurations – including all inputs used by SEA during the
7 ceiling price analysis. This allows all stakeholders to replicate SEA's modeling process
8 and results at any time.

9 **Q. Did the DG Board allow SEA to have direct communication with the stakeholders**
10 **on the development of the ceiling prices, including by email, phone calls and face**
11 **to face meetings?**

12 A. Yes. OER and the DG Board encouraged stakeholders to ask questions of SEA directly
13 by phone, email or in person. As a result, SEA attended stakeholder meetings,
14 conducted phone calls and email exchanges with a range of participants on a range of
15 topics.

16 **Q. How do you solicit stakeholder comments?**

17 A. We issue a formal data request to all stakeholders, as well as additional stakeholder
18 surveys, in which stakeholders are asked to respond to specific questions. We also
19 conduct interviews and follow-ups. The questions asked in the surveys are attached to
20 the Report.

21 **Q. How many stakeholder comments were received in response to the formal data**
22 **request?**

23 A. The data request and surveys received a more robust response than in recent years, in

part due to the adoption of a web-based data collection platform through Survey Monkey. The number of responses to both the data request and survey, including those obtained via interviews and follow-ups, are summarized in Table 1 below.

Table 1			
Technology	Total Stakeholder Responses Submitted by Category		
	1st Round²	2nd Round³	Final Round⁴
Solar	20	8	4
Wind	4	2	0
Anaerobic Digestion	1	1	0
Small Scale Hydropower	3	2	1

Q. Please summarize the subject matter on which stakeholders commented. How were these comments incorporated into the process and ceiling price recommendations to the DG Board?

A. SEA received comments regarding all four eligible technologies from a combination of project developers, financiers, consultants for the DPUC, and The Narragansett Electric Company d/b/a National Grid (“National Grid”). Throughout the process, SEA vetted all the stakeholder feedback and made more than a dozen adjustments to inputs or calculation methodologies as a direct result of stakeholder feedback. For summaries of comments provided by stakeholders and how SEA responded to them, please see the SEA presentations attached to the Report.

Q. Did SEA, on behalf of the DG Board, consider all the stakeholder feedback given in the development of recommended 2019 ceiling prices?

A. Yes. While we did not adopt every stakeholder suggestion, we solicited, carefully considered, and incorporated stakeholder feedback throughout the entire process.

² Ahead of 7/17/18 Presentation

³ Ahead of 8/20/18 Presentation

⁴ Ahead of 9/24/18 Presentation

SEA's presentation of multiple draft ceiling prices, and associated explanation of changes in response to stakeholder feedback, substantiates this consideration.

Q. Are ceiling price recommendations based exclusively on stakeholder input?

A. No. While stakeholder input is critical to understanding aspects of the project cost, financing and market landscape specific to Rhode Island, basing all aspects of the ceiling prices solely on the self-reported assumptions of the entities seeking tariff compensation, particularly if inputs and comments are received from a limited number of project developers in a given technology or size category, would be difficult to justify, and would risk over-compensating project owners at the expense of ratepayers. Thus, the 2019 recommended ceiling prices take other recent data sources into account, particularly with respect to cost and financing trends, to incentivize the development of projects in Rhode Island that are price-competitive with similar projects throughout the region.

Q. How were these ceiling prices developed and what factors were considered in developing them?

A. The ceiling prices were developed through a collaborative process between SEA, OER, the DG Board, and stakeholders. Through a formal data request, as well as several follow-up stakeholder surveys, OER, the DG Board and SEA implored all interested parties to provide market data (including sources) with respect to the cost, performance and financing assumptions related to each of the technology and size classes being evaluated. Stakeholders were afforded approximately six (6) weeks (from May 2, 2018 to June 15, 2018) to assemble and submit data. Late submittals were accepted. In fact, data submitted at any time was incorporated throughout the process. Follow-up

1 interviews were also conducted where required to understand the data response, or to
2 request additional information.

3 Recent 12-month installed cost data from price quotes in Rhode Island derived from
4 the online solar marketplace EnergySage, the Massachusetts Solar Carve-Out II
5 Qualified Units List, the NYSERDA Power Clerk Database, and the Connecticut
6 Residential Solar Investment Program. In addition, the prices also reflect bid pricing
7 received in the first open enrollment of the 2018 RE Growth Program, interconnection
8 cost data provided by National Grid, and other publicly available reports and data
9 sources. The Lawrence Berkeley National Laboratory (“LBNL”) provided solar cost
10 data for New England, New York and selected Mid-Atlantic states. SEA reviewed this
11 data and used it for benchmarking installed costs in the program, but did not directly
12 incorporate it as an input into the ceiling price modeling, due to the slightly moved-up
13 schedule for the 2019 ceiling price development process. Three pricing iterations were
14 shared with stakeholders and discussed at public meetings before recommendations
15 were submitted to OER and the DG Board.

16 **III. SEA’s Perspective - Recommendations made by DG Board**

17 **Q. Are you familiar with the Report that was submitted by the DG Board to the**
18 **PUC?**

19 A. Yes.

20 **Q. Does SEA support the recommendations contained within the Report?**

21 A. Yes.

22 **Q. Are the recommendations contained within the Report reasonable and**
23 **appropriate?**

1 A. Yes.

2 **Q. Does SEA believe that both important policy objectives and cost-effectiveness**
3 **were considered in its analysis and recommendations?**

4 A. Yes. SEA believes that the recommended ceiling prices represent an effective balance
5 among all the policy objectives of Rhode Island law.

6 **Q. Does SEA believe that the ceiling prices approved by the Board in its votes on**
7 **September 24, 2018 and recommended to the Commission, are reasonable and are**
8 **in the best interests of the State of Rhode Island and meet the program's goals?**

9 A. Yes.

10 **Q. Were there any SEA recommendations that were not included in the Report?**

11 A. No.

12 **Q. Can you verify the 2019 ceiling prices included in the Report and**
13 **Recommendations?**

14 A. Yes. The recommended ceiling price for each technology class is summarized in Table
15 2 and Table 3 below.

Table 2	
Renewable Energy Class	Ceiling Price (¢/kWh)
Small Solar I – 15 Year Tariff	28.45
Small Solar I – 20 Year Tariff	24.95
Small Solar II	27.65
Medium Solar	23.55
Commercial Solar	17.85
Commercial Solar - Carport	29.95
Large Solar	15.15
Large Solar - Carport	23.95
Small Wind	24.05
Large Wind	19.35
Anaerobic Digestion	20.85
Small Scale Hydropower	27.15

Table 3

Renewable Energy Class	Ceiling Price (¢/kWh)
Community Remote – Commercial Solar	20.53
Community Remote – Large Solar	17.42
Community Remote – Large Wind	21.65

Q. Are these the same ceiling prices that were developed through the CREST modeling in conjunction with stakeholders and OER, and recommended to the DG Board?

A. Yes.

Q. Do the proposed 2019 ceiling prices differ from the 2018 ceiling prices? If yes, please quantify the percentage change for each, and describe the main drivers for the price changes.

A. Yes. The percentage change between the proposed 2019 ceiling prices and the final 2018 ceiling prices can be seen in Table 4 and Table 5 below.

Table 4	
Ceiling Price Category	Change between final 2018 and proposed 2019 Ceiling Prices
Small Solar I (15-year Tariff)	-12%
Small Solar I (20-year Tariff)	-13%
Small Solar II	-6%
Medium Solar	-6%
Commercial Solar	-9%
Large Solar	-8%
Small Wind	8%
Large Wind	10%
Anaerobic Digestion	1%
Small Scale Hydropower	11%

Table 5	
Renewable Energy Class	Change between final 2018 and proposed 2019 Ceiling Prices
Community Remote – Commercial Solar	-9%
Community Remote – Large Solar	-8%
Community Remote – Large Wind	12%

Overall, the ceiling price declines associated with the solar categories are slightly

greater than in past years due to sharply lower installed costs relative to market expectations attributable to the Trump Administration’s import duties on imported photovoltaic (“PV”) cells and modules. These tariffs have had a less substantial impact on market activity than initially expected. In addition, at the request of consultants for the DPUC, the solar and wind ceiling prices now reflect forecasted year-on-year installed cost decline factors from 2018 to 2019, which we derived from the National Renewable Energy Laboratory’s 2018 Annual Technology Baseline (“ATB”).⁵ These year-on-year factors are shown in Table 6 below.

Table 6	
Categories	Forecasted Capital Cost Change for Solar Categories from 2018 to 2019 (%)⁶
Small Solar I & Small Solar II	-4.48%
Medium Solar	-4.16%
Commercial Solar, Commercial Solar-Carport, & Community Remote – Commercial Solar	-4.16%
Large Solar, Large Solar – Carport, & Community Remote – Large Solar	-3.54%

The 12%-13% price reduction for Small Solar I and 6% reduction for Small Solar II are a product of two main factors. First, the prices reflect lower estimated installed costs from both revealed pricing data from EnergySage and observed installed costs derived from state databases in Massachusetts, Connecticut, New York and Rhode Island. In addition, OER and the DG Board made a deliberate policy decision (which SEA vetted with stakeholders) to use a methodology utilizing an average of: 1) 1st

⁵ National Renewable Energy Laboratory. 2018 Annual Technology Baseline. July 2018. Available at: <https://atb.nrel.gov/>

⁶ Source: National Renewable Energy Laboratory. 2018 ATB. July 2018. Available at: <https://atb.nrel.gov/>

1 quartile observed installed cost estimates; 2) average of observed installed cost
2 estimates; and 3) the median of revealed Rhode Island system pricing data from Rhode
3 Island provided by EnergySage. OER suggested (and stakeholders indicated support
4 for) this methodology to mitigate the rate impact of (and establish more business
5 certainty regarding) a larger Small Solar I and II capacity allocation for the 2019
6 program year.

7 The 6%-9% price declines for the medium, commercial and large categories were
8 also driven by lower-than-expected observed installed costs, as well as favorable
9 pricing derived from robust solar developer response to the first open enrollment of the
10 2018 RE Growth program year.⁷

11 The bulk of the 8% increase for Small Wind and 10% increase for Large Wind
12 resources is due to the scheduled reduction in the value of the federal investment tax
13 credit (“ITC”) that can be taken in lieu of the federal production tax credit (“PTC”).
14 This value is set to phase down from 18% in 2018 to 12% during calendar year 2019.

15 The 1% increase in price for anaerobic digestion projects is attributable to a 50-
16 basis point (0.5%) increase in the assumed interest on term debt for such projects,
17 which was applied to all eligible technologies to reflect the impact of a rising interest
18 rate environment. The 11% increase in small-scale hydropower prices is attributable to
19 the impact of the Trump Administration’s import duties on steel, which are a significant
20 component of the screw-type turbine units for such projects, as well as to a decrease in
21 expected post-contract revenue for the final ten years of the project’s life.

⁷ See Tariff Advice Filing for Renewable Energy Growth Program Solicitation and Enrollment Process Rules, 2018 First Open Enrollment Report. Filed by National Grid on June 13, 2018 in Docket 4774. Available here: http://www.ripuc.org/eventsactions/docket/4774-NGrid-1stEnrollment2018_6-13-18.pdf

1 **Q. Do you agree with the DG Board’s recommendation to adopt Commercial Solar**
2 **– Carport and Large Solar – Carport as additional renewable energy classes for**
3 **the 2019 RE Growth Program year?**

4 A. Yes.

5 **Q. Could you explain why ceiling prices for carports are calculated differently than**
6 **traditional ground and roof mounted solar projects?**

7 A. Yes. There are fundamental differences in the materials, engineering and labor costs
8 that go into a solar carport parking lot project as compared to a roof or ground mounted
9 commercial and large solar system. Unlike traditional fixed-tilt ground-mounted or
10 roof-mounted systems, solar canopy projects require substantial added structural
11 balance of system (“BOS”) costs associated with added materials necessary to bear the
12 weight of the system, given various snow and wind loads common to New England,
13 and allow the PV system to provide desired space and shade beneath the structure. In
14 addition, these systems require added upfront design and engineering expenses. These
15 expenses are necessary to properly design the canopy structure to withstand the weight
16 under various conditions.

17 Stakeholders providing input on carport costs suggested that the total incremental
18 cost associated with a Large Solar - Carport system was approximately \$1/watt (“W”)
19 relative to a typical ground-mounted 1-5 megawatt (“MW”) project, and that the total
20 incremental cost of a Commercial Solar - Carport system was approximately \$1.20/W
21 relative to a typical ground-mounted 251-999 kilowatt (“kW”) project. Since carports
22 are a new market sector, we chose to directly utilize these incremental cost estimates
23 in developing the Commercial Solar – Carport and Large Solar - Carport ceiling prices.

1 We also assume (based in part on stakeholder feedback) that these projects are
2 disproportionately affected by import duties placed on imported steel and aluminum by
3 the Trump Administration. To account for these impacts for carports of all sizes, we
4 assumed a further premium of \$0.12/W. In total, the assumed installed cost premiums
5 relative to a ground-mounted system of the same size for Commercial Solar – Carport
6 and Large Solar - Carport are \$1.32/W and \$1.12/W, respectively.

7 **Q. If the DG Board had factored in solar canopy installations into the traditional**
8 **commercial and large solar ceiling prices classes designed each year, would that**
9 **have increased the proposed 2019 commercial and large solar ceiling prices?**

10 A. Yes. In setting ceiling prices, we develop estimates based on the types of systems that
11 would be eligible for inclusion in a given category. Thus, if we were to include carport
12 projects within the Commercial and Large Solar ceiling price categories, we would then
13 move to design a price based on what the cost of a carport is into those ceiling price
14 categories.

15 **Q. Does this conclude your testimony?**

16 A. Yes.

Rhode Island Renewable Energy Growth Program:

2019 Ceiling Price Recommendations to DG Board

September 24, 2018

Sustainable Energy Advantage, LLC

Mondre Energy, Inc.

Recommended 2019 Ceiling Prices

Summary Results (1): Solar, (cents/kWh)

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP	2019 1 st Draft CP (% Change from 2018 Approved)	2019 2nd Draft CP (% Change from 2018 Approved)	2019 Proposed Final CP (% Change from 2018 Approved)
Small Solar I: 15 Year Tariff	1-10 (5)	32.25	26.45 / (-18%)	28.45 / (-12%)	28.45 / (-12%)
Small Solar I: 20 Year Tariff	1-10 (5)	28.55	23.25 (-19%)	24.95 / (-13%)	24.95 / (-13%)
Small Solar II	11-25 (25)	29.45	26.15 / (-11%)	27.65 / (-6%)	27.65 / (-6%)
Medium Solar	26-250 (250*)	24.95	22.75 / (-9%)	23.05 / (-8%)	23.55 / (-6%)
Commercial Solar	251-999 (500)	19.65	17.05 / (-13%)	17.25 / (-12%)	17.85 / (-9%)
Comm. Solar-CRDG	251-999 (500)	22.45	19.61* / (-13%)	19.84* / (-12%)	20.53* / (-9%)
Commercial Solar – Carport	251-999 (500)	N/A	N/A	N/A	29.95
Large Solar	1,000-5,000 (2,000)	16.45	14.45 / (-12%)	14.65 / (-11%)	15.15 / (-8%)
Large Solar-CRDG	1,000-5,000 (2,000)	18.92	16.62* / (-13%)	16.85* / (-11%)	17.42 / (-8%)
Large Solar – Carport	1,000-5,000 (1,000)	N/A	26.35	26.85	23.95

Notes: All CP represent 20 year tariffs, with the exception of the first row for Small Solar I under a 15 year tariff.

This is the maximum CRDG Ceiling Price allowed by law. Note, however, that this CP would allow cost-competitive projects (bidding below the CP) access to > a 15% premium compared to actual project costs.

Summary Results (2): Wind, Hydro & AD

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP 20 year Tariff Duration	2019 1 st Draft CP 20 year Tariff Duration (% Change from 2018 Approved)	2019 2 nd Draft CP 20 year Tariff Duration (% Change from 2018 Approved)	2019 Proposed Final CP 20 year Tariff Duration (% Change from 2018 Approved)
Small Wind	1-999 (100)	22.25	22.25 / (0%)	23.95* / (8%)	24.05 / (8%)
Large Wind	1,000-5,000 (3,000)	17.55	17.55 / (0%)	19.05* / (9%)	19.35 / (10%)
Large Wind - CRDG	1,000-5,000 (3,000)	19.35	19.75 / (2%)	21.35* / (10%)	21.65 / (12%)
Hydroelectric	1-5,000 (500)	24.55	25.05 / (2%)	25.45 / (4%)	27.15** / (11%)
Anaerobic Digestion	1-5,000 (750)	20.55	20.55 / (0%)	20.85 / (1%)	20.85 / (1%)

*Large Wind ceiling price changes driven by ILoPTC value revision from 2018 to 2019. Large Wind CRDG prices driven by stakeholder feedback on customer acquisition and customer care and replacement costs.

**Hydroelectric – Change in 2019 Proposed Final Ceiling Price is driven by estimates of steel tariffs. Changes in post-tariff market value of production and change in assumed interest rate on term debt drive changes from 2018 final values to previous drafts.

Changes from Revised Prices (1)

- Creation of Commercial Solar – Carport/Methodology Shift for Large Solar – Carport
 - Represents average installed cost for 251-999 kW ground mounted projects from MA SQA plus premium of \$1.20/W (taken from stakeholder feedback) for added balance of system (BOS) and other incremental costs
 - Methodology then applied to Large Solar – Carport value (based on average installed costs for 1,000-5,000 kW ground mounted system in the MA SQA plus \$1/W premium suggested by stakeholders for BOS/other incremental costs) for consistency
- Treatment of Interconnection on ITC/Depreciation Basis
 - **Stakeholder question:** if SEA is relying on total installed costs as a means to capture interconnection costs over time, are interconnection costs being excluded from the basis on which the ITC and MACRS depreciation are based?
 - **Prior practice:** Portion of the installed cost associated with “generation equipment” is excluded from MACRS/ITC basis from Solar and Wind projects as a proxy, but not explicitly removed and categorized as interconnection costs (which depreciate on a 15-year straight line basis, per tax law)
 - **Modeling Implication (M.I.):** *Prices for >25 kW Solar and all Wind projects eligible for MACRS and ITC explicitly exclude a median interconnection cost value (\$131/kW) from their ITC/depreciation basis (based on National Grid interconnection dataset including MA and RI)*

Changes from Revised Prices (2)

- Trump Administration Duties on Imported Steel and Aluminum
 - *M.I. for solar carports: assumed to be a premium of \$0.12/W (based on mix of publicly-produced estimates from financier-developer [Sol Systems LLC](#) and stakeholder feedback suggesting a 5%-10% cost increase for carport systems)*
 - *M.I. for hydro: assumed to be a premium of \$681/kW (based on stakeholder feedback)*
- Ministerial v. Non-Ministerial Permitting Costs
 - **Stakeholder feedback:** almost all permitting costs for larger solar projects were associated with non-ministerial permits (e.g. local zoning board approvals), and thus were unaffected by 2017 legislation reducing ministerial solar permitting costs
 - *M.I.: Solar permitting-related cost reductions (representing a 10% reduction on 3% of total installed cost) excluded from Commercial and Large Ceiling Prices*
- Decommissioning
 - **Initial data from Cadmus Group (solicited by OER):** \$20/kW for decommissioning more reasonable than \$37.50/kW (which were estimates initially associated with wind)
 - *M.I.: Assumed Solar decommissioning costs reduced from \$37.50/kW to \$20/kW, but additional analysis from Cadmus will inform future decommissioning estimates*

Modeling Parameters

Summary: Solar Cost & Production Assumptions

	Small I	Small II	Medium	Commercial	Commercial CRDG	Commercial Solar - Carport	Large	Large CRDG	Large Solar – Carport
Nameplate Capacity (kW)	5	25	250	500	500	500	2,000	2,000	1,000
Capacity Factor	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	15.30%	15.30%	14.00%
Annual Degradation	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Installed Capital Cost ¹ (\$/kW)	\$3,386 \$3,185 [\$3,834]	\$3,171 \$3,027 [\$3,584]	\$2,678 [\$2,981]	\$2,093 \$2,087 [\$2,326]	\$2,243 ² \$2,237² [\$2,526 ²]	\$3,997	\$1,881 \$1,876 [\$2,139]	\$2,031 ² \$2,026² [\$2,339 ²]	\$3,256 \$3,828
Interconnection Costs (\$/kW) ³	N/A	N/A	\$131	\$131	\$131	\$131	\$131	\$131	\$131
Year-over-Year Capital Cost Declines ⁴	4.48%	4.48%	4.16%	4.16%	4.16%	4.16%	3.54%	3.54%	3.54%

Key: Values in [\[Brackets\]](#) represent 2018 ceiling price inputs that were changed for the 2019 prices. ~~Red-strikeout~~ text denotes 1st draft input values that were updated in the 2nd draft. ~~Green-strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

Notes:

1. Impacts due to solar module trade tariffs are assumed to be incorporated in installed cost data. **In addition, total installed costs assume the inclusion of the interconnection costs from the line below.**
2. Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [\[\\$200/kW in 2018\]](#)).
3. Interconnection costs have been separated from generation equipment for >25 kW in order to assign proper depreciation and tax credit treatment, and are based on median prices for solar projects interconnected since 2017 in data from National Grid. **The separation does not impact total installed costs.**
4. From [2018 NREL Annual Technology Baseline](#). Cost declines were not explicitly modeled in 2018 ceiling prices.



Summary: Solar Cost & Production Assumptions (Cont'd)

	Small I	Small II	Medium	Commercial	Commercial CRDG	Commercial Solar - Carport	Large	Large CRDG	Large Solar – Carport
Fixed O&M (\$/kW-yr)	\$35 [\$50]	\$35 [\$50]	\$35	\$15 [\$21]	\$40 [\$36*]	\$15	\$15	\$40 [\$30*]	\$15
O&M Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Insurance (% of Cost)	0.0%	0.0%	0.27%	0.45%	0.45%	0.45%	0.45%	0.45%	0.45%
Project Management (\$/yr)	\$0	\$0	\$750	\$3,000	\$3,000	\$7,500	\$12,000	\$12,000	\$12,000
Site Lease (\$/yr)	\$0	\$0	\$6,250	\$12,500	\$12,500	\$12,500	\$50,000	\$50,000	\$12,500
Decommissioning Costs (\$/kW)	\$0	\$0	\$20.00 \$37.50	\$20.00 \$37.50	\$20.00 \$37.50	\$20.00	\$20.00 \$37.50	\$20.00 \$37.50	\$20.00 \$37.50

Key: Values in ~~[Brackets]~~ represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft. ~~Green-strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

* Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [~~\$15/kW in 2018~~]).

Summary: Solar Financing Assumptions

	Small I	Small II	Medium	Commercial	Commercial CRDG	Commercial Solar - Carport	Large	Large CRDG	Large Solar – Carport
% Debt	0%	0%	50%	55% [50%]	55% [50%]	55%	55%	55%	55% [50%]
Debt Term (years)	N/A	N/A	15 [12]	15 [12]	15 [12]	15	15 [10]	15 [10]	15 [12]
Interest Rate on Term Debt	N/A	N/A	7.00% 6.50%	6.50% 6.00%	6.50% 6.00%	6.50%	6.50% 6.00%	6.50% 6.00%	6.50% 6.00%
Lender's Fee (% of total borrowing)	N/A	N/A	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Target After-Tax Equity IRR	5.25% 5.0%	9.7% 9.4%	9.4%	9.4%	9.4%	9.4%	9.4%	9.4%	9.4%

Key: Values in [Brackets] represent 2018 ceiling price inputs. ~~Red strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft. ~~Green strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

Summary: Cost & Production Assumptions

Wind, Hydro, and AD

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Nameplate Capacity (kW)	100	3,000	3,000	500	725
Capacity Factor	21.00%	21.00%	21.00%	55.00%	92% ¹
Annual Degradation	0.5%	0.5%	0.5%	0.0%	0.0%
Total Installed Capital Cost (\$/kW)	\$3,500	\$2,820	\$2,970 [\$3,020] ²	\$9,431 \$8,750	\$10,150
Interconnection Costs (\$/kW) ³	\$95	\$282	\$282	\$500	\$150
Year-over-Year Capital Cost Declines ⁴	0%	0%	0%	0%	0%

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft. ~~Green-strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

1. Note: For Anaerobic Digestion we use an Availability Factor
2. Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [~~\$200/kW~~ in 2018])
3. Interconnection costs have been separated from generation equipment in order to assign proper depreciation and tax credit treatment. Wind costs are based on median prices for projects interconnected since 2017 in data from National Grid. Hydro and AD costs are based on stakeholder input. The separation does not impact total installed costs.
4. From [2018 NREL Annual Technology Baseline](#). No decline modeled because NREL ATB data not available, shows no decline, or slight increase. Cost declines were not explicitly modeled in 2018 ceiling prices.

Summary: Cost & Production Assumptions (Cont'd)

Wind, Hydro, and AD

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Fixed O&M (\$/kW-yr)	\$30.00	\$26.50	\$51.50 [\$41.50] ¹	\$2.00	\$600
O&M Inflation	2.0%	2.0%	2.0%	2.0%, 1.0%	2.0%
Insurance (% of Cost)	0.25%	0.20%	0.20%	2.0%	1.0%
Project Management (\$/yr)	\$750	\$18,000	\$18,000	\$3,000	\$75,000
Site Lease (\$/yr)	\$5,000	\$162,000	\$162,000	\$8,750	\$35,000

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs. . ~~Red strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft. ~~Green strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

1. Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [~~\$15/kW~~ in 2018]).

Summary: Financing Assumptions (Wind, Hydro, and AD)

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
% Debt	45%	65%	65%	70%	60%
Debt Term (years)	15	15	15	20	15
Interest Rate on Term Debt	6.5% 6.0%	6.5% 6.0%	6.5% 6.0%	7.0% 6.5%	7.0% 6.5%
Lender's Fee (% of total borrowing)	2.0%	1.0%	1.0%	1.88%	1.5%
Target After-Tax Equity IRR	9.4%	9.4%	9.4%	9.4%	9.4%

Values in [Brackets] represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft. ~~Green-strikeout~~ text denotes 2nd draft inputs that were updated for the final proposed draft.

Appendix A: Stakeholder Input into Draft 2019 Ceiling Prices & Modeling Implications

(From July 17, 2018 presentation)

Small Solar I & II Incentive Approach

- OER/DG Board sought feedback on two main options:
 - A two-tranche approach in which the initial 6.55 MW tranche would receive a cost-based incentive rate, and the second tranche (of capacity exceeding 6.55 MW) would receive a lower rate
 - A single-tranche approach that would represent the midpoint between a cost-based and lower rate for all of the 2019 capacity
- Majority of respondents preferred a single-tranche approach, arguing that it would be easier to administer and create enhanced business certainty
- Other suggestions included:
 - Setting a single cost-based value for the entire tranche; and
 - Developing a pricing option that would be based on the midpoint of the 15- and 20-year Small Solar pricing options that would apply to the single tranche
- ***M.I. for Initial Draft Prices: Single-tranche approach for all capacity***

Solar Carport Costs & Incentives

- Typical Carport Sizing
 - Stakeholders provided a range of responses between 250 kW-1.5 MW, with most respondents suggesting systems greater than 500-700 kW would be preferable (matching with the 500 kW-5 MW initial size category)
- Differences in Carport Costs
 - Balance of system costs were found to be around \$0.50-\$1.25/W higher than for a ground-mounted system of the same size
 - At least five stakeholders raised permitting costs as significantly higher for Carport systems, suggesting that municipal height restrictions for new structures could require costly applications for a variance
 - Structural engineering cost differences were found to be at least 2-3 additional cents per Watt
- Slight lean in preference towards an adder, rather than a separate Ceiling Price category, for Carports
- ***M.I. for Initial Draft Prices: Carports assumed to have their own Ceiling Price category***

Solar Permitting

- Stakeholders mostly suggested that assuming permitting cost reductions across the board at 10% of total permitting cost may not be reasonable (thus arguing larger reductions may not be justifiable at this time)
- Several Large Solar developers suggest that the 2017 state permitting law did not substantially reduce their cost
 - One stakeholder pointed out that the applicability of the initial law extended only to ministerial permits (such as building and electrical), but not non-ministerial permits that larger Solar projects need
- Other installers/developers in other Solar segments suggest that the gains associated with permitting cost reduction have been uneven, as not all municipalities have embraced the state's e-permitting system
- ***M.I. for Initial Draft Prices: 10% permitting reduction retained across-the-board, but consideration to be given during 2019 process to reassessing cost reductions for projects requiring non-ministerial permits***

New (or Different) Ceiling Price Categories

- Subdividing Commercial Solar into 250-500 kW and 501-999 kW segments
 - One stakeholder argued that splitting Commercial Solar would allow for more diversity of large C&I rooftop applications, since current cutoffs incentivize projects to size to 249 kW (within Medium Solar) and 999 kW (within Commercial Solar)
- Consolidation of CRDG categories into one (rather than for Commercial and Large Solar)
- Several stakeholders suggested incentives for non-greenfield projects (including for closed landfills, brownfields, quarries and other areas with disturbed land)
- Several stakeholders have signaled interest in incentivizing systems with paired energy storage
- One stakeholder suggested splitting hydro into small scale <500 kW and large <1MW
- ***M.I. for Initial Draft Prices: Carports to be added as a separate Ceiling Price category, but no additional incentive or “adder” categories have been developed at this time***

Financing and Federal Tax Assumptions

- During PY 2019, the federal Investment Tax Credit applicable to solar and Small Wind will step down from 30% to 26% of total system cost
- Extension of federal Investment Tax Credit (ITC) in late 2015's Consolidated Omnibus Appropriations Act allows systems to "commence construction" during a given tax year (rather than become operational)
- However, several stakeholders have suggested that while projects selected in either the First or Second Open Enrollments can expect to "commence construction" during 2019, projects selected in the Third Open Enrollment would be unlikely to reach commercial operation in a timely-enough manner to receive the 2019 ITC value of 30%
- Federal tax credits for hydro and AD have expired.
- ***M.I. for Initial Draft Prices: SEA is assuming all projects will "commence construction" during 2019***

Additional solar stakeholder feedback

- Labor costs are higher in RI, driven by cost of electricians and labor ratio of electricians vs. other laborers/helpers. Large union presence relative to neighbor states. Rhode Island specific license is required.
- Non-profit and municipal customers do not receive tax credits
- Bonus depreciation – mixed feedback, but most not taking it:
 - Assume a typical 5-year MACRS.
 - Bonus depreciation has been very helpful and has served to offset module tariffs. Its more vital to large projects where 1 cent/watt makes a big difference and contracts are negotiated more closely
 - Immediate bonus depreciation hasn't been a major game changer.
 - ***M.I. for Initial Draft Prices: SEA assumes investors elect 5-year MACRS rather than bonus depreciation.***
- Tax equity availability and rates:
 - “Equity markets have been liquid enough, but equity returns have fallen. Assume that in a steady interest rate world, IRRs would be down.”
- Loan terms:
 - “Still not seeing [commercial] lenders step into long term loans – maybe for huge PPAs. Your term assumptions are over generous. Terms more typical for 7 or 10 years.”
 - ***M.I. for Initial Draft Prices: SEA initially proposed to model a loan term input of 18 years for 2019, adjusted to 15 years as a result of this feedback.***
- Interconnection cost assumptions:
 - “Limited to project specific upgrades, but not accounting for high costs associated with substation upgrades” (e.g. 3Vo)
- Siting Issues:
 - “Clarity of the path forward takes out uncertainty from a development perspective. No specific cost impacts at this point.”



Additional non-solar stakeholder feedback

- Wind

- "With small projects, returns are never as you model them."
- "Costs are not necessarily going up. Cost of new turbines is dropping. So, total cost should be less if you are able to site it."
- "Interconnection costs are higher than estimated. For new projects, even higher."
- "Add a modeling category for 1.5MW and a category for 3.0MW. There are significant economies of scale for installing more capacity, particularly on interconnection."

- Hydro

- "Total FERC license prep is about 10% of total cost. Need to invest \$500K to \$750K before FERC licensing complete."
- "Approvals from FERC costing several thousand in additional studies. If fish ladder is required, then it will stop the project on cost (prohibitive)."
- Impending steel tariffs from Canada may be a major issue – could "sink projects."
- "Interconnection cost estimates are wildly off. Use of variable speed drive is causing confusion."

Appendix B: Stakeholder Feedback on Draft 2019 Ceiling Prices & Modeling Implications

(From August 20, 2018 presentation)

Stakeholder Feedback on Ceiling Price Modeling (1)

- **Small Solar I & II Assumptions**
 - Price reduction too significant to make REGrowth capacity uptake attractive (and could shift adoption to net metering projects); 20-year option unlikely to provide customer value; consider only offering a 15-year payment.
 - **Modeling Implication (M.I.): 15- or 20-year terms remain, but changes to Small Solar assumptions include:**
 - Adopting three-part average incorporating the average MA, NY, CT and RI state database costs, 1st quartile state database costs and EnergySage values (similar to Medium & Commercial Solar approach);
 - Setting EnergySage installed cost input as median of RI quotes from CY 2018 (from 1st quartile); and
 - Incorporating a 25 basis point discount rate increase to account for rising interest rate environment
- **Installed Cost Assumptions**
 - **Stakeholder Feedback Following 1st Draft:** Solar installed costs appear to include project “hard costs”, but not “surveys, engineering, local permitting fees or interconnection study costs” or “due diligence, title reviews, and other financing fees”.
 - **M.I.: After careful consideration, no change in installed cost methodology. Failure to assume that database or REGrowth bid values do not represent total installed costs (including interconnection) could introduce highly subjective/questionable data.**
 - **SEA Clarification regarding 1st Draft Prices:** Based on early feedback from the Division of Public Utilities and Carriers, both the 1st and 2nd Draft prices include year-on-year (YoY) installed cost reduction factors derived from the [National Renewable Energy Laboratory's 2018 Annual Technology Baseline \(ATB\)](#) to capture expected reductions from 2018-2019. While both the 1st and 2nd Draft prices include this assumption, an error in preparing the presentation caused this assumption to not be reported in the 1st Draft presentation.
 - **M.I.: SEA will request further feedback regarding the incorporation of NREL's 2018-2019 assumed reduction factors.**

Stakeholder Feedback on Ceiling Price Modeling (2)

- **Interest Rate on Term Debt Assumptions**
 - Interest rates for Large Solar closer to 6.5% rather than 6%; several C-PACE projects in the midst of closing financing are seeing debt offered at ~7%
 - **M.I.: 50 basis point (0.5%) increase in interest rate assumed across the board in recognition of [rising interest rates](#) (with the exception of 25 basis point increase for Small Solar I & II, mentioned previously).**
 - **After-Tax Equity IRR Assumptions**
 - Sponsor and tax equity AT IRRs should be 12% and 18% (not 10% and 9.4%, respectively)
 - **M.I.: No Change. SEA increased its sponsor equity IRR input to 10% after Large Solar stakeholder consultations last year, which match [National Renewable Energy Laboratory estimates](#) of the cost of sponsor capital for “mid-cost” systems <=\$25M.**
- Additional Project Finance Market Indicators:**

 - Major project finance advisory firm [CohnReznick](#) foresees “compression in sponsor (equity) returns” will continue due to “a bevy of bidders” competing for equity positions in ITC-eligible projects.
 - Tax equity has also remained a more stable market than had been expected after tax reform (see comments made by executives at JP Morgan and US Bank from Norton Rose Fulbright’s recent [Solar Tax Equity Update](#))
- **Subdividing Commercial Solar Category**
 - 250-999 kW range for Commercial Solar incentivizes projects at the 999 kW value, potentially limiting the potential for medium-sized systems, and recommended splitting into two categories (e.g. 250-499 kW and 500-999 kW) or potentially more
 - **M.I.: No change for 2019 Program Year, but careful consideration to be given for 2020 Program Year**



Stakeholder Feedback on Ceiling Price Modeling (3)

- **Carport Solar Assumptions**
 - **Installed Cost:** Stakeholders suggested installed costs values at between \$3.50-\$3.80/W for a 1 MW modeled size system were reasonable. **M.I.: Installed Cost at ~\$3.8/W unchanged**
 - **Capacity Factors:** Stakeholders suggested a range of 13.7%-14%. **M.I.: 14% CF unchanged**
 - **Eligible Size/Carport Categories:** Tariffs should target smaller carports in order to cover more of the carport market. **M.I.: OER has directed SEA to develop a separate category for 1-500 kW Carports**
- **Wind Cost Assumptions**
 - Wind ITC values appear not to reflect reduced ITC in lieu of PTC (ILoPTC) value of 12% (from 18% in 2018): Wind installed costs appear too low
 - **M.I.: Revised prices incorporate 2019 ILoPTC value of 12%; wind installed costs assumed unchanged from 2018 given selection of projects in 2018 1st Open Enrollment at the 2018 Ceiling Price value.**
- **30% ITC Eligibility Assumption for 2019 Program Year Projects**
 - Solar projects eligible for the 30% ITC in 2019 selected in the 3rd Open Enrollment would be unlikely to receive their Certificate of Eligibility (COE) from the PUC until at least December 2019, even under relaxed federal guidelines for “commenced construction” status
 - **M.I.: No change to 30% ITC, but OER/DG Board likely to recommend to the PUC that it direct National Grid to select all ITC-dependent projects (in Solar and Wind categories) in 1st and 2nd Open Enrollment to ensure projects remain can “commence construction” such that they remain eligible for 30% ITC (and thus lock in ratepayer cost efficiencies).**

Stakeholder Feedback on Ceiling Price Modeling (4)

- **Interconnection Cost Assumptions**
 - Upfront interconnection construction costs remain high and should be accounted for – can range higher if 3v0 and DTT technology incorporated into installations.
 - **M.I.: After careful consideration, SEA does not plan to make any adjustments to modeled interconnection costs.**
- **Trump Administration Steel Tariffs**
 - For solar carports, as-yet-unsubstantiated feedback of a potential impact of up to 5%-10%, and potentially higher for hydro projects.
 - **M.I. After careful consideration, data deemed insufficient for changes to 2nd round prices, but SEA to seek additional clarity and substantiation regarding these impacts ahead of final recommendations.**
- **Other Cost Assumptions**
 - **Land Lease Costs:** Developers indicated higher land lease costs might be justified in all Solar categories.
 - **M.I.: No change included in revised prices, but SEA to solicit further feedback ahead of final recommended prices.**
 - **Non-Ministerial Permits:** Survey ahead of 1st Round Prices suggested Large Solar may not be able to benefit from reduced permitting prices given need for non-ministerial permits.
 - **M.I.: See above.**





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Rhode Island Renewable Energy Growth Program:

Analysis & Discussion in Support of 2nd Draft 2019 Ceiling Price Recommendations

August 20, 2018

Sustainable Energy Advantage, LLC

Mondre Energy, Inc.

Stakeholder Comments and Modeling Implications

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 - **M.I.: See above.**

2nd Draft 2019 Ceiling Prices

Summary Results (1): Solar, (cents/kWh)

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP	2019 1 st Draft CP / % Change from 2018 Approved	2019 2 nd Draft CP / % Change from 2018 Approved
Small Solar I – 15 year Tariff Duration	1-10 (5)	32.25	26.45 / (-18%)	28.45 / (-12%)
Small Solar I – 20 year Tariff Duration	1-10 (5)	28.55	23.25 (-19%)	24.95 / (-13%)
Small Solar II	11-25 (25)	29.45	26.15 / (-11%)	27.65 / (-6%)
Medium Solar	26-250 (250)	24.95	22.75 / (-9%)	23.05 / (-8%)
Commercial Solar	251-999 (500)	19.65	17.05 / (-13%)	17.25 / (-12%)
Comm. Solar-CRDG	251-999 (500)	22.45	19.61* / (-13%)	19.84* / (-12%)
Carport I	1-500 (500)	To Be Developed For Final Recommended Prices		
Carport II	500-5,000 (1,000)	N/A	26.35	26.85
Large Solar	1,000-5,000 (2,000)	16.45	14.45 / (-12%)	14.65 / (-11%)
Large Solar-CRDG	1,000-5,000 (2,000)	18.92	16.62* / (-13%)	16.85* / (-11%)

*This is the maximum CRDG Ceiling Price allowed by law. Note, however, that this CP would allow cost-competitive projects (bidding below the CP) access to > a 15% premium compared to actual project costs.

Summary Results (2): Wind, Hydro & AD

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP 20 year Tariff Duration	2019 1 st Draft CP / (% Change from 2018 Approved) 20 year Tariff Duration	2019 2 nd Draft CP / (% Change from 2018 Approved) 20 year Tariff Duration
Small Wind	1-999 (100)	22.25	22.25 / (0%)	23.95* / (8%)
Large Wind	1,000-5,000 (3,000)	17.55	17.55 / (0%)	19.05* / (9%)
Large Wind - CRDG	1,000-5,000 (3,000)	19.35	19.75 / (2%)	21.35* / (10%)
Hydroelectric	1-5,000 (500)	24.55	25.05 / (2%)	25.45** / (4%)
Anaerobic Digestion	1-5,000 (750)	20.55	20.55 / (0%)	20.85 / (1%)

*Large Wind ceiling price changes driven by ILoPTC value revision from 2018 to 2019. Large Wind CRDG prices driven by stakeholder feedback on customer acquisition and customer care and replacement costs.

**Hydroelectric – Ceiling price change driven by changes in post-tariff market value of production and change in assumed interest rate on term debt.

Revised Modeling Parameters



Summary: Solar Cost & Production Assumptions

	Small I	Small II	Medium	Commercial	Commercial CRDG	Carport	Large	Large CRDG
Nameplate Capacity (kW)	5	25	250	500	500	1,000	2,000	2,000
Capacity Factor	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	15.30%	15.30%
Annual Degradation	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Installed Capital Cost^ (\$/kW)	\$3,386 \$3,185 [\$3,834]	\$3,171 \$3,027 [\$3,584]	\$2,678 [\$2,981]	\$2,087 [\$2,326]	\$2,237* [\$2,526*]	\$3,828	\$1,876 [\$2,139]	\$2,026* [\$2,339*]
Year-over-Year Capital Cost Declines**	4.48%	4.48%	4.16%	4.16%	4.16%	3.54%	3.54%	3.54%

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft

^ Impacts due to solar module trade tariffs are assumed to be incorporated in installed cost data.

* Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [\[\\$200/kW in 2018\]](#)).

**From [2018 NREL Annual Technology Baseline](#). Cost declines were not explicitly modeled in 2018 ceiling prices.

Summary: Solar Cost & Production Assumptions (Cont'd)

	Small I	Small II	Medium	Commercial	Commercial CRDG	Carport	Large	Large CRDG
Fixed O&M (\$/kW-yr)	\$35 [\$50]	\$35 [\$50]	\$35	\$15 [\$21]	\$40 [\$36*]	\$15	\$15	\$40 [\$30*]
O&M Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Insurance (% of Cost)	0.0%	0.0%	0.27%	0.45%	0.45%	0.45%	0.45%	0.45%
Project Management (\$/yr)	\$0	\$0	\$750	\$3,000	\$3,000	\$12,000	\$12,000	\$12,000
Site Lease (\$/yr)	\$0	\$0	\$6,250	\$12,500	\$12,500	\$12,500	\$50,000	\$50,000
Decommissioning Costs (\$/kW)	\$0	\$0	\$37.50	\$37.50	\$37.50	\$37.50	\$37.50	\$37.50

Values in [Brackets] represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft

* Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [~~\$15/kW in 2018~~]).

Summary: Solar Financing Assumptions

	Small I	Small II	Medium	Commercial	Commercial CRDG	Carport	Large	Large CRDG
% Debt	0%	0%	50%	55% [50%]	55% [50%]	55% [50%]	55%	55%
Debt Term (years)	N/A	N/A	15 [12]	15 [12]	15 [12]	15 [12]	15 [10]	15 [10]
Interest Rate on Term Debt	N/A	N/A	7.00% 6.50%	6.50% 6.00%	6.50% 6.00%	6.50% 6.00%	6.50% 6.00%	6.50% 6.00%
Lender's Fee (% of total borrowing)	N/A	N/A	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Target After-Tax Equity IRR	5.25% 5.0%	9.7% 9.4%	9.4%	9.4%	9.4%	9.4%	9.4%	9.4%

Values in [Brackets] represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft

Summary: Cost & Production Assumptions

Wind, Hydro, and AD

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Nameplate Capacity (kW)	100	3,000	3,000	500	725
Capacity Factor	21.00%	21.00%	21.00%	55.00%	92% ¹
Annual Degradation	0.5%	0.5%	0.5%	0.0%	0.0%
Total Installed Capital Cost (\$/kW)	\$3,500	\$2,820	\$2,970 [\$3,020] ²	\$8,750	\$10,150 ³
Year-over-Year Capital Cost Declines ⁴	0%	0%	0%	0%	0%

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft

1. *Note: For Anaerobic Digestion we use an Availability Factor*
2. *Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [~~\$200/kW~~ in 2018])*
3. *Note: Includes \$150 per kW for interconnection costs*
4. *From [2018 NREL Annual Technology Baseline](#). No decline modeled because NREL ATB data not available, shows no decline, or slight increase. Cost declines were not explicitly modeled in 2018 ceiling prices.*

Summary: Cost & Production Assumptions (Cont'd)

Wind, Hydro, and AD

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Fixed O&M (\$/kW-yr)	\$30.00	\$26.50	\$51.50 [\$41.50] ¹	\$2.00	\$600
O&M Inflation	2.0%	2.0%	2.0%	2.0%, 1.0%	2.0%
Insurance (% of Cost)	0.25%	0.20%	0.20%	2.0%	1.0%
Project Management (\$/yr)	\$750	\$18,000	\$18,000	\$3,000	\$75,000
Site Lease (\$/yr)	\$5,000	\$162,000	\$162,000	\$8,750	\$35,000

Values in [Brackets] represent 2018 ceiling price inputs. . ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft

1. Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [~~\$15/kW~~ in 2018]).

Summary: Financing Assumptions (Wind, Hydro, and AD)

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
% Debt	45%	65%	65%	70%	60%
Debt Term (years)	15	15	15	20	15
Interest Rate on Term Debt	6.5% 6.0%	6.5% 6.0%	6.5% 6.0%	7.0% 6.5%	7.0% 6.5%
Lender's Fee (% of total borrowing)	2.0%	1.0%	1.0%	1.88%	1.5%
Target After-Tax Equity IRR	9.4%	9.4%	9.4%	9.4%	9.4%

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs. ~~Red-strikeout~~ text denotes 1st draft input values that were updated to values in black text in 2nd draft



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Rhode Island Renewable Energy Growth Program:

Research, Analysis, & Discussion in Support of First Draft 2019 Ceiling Price Recommendations

July 17, 2018

Sustainable Energy Advantage, LLC

Mondre Energy, Inc.

Purpose

- To present stakeholder data responses, survey results, and supplemental research,
- To *begin* the discussion that supports the development of Ceiling Price inputs and recommendations for the 2019 Renewable Energy Growth (REG) Program.
- To develop Ceiling Price recommendations through an iterative, public process.

Draft 2019 Ceiling Prices, Categories and Modeling Parameters

Proposed Ceiling Price Categories

2019 REG Program: Proposed Technology, Size & Tariff Length Parameters

The DG Board and OER seek comment on the following Ceiling Price technology, system size and tariff length parameters.

Eligible Technology	System Size for CP Development	Eligible System Size Range	Tariff Length
Small Solar I	5 kW	≤ 10 kW	15 and 20 Year Options
Small Solar II	25 kW	11 to 25 kW	20 Years
Medium Solar	250 kW	26 to 250 kW	20 Years
Commercial Solar	500 kW	251 to 999 kW	20 Years
Commercial Solar – Community Remote DG (CRDG)	500 kW	251 to 999 kW	20 Years
Carport	1,000 kW	500 kW to 5 MW	20 Years
Large Solar	2,000 kW	1 to 5 MW	20 Years
Large Solar - CRDG	2,000 kW	1 to 5 MW	20 Years
Small Wind	100 kW	≤ 999 kW	20 Years
Large Wind	3,000 kW	1.0 to 5.0 MW	20 Years
Anaerobic Digestion	750 kW	≤ 5 MW	20 Years
Hydropower	500 kW	≤ 5 MW	20 Years



Summary Results (1): Solar, (cents/kWh)

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP	2019 <i>Proposed</i> CP
Small Solar I – 15 year Tariff Duration	1-10 (5)	32.25	26.45 / (-18%)
Small Solar I – 20 year Tariff Duration	1-10 (5)	28.55	23.25 (-19%)
Small Solar II	11-25 (25)	29.45	26.15 / (-11%)
Medium Solar	26-250 (250)	24.95	22.75 / (-9%)
Commercial Solar	251-999 (500)	19.65	17.05 / (-13%)
Comm. Solar-CRDG	251-999 (500)	22.45	19.61* / (-13%)
Carport	500-5,000 (1,000)	N/A	26.35
Large Solar	1,000-5,000 (2,000)	16.45	14.45 / (-12%)
Large Solar-CRDG	1,000-5,000 (2,000)	18.92*	16.62* / (-13%)

*This is the maximum CRDG Ceiling Price allowed by law. The calculated 2019 values are 20.55 for Commercial and 17.65 for Large. Note, however, that this CP would allow cost-competitive projects (bidding below the CP) access to > a 15% premium compared to actual project costs.



Summary Results (2): Wind, Hydro & AD

Technology	Size Range kW (Modeled Size kW)	2018 Approved CP 20 year Tariff Duration	2019 <i>Proposed</i> CP 20 year Tariff Duration
Small Wind	1-999 (100)	22.25	22.25 / (0%)
Large Wind	1,000-5,000 (3,000)	17.55	17.55 / (0%)
Large Wind - CRDG	1,000-5,000 (3,000)	19.35	19.75* / (2%)
Hydroelectric	1-5,000 (500)	24.55	25.05** / (2%)
Anaerobic Digestion	1-5,000 (750)	20.55	20.55 / (0%)

*Large Wind – CRDG ceiling price change driven by stakeholder feedback on customer acquisition and customer care and replacement costs.

**Hydroelectric – Ceiling price change driven by changes in post-tariff market value of production, which impacts hydro projects more than solar, wind, and AD because of its longer assumed useful life.

Summary: Cost & Production Assumptions (Solar)

	Small I	Small II	Medium	Commercial	Commercial CRDG	Carport	Large	Large CRDG
Nameplate Capacity (kW)	5	25	250	500	500	1,000	2,000	2,000
Capacity Factor	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	15.30%	15.30%
Annual Degradation	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Cost^ (\$/kW)	\$3,185 [\$3,834]	\$3,027 [\$3,584]	\$2,678 [\$2,981]	\$2,087 [\$2,326]	\$2,237* [\$2,526*]	\$3,828	\$1,876 [\$2,139]	\$2,026* [\$2,339*]
Fixed O&M (\$/kW-yr)	\$35 [\$50]	\$35	\$35	\$15 [\$21]	\$40 [\$36**]	\$15	\$15	\$40 [\$30**]
O&M Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Insurance (% of Cost)	0.0%	0.0%	0.27%	0.45%	0.45%	0.45%	0.45%	0.45%
Project Management (\$/yr)	\$0	\$0	\$750	\$3,000	\$3,000	\$12,000	\$12,000	\$12,000
Site Lease (\$/yr)	\$0	\$0	\$6,250	\$12,500	\$12,500	\$12,500	\$50,000	\$50,000

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs

^ Impacts due to solar module trade tariffs are assumed to be incorporated in installed cost data.

* Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [\$200/kW in 2018]).

** Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [\$15/kW in 2018]).



Summary: Financing Assumptions (Solar)

	Small I	Small II	Medium	Commercial	Commercial CRDG	Carport	Large	Large CRDG
% Debt	0%	0%	50%	55% [50%]	55% [50%]	55% [50%]	55%	55%
Debt Term (years)	N/A	N/A	15 [12]	15 [12]	15 [12]	15 [12]	15 [10]	15 [10]
Interest Rate on Term Debt	N/A	N/A	6.50%	6.00%	6.00%	6.00%	6.00%	6.00%
Lender's Fee (% of total borrowing)	N/A	N/A	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Target After-Tax Equity IRR	5.0%	5.0%	9.4%	9.4%	9.4%	9.4%	9.4%	9.4%

Values in [Brackets] represent 2018 ceiling price inputs.

Summary: Cost & Production Assumptions

Wind, Hydro, and AD

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Nameplate Capacity (kW)	100	3,000	3,000	500	725
Capacity Factor	21.00%	21.00%	21.00%	55.00%	92% ¹
Annual Degradation	0.5%	0.5%	0.5%	0.0%	0.0%
Total Cost (\$/kW)	\$3,500	\$2,820	\$2,970 [\$3,020] ²	\$8,750	\$10,150 ³
Fixed O&M (\$/kW-yr)	\$30.00	\$26.50	\$51.50 [\$41.50] ⁴	\$2.00	\$600
O&M Inflation	2.0%	2.0%	2.0%	2.0%, 1.0%	2.0%
Insurance (% of Cost)	0.25%	0.20%	0.20%	2.0%	1.0%
Project Management (\$/yr)	\$750	\$18,000	\$18,000	\$3,000	\$75,000
Site Lease (\$/yr)	\$5,000	\$162,000	\$162,000	\$8,750	\$35,000

Values in [\[Brackets\]](#) represent 2018 ceiling price inputs

1. Note: For Anaerobic Digestion we use an Availability Factor
2. Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$150/kW [\$200/kW in 2018])
3. Note: Includes \$150 per kW for interconnection costs
4. Reflects O&M cost of non-CRDG project from same category, plus estimated cost of customer care and replacement (\$25/kW [\$15/kW in 2018]).



Summary: Financing Assumptions (Wind, Hydro, and AD)

	Small Wind	Large Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
% Debt	45%	65%	65%	70%	60%
Debt Term (years)	15	15	15	20	15
Interest Rate on Term Debt	6.0%	6.0%	6.0%	6.5%	6.5%
Lender's Fee (% of total borrowing)	2.0%	1.0%	1.0%	1.88%	1.5%
Target After-Tax Equity IRR	9.4%	9.4%	9.4%	9.4%	9.4%

Overview of Stakeholder Feedback (and Modeling Implications)



Summary of Data/Survey Response

Ceiling Price Category	# of Data Points Received (Data Request or Survey)
Small Solar I/II	7
Medium Solar	2
Commercial Solar	8
Commercial Solar - CRDG	3
Large Solar	10
Large Solar - CRDG	3
Carport	8
Small Wind	1
Large Wind	4
Large Wind - CRDG	0
Anaerobic Digestion	1
Hydro	3
TOTAL	29*

**Rows do not sum to total as sum respondents provided input in multiple categories.*



Small Solar I & II Incentive Approach

- OER/DG Board sought feedback on two main options:
 - A two-tranche approach in which the initial 6.55 MW tranche would receive a cost-based incentive rate, and the second tranche (of capacity exceeding 6.55 MW) would receive a lower rate
 - A single-tranche approach that would represent the midpoint between a cost-based and lower rate for all of the 2019 capacity
- Majority of respondents preferred a single-tranche approach, arguing that it would be easier to administer and create enhanced business certainty
- Other suggestions included:
 - Setting a single cost-based value for the entire tranche; and
 - Developing a pricing option that would be based on the midpoint of the 15- and 20-year Small Solar pricing options that would apply to the single tranche
- ***M.I. for Initial Draft Prices: Single-tranche approach for all capacity***

Solar Carport Costs & Incentives

- Typical Carport Sizing
 - Stakeholders provided a range of responses between 250 kW-1.5 MW, with most respondents suggesting systems greater than 500-700 kW would be preferable (matching with the 500 kW-5 MW initial size category)
- Differences in Carport Costs
 - Balance of system costs were found to be around \$0.50-\$1.25/W higher than for a ground-mounted system of the same size
 - At least five stakeholders raised permitting costs as significantly higher for Carport systems, suggesting that municipal height restrictions for new structures could require costly applications for a variance
 - Structural engineering cost differences were found to be at least 2-3 additional cents per Watt
- Slight lean in preference towards an adder, rather than a separate Ceiling Price category, for Carports
- ***M.I. for Initial Draft Prices: Carports assumed to have their own Ceiling Price category***

Solar Permitting

- Stakeholders mostly suggested that assuming permitting cost reductions across the board at 10% of total permitting cost may not be reasonable (thus arguing larger reductions may not be justifiable at this time)
- Several Large Solar developers suggest that the 2017 state permitting law did not substantially reduce their cost
 - One stakeholder pointed out that the applicability of the initial law extended only to ministerial permits (such as building and electrical), but not non-ministerial permits that larger Solar projects need
- Other installers/developers in other Solar segments suggest that the gains associated with permitting cost reduction have been uneven, as not all municipalities have embraced the state's e-permitting system
- ***M.I. for Initial Draft Prices: 10% permitting reduction retained across-the-board, but consideration to be given during 2019 process to reassessing cost reductions for projects requiring non-ministerial permits***

New (or Different) Ceiling Price Categories

- Subdividing Commercial Solar into 250-500 kW and 501-999 kW segments
 - One stakeholder argued that splitting Commercial Solar would allow for more diversity of large C&I rooftop applications, since current cutoffs incentivize projects to size to 249 kW (within Medium Solar) and 999 kW (within Commercial Solar)
- Consolidation of CRDG categories into one (rather than for Commercial and Large Solar)
- Several stakeholders suggested incentives for non-greenfield projects (including for closed landfills, brownfields, quarries and other areas with disturbed land)
- Several stakeholders have signaled interest in incentivizing systems with paired energy storage
- One stakeholder suggested splitting hydro into small scale <500 kW and large <1MW
- ***M.I. for Initial Draft Prices: Carports to be added as a separate Ceiling Price category, but no additional incentive or “adder” categories have been developed at this time***

Financing and Federal Tax Assumptions

- During PY 2019, the federal Investment Tax Credit applicable to solar and Small Wind will step down from 30% to 26% of total system cost
- Extension of federal Investment Tax Credit (ITC) in late 2015's Consolidated Omnibus Appropriations Act allows systems to “commence construction” during a given tax year (rather than become operational)
- However, several stakeholders have suggested that while projects selected in either the First or Second Open Enrollments can expect to “commence construction” during 2019, projects selected in the Third Open Enrollment would be unlikely to reach commercial operation in a timely-enough manner to receive the 2019 ITC value of 30%
- Federal tax credits for hydro and AD have expired.
- ***M.I. for Initial Draft Prices: SEA is assuming all projects will “commence construction” during 2019***

Additional solar stakeholder feedback

- Labor costs are higher in RI, driven by cost of electricians and labor ratio of electricians vs. other laborers/helpers. Large union presence relative to neighbor states. Rhode Island specific license is required.
- Non-profit and municipal customers do not receive tax credits
- Bonus depreciation – mixed feedback, but most not taking it:
 - Assume a typical 5-year MACRS.
 - Bonus depreciation has been very helpful and has served to offset module tariffs. Its more vital to large projects where 1 cent/watt makes a big difference and contracts are negotiated more closely
 - Immediate bonus depreciation hasn't been a major game changer.
 - ***M.I. for Initial Draft Prices: SEA assumes investors elect 5-year MACRS rather than bonus depreciation.***
- Tax equity availability and rates:
 - “Equity markets have been liquid enough, but equity returns have fallen. Assume that in a steady interest rate world, IRRs would be down.”
- Loan terms:
 - “Still not seeing [commercial] lenders step into long term loans – maybe for huge PPAs. Your term assumptions are over generous. Terms more typical for 7 or 10 years.”
 - ***M.I. for Initial Draft Prices: SEA initially proposed to model a loan term input of 18 years for 2019, adjusted to 15 years as a result of this feedback.***
- Interconnection cost assumptions:
 - “Limited to project specific upgrades, but not accounting for high costs associated with substation upgrades” (e.g. 3Vo)
- Siting Issues:
 - “Clarity of the path forward takes out uncertainty from a development perspective. No specific cost impacts at this point.”



Additional non-solar stakeholder feedback

- Wind

- “With small projects, returns are never as you model them.”
- “Costs are not necessarily going up. Cost of new turbines is dropping. So, total cost should be less if you are able to site it.”
- “Interconnection costs are higher than estimated. For new projects, even higher.”
- “Add a modeling category for 1.5MW and a category for 3.0MW. There are significant economies of scale for installing more capacity, particularly on interconnection.”

- Hydro

- “Total FERC license prep is about 10% of total cost. Need to invest \$500K to \$750K before FERC licensing complete.”
- “Approvals from FERC costing several thousand in additional studies. If fish ladder is required, then it will stop the project on cost (prohibitive).”
- Impending steel tariffs from Canada may be a major issue – could “sink projects.”
- “Interconnection cost estimates are wildly off. Use of variable speed drive is causing confusion.”

Further Stakeholder Input Sought

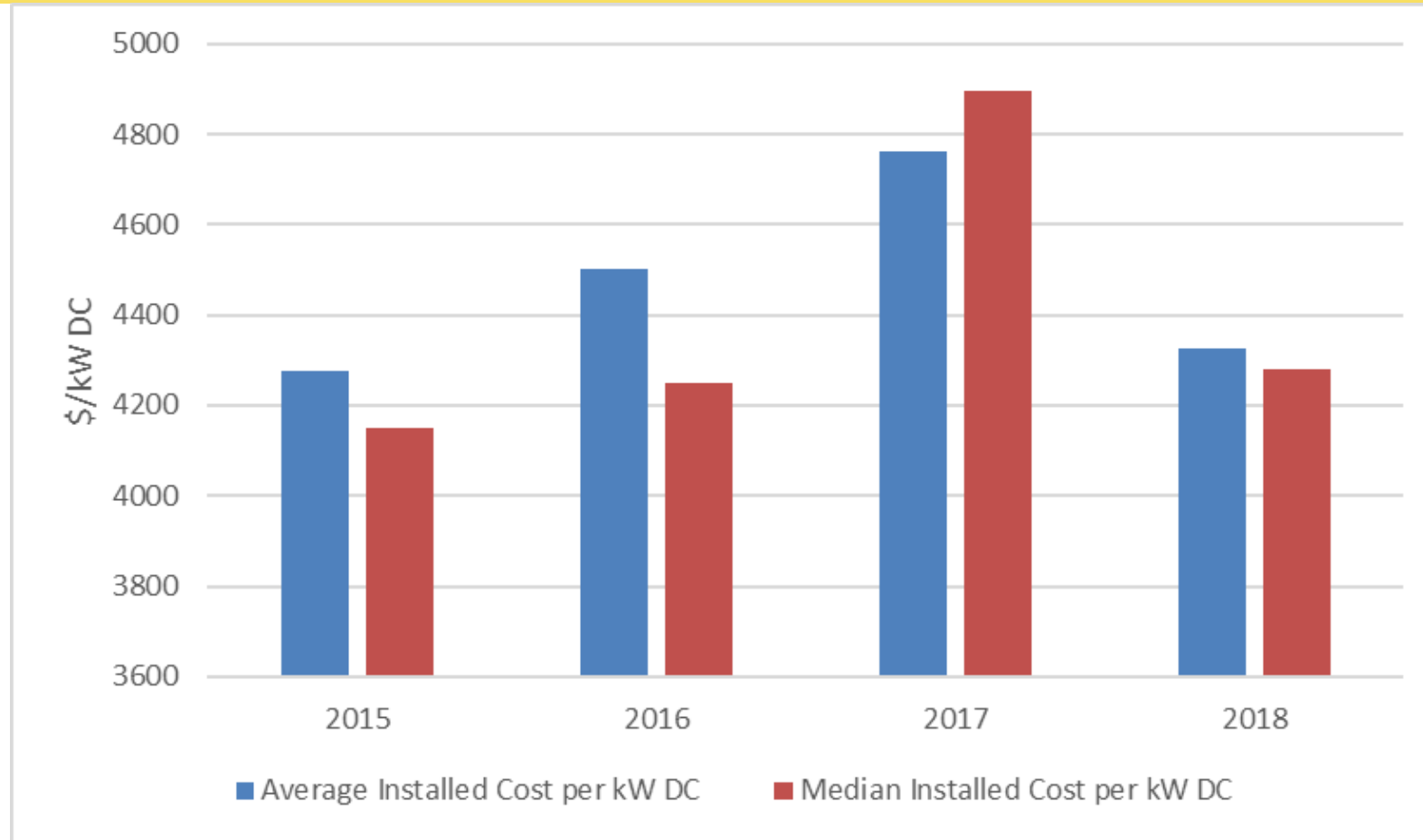
- The IRS recently issued guidance regarding commenced construction requirements to qualify for ITC levels in a given year. As with qualification for the PTC, projects may qualify by starting significant physical work or incurring 5% or more of the total costs. Given these allowances, please explain and justify whether the assumption that projects participating in the 2019 program year will commence construction by 2019 is reasonable.
- We have limited data points for installed costs of carports. Please provide input on typical project costs for a ~1 MW carport system.
- Carport capacity factor: Some data received indicated a lower CF than comparable ground-mount or rooftop systems. Please explain and provide documentation for why a carport would have a lower CF.
- Steel tariffs: what are the implications for project costs, particularly for solar carports and hydro?
- FERC licensing requirements for hydro: please comment on potential costs, given uncertainties in the context of project development timelines.

Appendix: Bid Data, Regional Benchmarking, and Additional Assumptions

Overview of Research to Inform CP Inputs

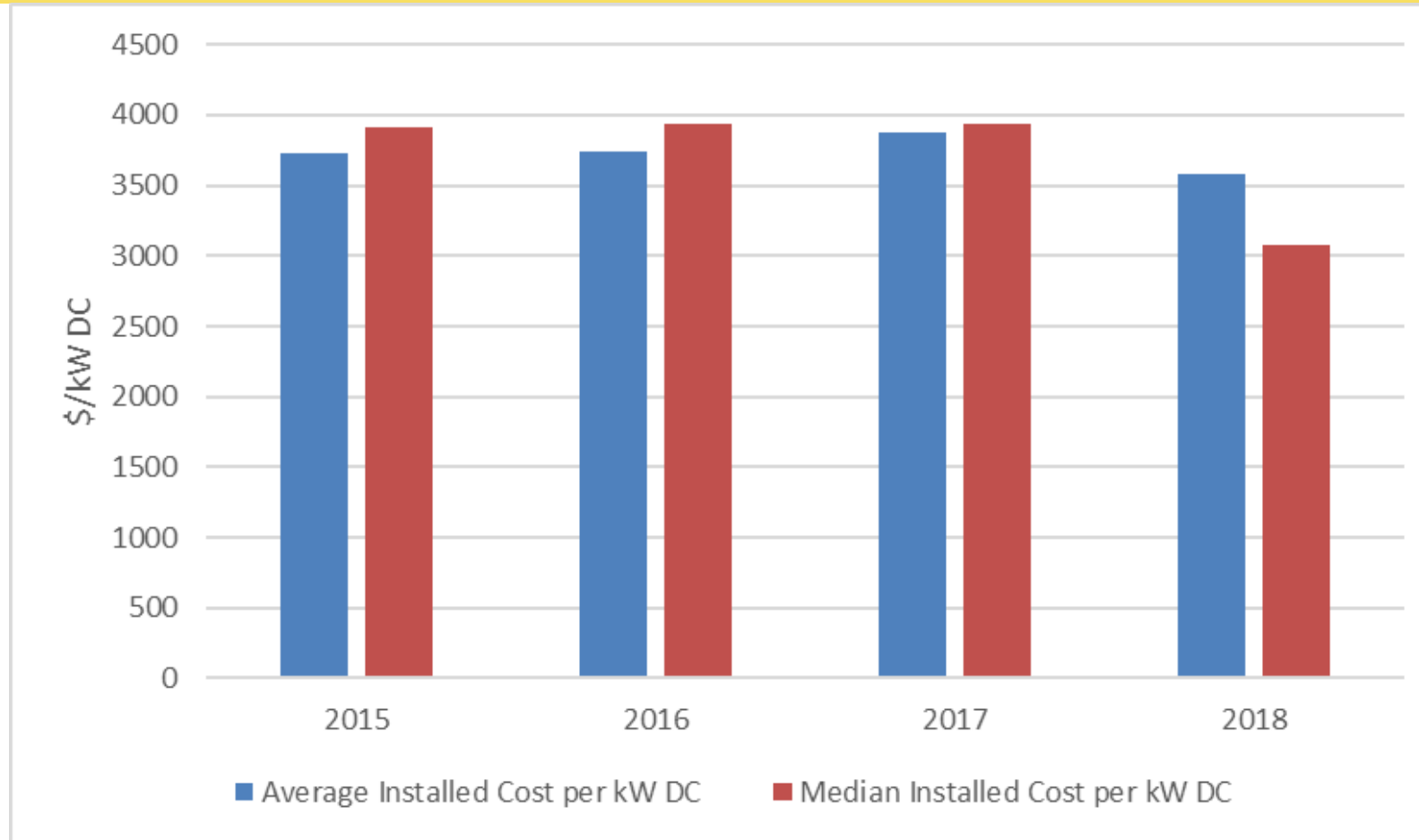
- Direct stakeholder input
 - Through *Data Request and Survey*
- Supplemental research
 - Interviews
 - Program data (bids, executed contracts)
 - Additional data from National Grid (Actual interconnection costs)
 - Northeast regional cost databases
 - Revealed pricing data for ≤ 25 kW system from EnergySage
 - Northeast data from national reports (LBNL *Tracking the Sun*, which will be analyzed for the 2nd round of prices)
 - Technology-specific, competitively bid long-term contract pricing data (VT)
- DG Standard Contracts bid data (2011 – 2014)
- REG bid data (2015, 2016, 2017 & 2018 1st Open Enrollment)

REG Bid Data – Average & Median Installed Cost for Small Solar I Under Different Tariff Years



Note: Data includes 375 projects with contracts under the 2015 tariff, 920 under the 2016 tariff, 1062 under the 2017 tariff, and 645 thus far under the 2018 tariff. 229 projects (9% of the total) lacking cost data are omitted from analysis.

REG Bid Data – Average & Median Installed Cost for Small Solar II Under Different Tariff Years



Note: Data includes 10 projects with contracts under the 2015 tariff, 20 under the 2016 tariff, 10 under the 2017 tariff, and 25 thus far under the 2018 tariff. 6 projects (9% of the total) lacking cost data are omitted from analysis.

REG Bid Data – Small Solar Installed Costs (2015-18)

Installed Cost Analysis of REGrowth Systems 1-25 kW, 2015-2018

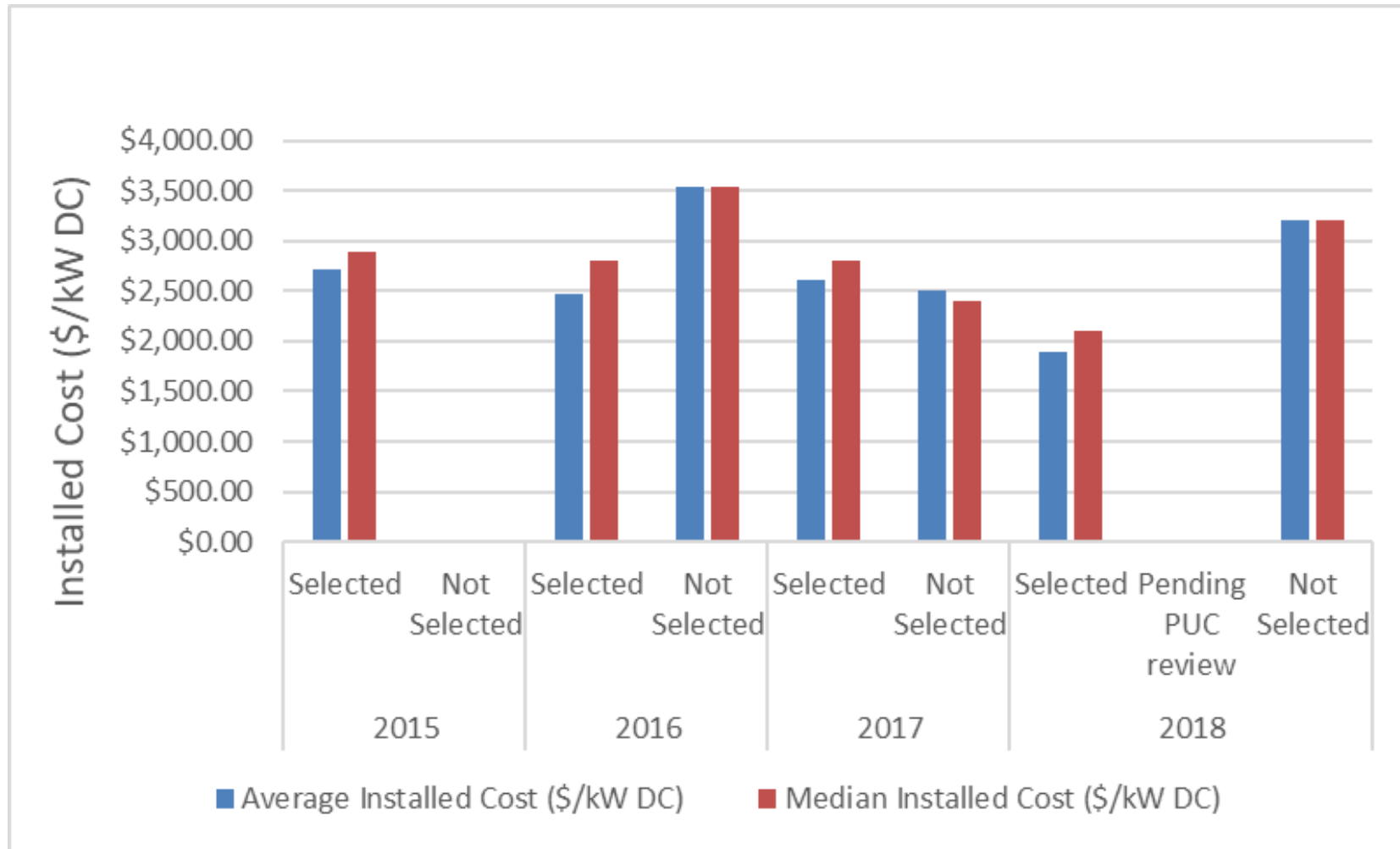
	Tariff Year	Average cost (\$/kW)	Median cost (\$/kW)	1 st Quartile	3 rd Quartile	N*
Small Solar I (1-10 kW)	2015	\$4276.71	\$4150	\$3798.57	\$4636.52	375
	2016	\$4502.14	\$4250	\$3850.04	\$5021.69	920
	2017	\$4761.23	\$4894.12	\$4100	\$5499.38	1062
	2018	\$4324.89	\$4279.96	\$3451.37	\$5000	561
Small Solar 2 (10-25 kW)	2015	\$3733.70	\$3911.72	\$3694.25	\$4121.90	10
	2016	\$3740.98	\$3931.08	\$3548.69	\$4103.92	20
	2017	\$3875.31	\$3942.33	\$3170.41	\$4240.63	10
	2018	\$3584.64	\$3076.89	\$2998.76	\$4011.50	21

Note: Data from National Grid REGrowth Report

**Counts represent projects with cost data available. 299 Small Solar I projects and 6 Small Solar II projects are missing data.*

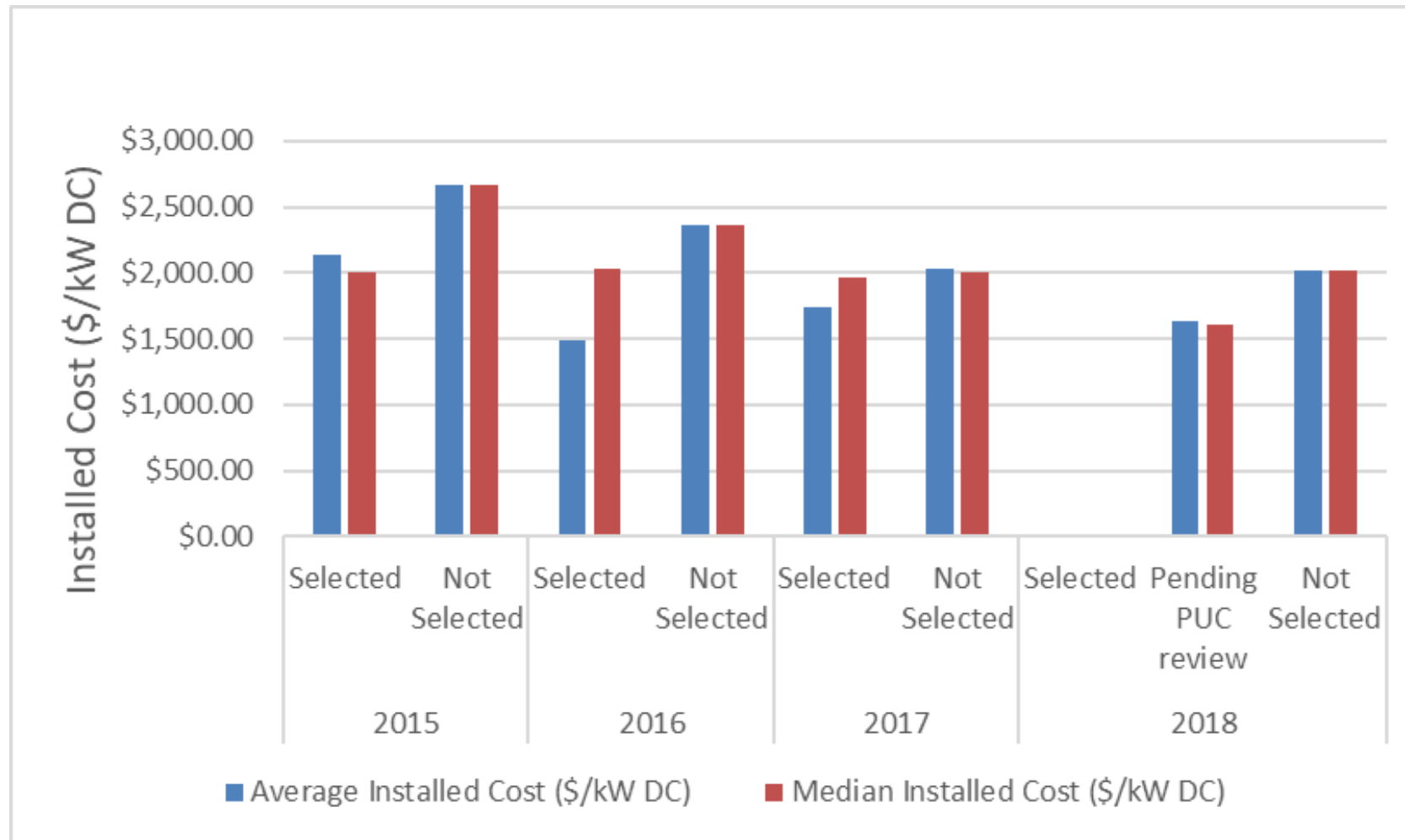


REG Bid Data – Average & Median Installed Cost for Medium Solar Under Different Tariff Years



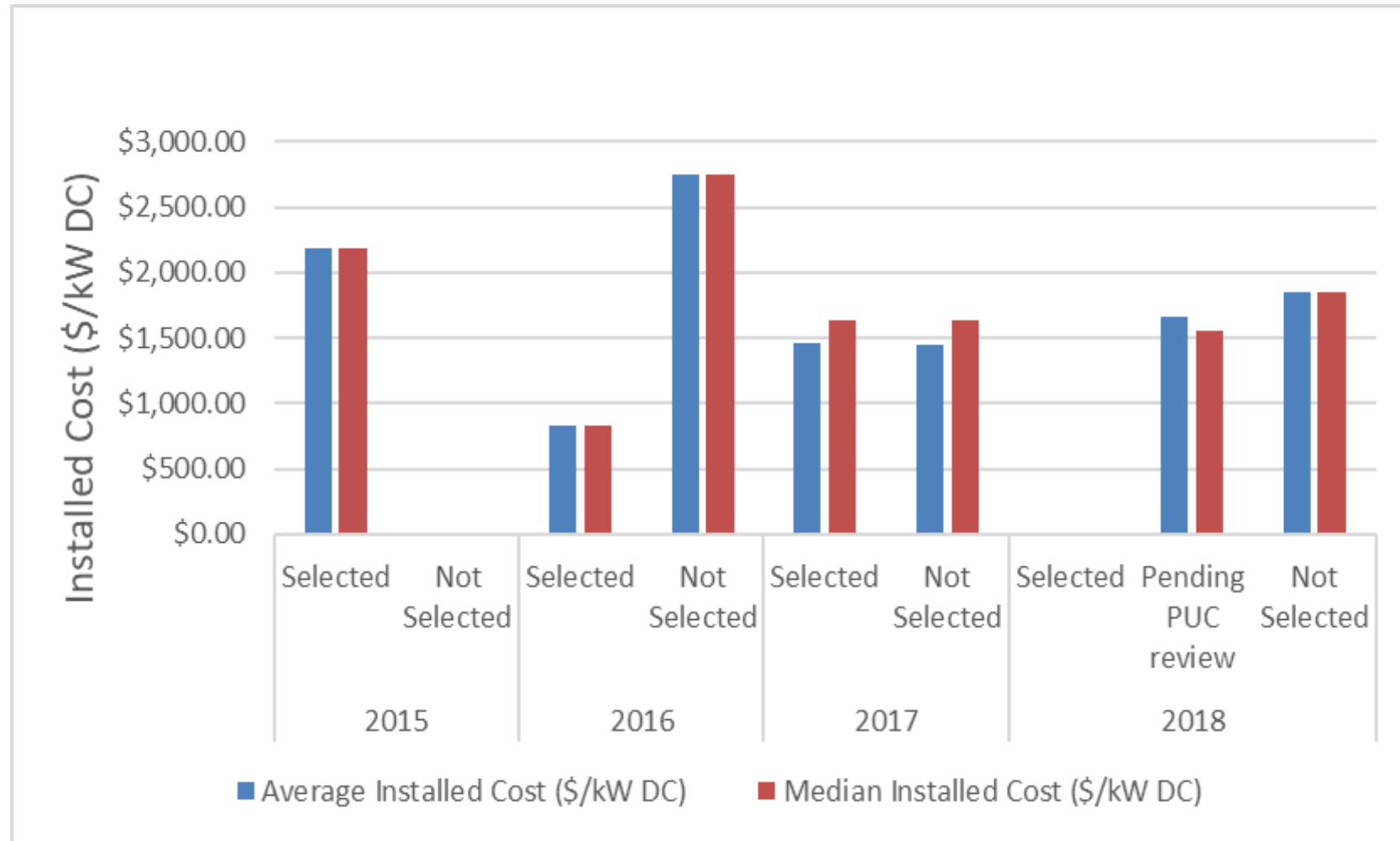
Note: Only 1 project was not selected under the 2016 tariff and thus far under the 2018 tariff.

REG Bid Data – Average & Median Installed Cost for Commercial Solar Under Different Tariff Years



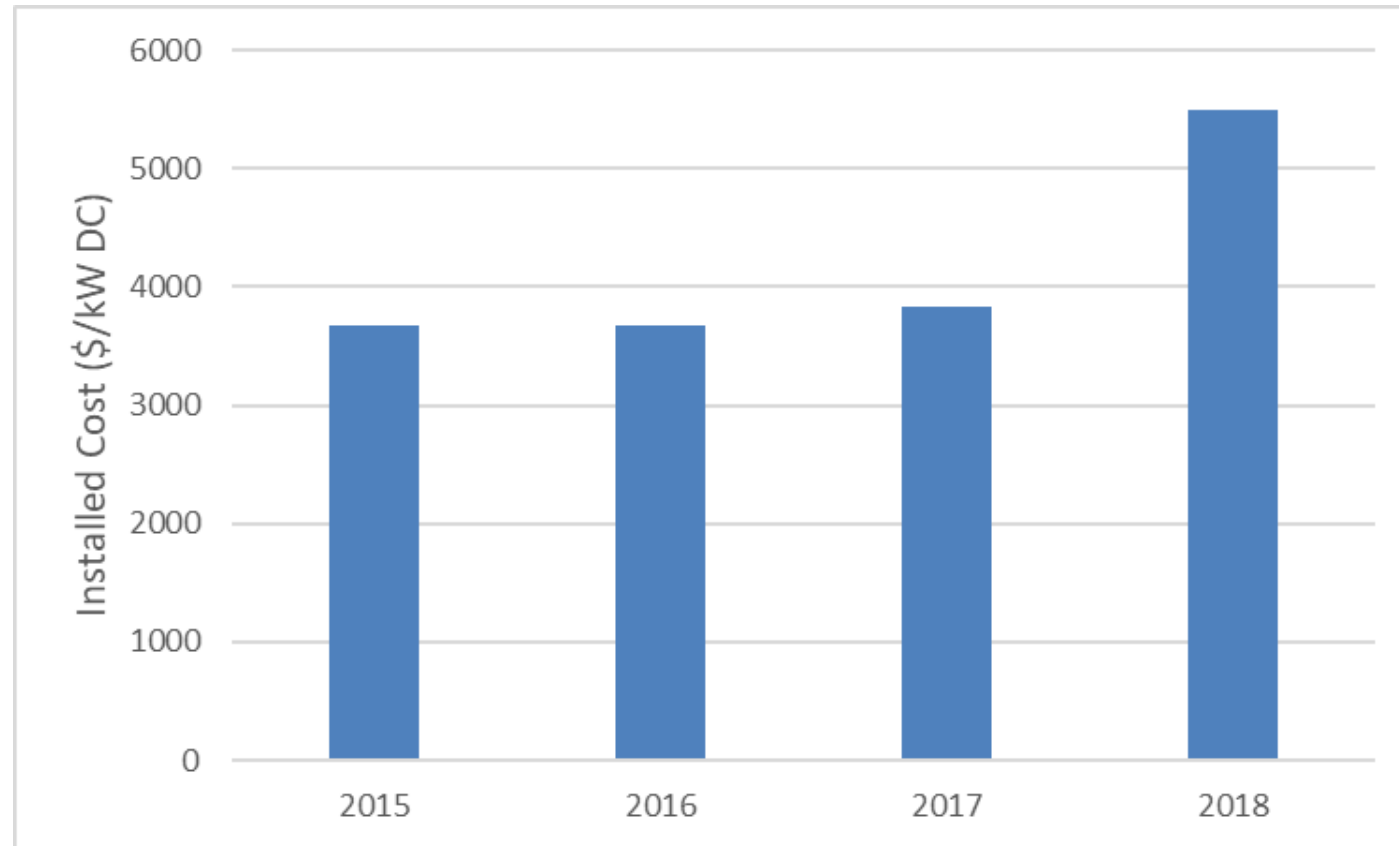
Note: Only 1 project was not selected under the 2018 tariff.

REG Bid Data – Average & Median Installed Cost for Large Solar Under Different Tariff Years



Note: Only one cost one data point was available for projects selected under the 2016 tariff.

REG Bid Data – Average Installed Costs for Large Wind Under Different Tariff Years



Note: Only 2 projects were bid in each year's tariff (all were accepted).

Small Solar I, Installed Costs

Small Solar I (1-10 kW) Installed Costs						
	2017			2018		
Dataset	Average* (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)	Average (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)
NY - NYSERDA Solar Electric Programs	\$4,064	\$3,390	\$4,605	\$4,085	\$3,410	\$4,480
MA RPS Solar Carve Out II (Qualified & Operational)	\$3,871	\$3,350	\$4,353	\$3,751	\$3,341	\$4,190
MA RPS Solar Carve Out II (Under Review)	\$4,080	\$3,381	\$4,584	\$3,801	\$3,272	\$4,227
MA Performance Tracking System	\$3,874	\$3,350	\$4,369	\$3,684	\$3,249	\$4,083
CT Residential Solar Investment Program	\$3,355	\$2,920	\$3,690	\$3,429	\$3,121	\$3,811
NY - Energy Sage	\$3,400	\$3,217	\$3,510	\$3,400	\$3,200	\$3,650
MA - Energy Sage	\$3,263	\$3,120	\$3,430	\$3,220	\$3,090	\$3,440
RI - Energy Sage	\$3,420	\$3,307	\$3,643	\$3,430	\$3,280	\$3,700

*Median pricing used for Energy Sage data given apparent outliers in dataset.

Datasets: MA SREC, MA PTS, NY (NYSERDA Solar Programs), CT (Residential Solar Investment Program), Energy Sage revealed pricing data. LBNL Tracking the Sun data to be incorporated when available.



Small Solar II, Installed Costs

Small Solar II (11-25 kW) Installed Costs						
	2017			2018		
Dataset	Average* (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)	Average (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)
NY - NYSERDA Solar Electric Programs	\$3,527	\$2,987	\$3,999	\$3,433	\$2,910	\$3,896
MA RPS Solar Carve Out II (Qualified & Operational)	\$3,666	\$3,221	\$4,028	\$3,539	\$3,185	\$3,900
MA RPS Solar Carve Out II (Under Review)	\$2,948	\$2,365	\$3,765	\$3,412	\$3,006	\$3,935
MA Performance Tracking System	\$3,666	\$3,214	\$4,010	\$3,484	\$3,144	\$3,815
CT Residential Solar Investment Program	\$3,191	\$2,828	\$3,533	\$3,278	\$3,067	\$3,464
NY - Energy Sage	\$3,267	\$2,960	\$3,400	\$3,200	\$2,950	\$3,400
MA - Energy Sage	\$3,140	\$2,973	\$3,317	\$3,150	\$3,000	\$3,350
RI - Energy Sage	\$3,343	\$3,230	\$3,433	\$3,300	\$3,170	\$3,490

*Median pricing used for Energy Sage data given apparent outliers in dataset.

Datasets: MA SREC, MA PTS, NY (NYSERDA Solar Programs), CT (Residential Solar Investment Program), Energy Sage revealed pricing data. LBNL Tracking the Sun data to be incorporated when available.

Medium, Commercial, and Large Solar Installed Costs

Dataset	2017			2018		
	Average (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)	Average (\$/kW)	25th Percentile (\$/kW)	75th Percentile (\$/kW)
Medium Solar (26-250 kW)						
NY - NYSERDA Solar Electric Programs	\$3,307	\$2,673	\$3,738	\$3,088	\$2,300	\$3,519
MA RPS Solar Carve Out II (Qualified & Operational)	\$3,064	\$2,592	\$3,376	\$3,166	\$2,624	\$3,738
MA RPS Solar Carve Out II (Under Review)	\$2,452	\$2,145	\$2,628	\$3,104	\$2,329	\$4,151
MA Performance Tracking System	\$3,138	\$2,605	\$3,419	\$3,231	\$2,767	\$3,515
CT Residential Solar Investment Program	\$3,004	No Data	No Data	No Data	No Data	No Data
MA RPS Solar Carve Out II (Qualified & Not Operational)*				\$3,129	\$2,610	\$3,469
Commercial Solar (251-999 kW)						
NY - NYSERDA Solar Electric Programs	\$2,283	\$2,134	\$2,589	\$2,534	\$2,259	\$2,983
MA RPS Solar Carve Out II (Qualified & Operational)	\$2,541	\$2,133	\$2,788	\$2,916	\$2,330	\$3,205
MA RPS Solar Carve Out II (Under Review)	\$1,835	No Data	No Data	\$1,858	\$1,650	\$2,064
MA Performance Tracking System	\$2,732	\$2,297	\$2,874	\$3,047	\$2,603	\$3,353
CT Residential Solar Investment Program	No Data	No Data	No Data	No Data	No Data	No Data
MA RPS Solar Carve Out II (Qualified & Not Operational)*				\$2,430	\$2,089	\$2,803
Large Solar (1000-5000+ kW)						
NY - NYSERDA Solar Electric Programs	\$2,485	\$1,736	\$3,250	\$1,780	No Data	No Data
MA RPS Solar Carve Out II (Qualified & Operational)	\$2,411	\$2,008	\$2,669	\$2,524	\$2,086	\$3,056
MA RPS Solar Carve Out II (Under Review)	\$2,701	\$2,381	\$3,020	\$1,261	\$31	\$2,040
MA Performance Tracking System	\$2,605	\$2,194	\$2,885	\$2,664	\$2,195	\$3,162
CT Residential Solar Investment Program	No Data	No Data	No Data	No Data	No Data	No Data
MA RPS Solar Carve Out II (Qualified & Not Operational)*				\$2,332	\$1,774	\$2,765

*Not Operational projects have no completion date. Datasets: MA SREC, MA PTS, NY (NYSERDA Solar Programs).



Average & Median Installed Cost/kW for RI REF Data (2017-18)

Installed Cost Analysis of Renewable Energy Fund (REF) Systems 1-25 kW, 2017-2018

	Average cost (\$/kW)	Median cost (\$/kW)	1 st Quartile	3 rd Quartile	N
1-10 kW	\$3,821.44	\$3,796.39	\$3,506.25	\$4,128.26	148
10-25 kW	\$4,048.94	\$3,999.67	\$3,622.33	\$4,470.62	15

Note: Data from RI Renewable Energy Fund (CommerceRI). Two outliers above \$10,000/kW and below \$2,000/kW were removed.

Interconnection Cost Analysis: MA & RI (2017-18)

	Massachusetts & Rhode Island		Rhode Island only	
	Number of Projects with Cost Data	Wtd. Average Cost (\$/kW DC)	Number of Projects with Cost Data	Wtd. Average Cost (\$/kW DC)
Small Solar I (<=10 kW)	0	NA	0	NA
Small Solar II (11-25 kW)	0	NA	0	NA
Medium Solar (26-250 kW)	11	\$158.07	4	\$306.85
Commercial Solar (251-999 kW)	55	\$281.15	10	\$108.85
Large Solar (1000-5000 kW)	96	\$189.39	6	\$120.53
Small Wind (<=999 kW)	0	NA	0	NA
Large Wind (1000-5000 kW)	1	\$239.80	1	\$239.80
Anaerobic Digestion (<=5000 kW)	0	NA	0	NA
Hydro	0	NA	0	NA

Note: Based on National Grid Data. Few projects in 2017-2018 indicate whether or not safety equipment related to islanding (i.e. DTT, 3Vo, etc.) is required; unknown whether reported project costs include safety equipment costs. Dataset includes additional projects that do not have cost data available.

MA SMART Procurement Results

Procurement Summary	NGrid	Nantucket	NSTAR	WMECo	Unitil
MW Solicited (MW-AC)	45.00	2.00	46.00	8.00	4.00
MW Received (MW-AC)	53.30	0.00	2.00	13.00	0.00
MW Selected (MW-AC)	43.57	0.00	2.00	7.70	0.00
Clearing Price (\$/kWh)	\$ 0.16933	N/A	\$ 0.17000	\$ 0.14890	N/A
Weighted Average Clearing Price (\$/kWh)	\$ 0.15563	N/A	\$ 0.17000	\$ 0.14288	N/A
Block 1 Base Compensation Rate (\$/kWh)	\$ 0.15563	\$ 0.17000	\$ 0.17000	\$ 0.14288	\$ 0.15563

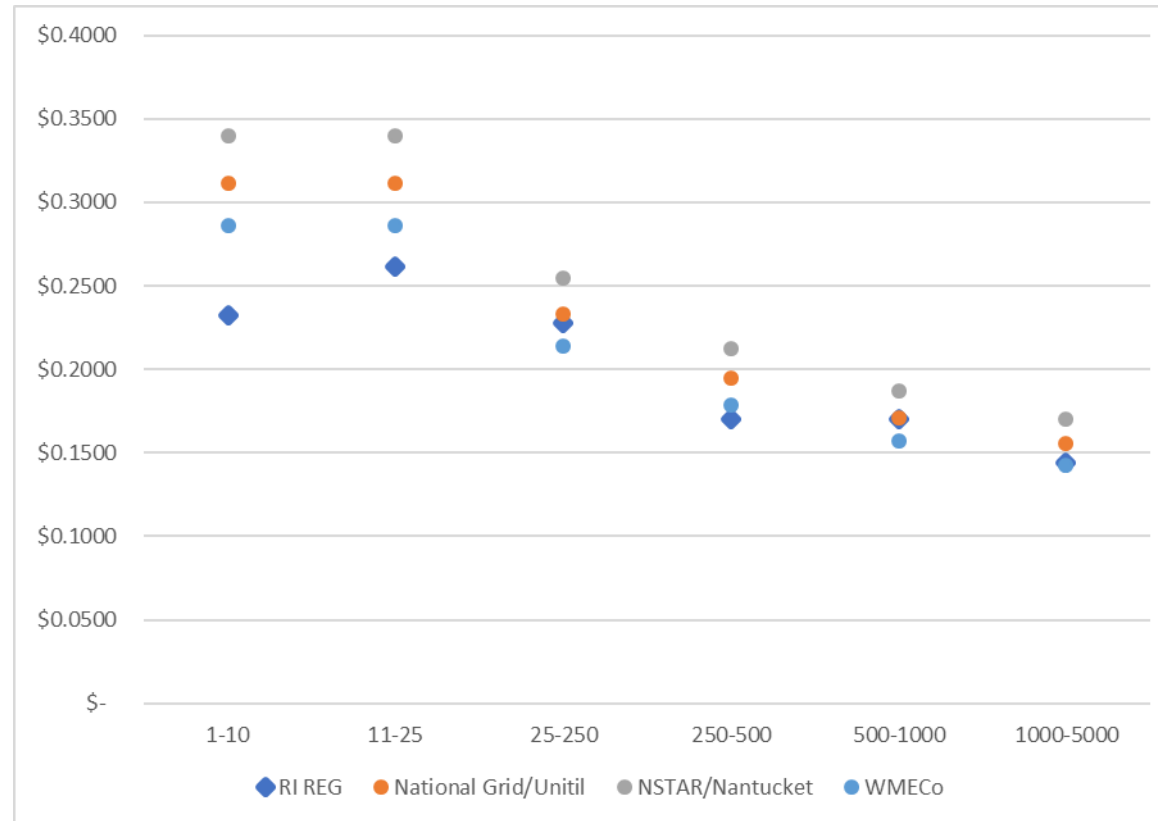
Block 1 Base Compensation Rates

Size Bucket	Capacity Based Rate Factor	NGrid	Nantucket	NSTAR	WMECo	Unitil
Low Income <=25 kW	230%	\$ 0.3579	\$ 0.3910	\$ 0.3910	\$ 0.3286	\$ 0.3579
<=25 kW	200%	\$ 0.3113	\$ 0.3400	\$ 0.3400	\$ 0.2858	\$ 0.3113
25-250 kW	150%	\$ 0.2334	\$ 0.2550	\$ 0.2550	\$ 0.2143	\$ 0.2334
250-500 kW	125%	\$ 0.1945	\$ 0.2125	\$ 0.2125	\$ 0.1786	\$ 0.1945
500-1000 kW	110%	\$ 0.1712	\$ 0.1870	\$ 0.1870	\$ 0.1572	\$ 0.1712
1-5 MW	100%	\$ 0.1556	\$ 0.1700	\$ 0.1700	\$ 0.1429	\$ 0.1556

Procurement projects receive the clearing price (highest bid value) as their base compensation rate, while the rest of the compensation in the program is based on the weighted average clearing price.

RI REG Ceiling Prices and SMART Base Compensation Rates

First Draft Proposed 2019 Ceiling Prices and SMART Block 1 Base Compensation Rates (\$/kWh)



Note: SMART Base Compensation Rates are set as a percentage-based factor from the weighted average clearing price of the opening competitive procurement for projects sized 1-5 MW. Projects bidding into the procurement receive the clearing price.

VT Standard Offer 2018 Bid Prices: SOLAR

Project Name	Project Size (kW)	Bid Price* (\$/kWh)
1861 Solar	1,000	0.1250
Bennington East Solar	1,700	0.0874
Furnace Brook Solar	1,700	0.0884
Power Factor Solar	2,200	0.0899
Warner Solar	2,200	0.1087
Stark Solar	2,200	0.1106
Otter Creek 1 Solar	2,200	0.1112
Otter Creek 3 Solar	2,200	0.1126
Vergennes Solar	2,200	83.9800**
Charlotte Solar – Lake Road	2,200	86.5000**
St. Albans Solar	2,200	-

Highlighted Blue= Projects awarded a contract (recommended)

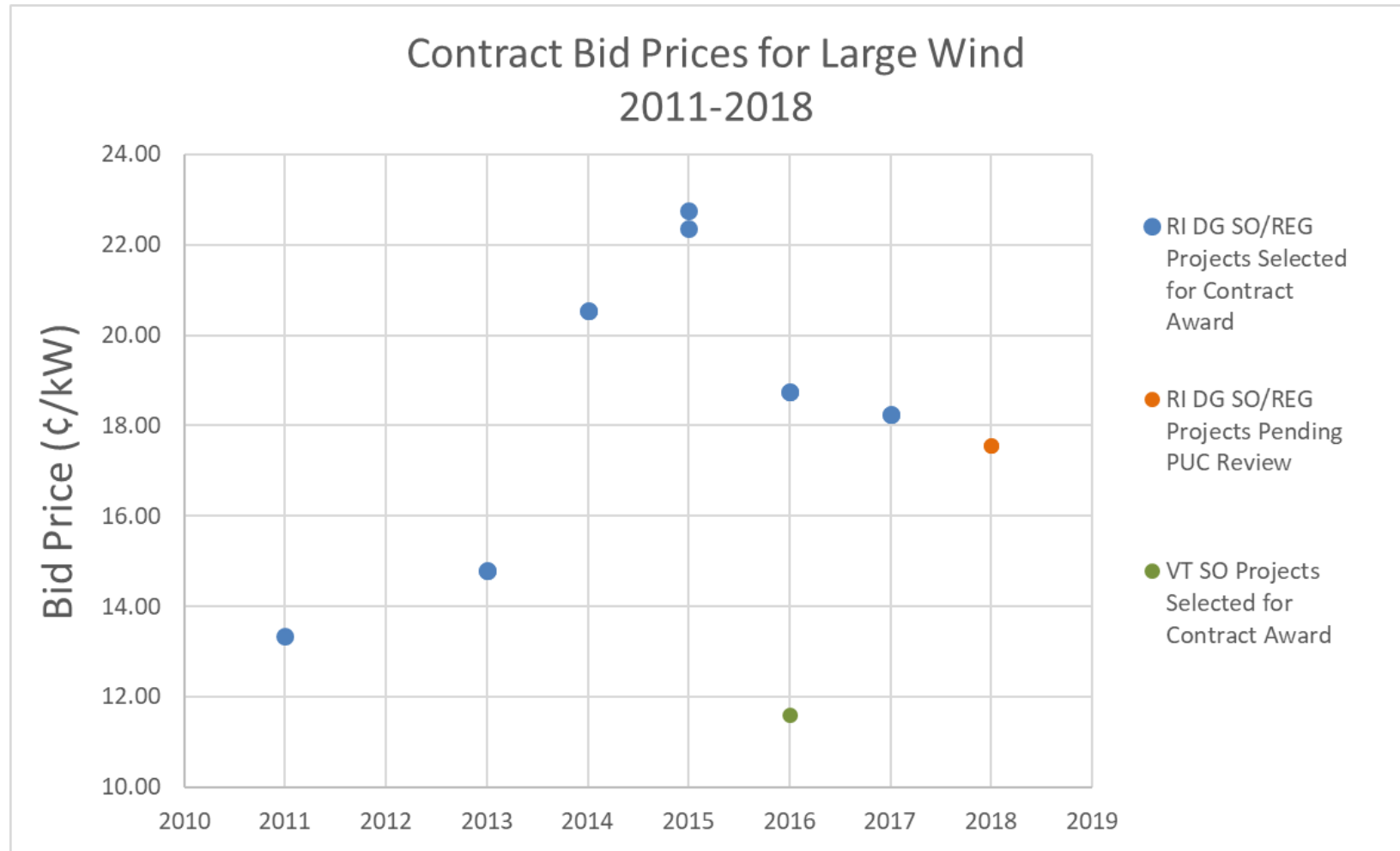
Highlighted Green = Projects selected for “Reserve Group” – these projects will be contracted if a project in the “Award Group” is withdrawn following selection (recommended)

**Note that the VT SO Program offers 25-year fixed price contracts, compared to 20 years in RI. In 2018, the program changed incentive allocations to a competitive block and a technology diversity block, but did not change overall eligibility.*

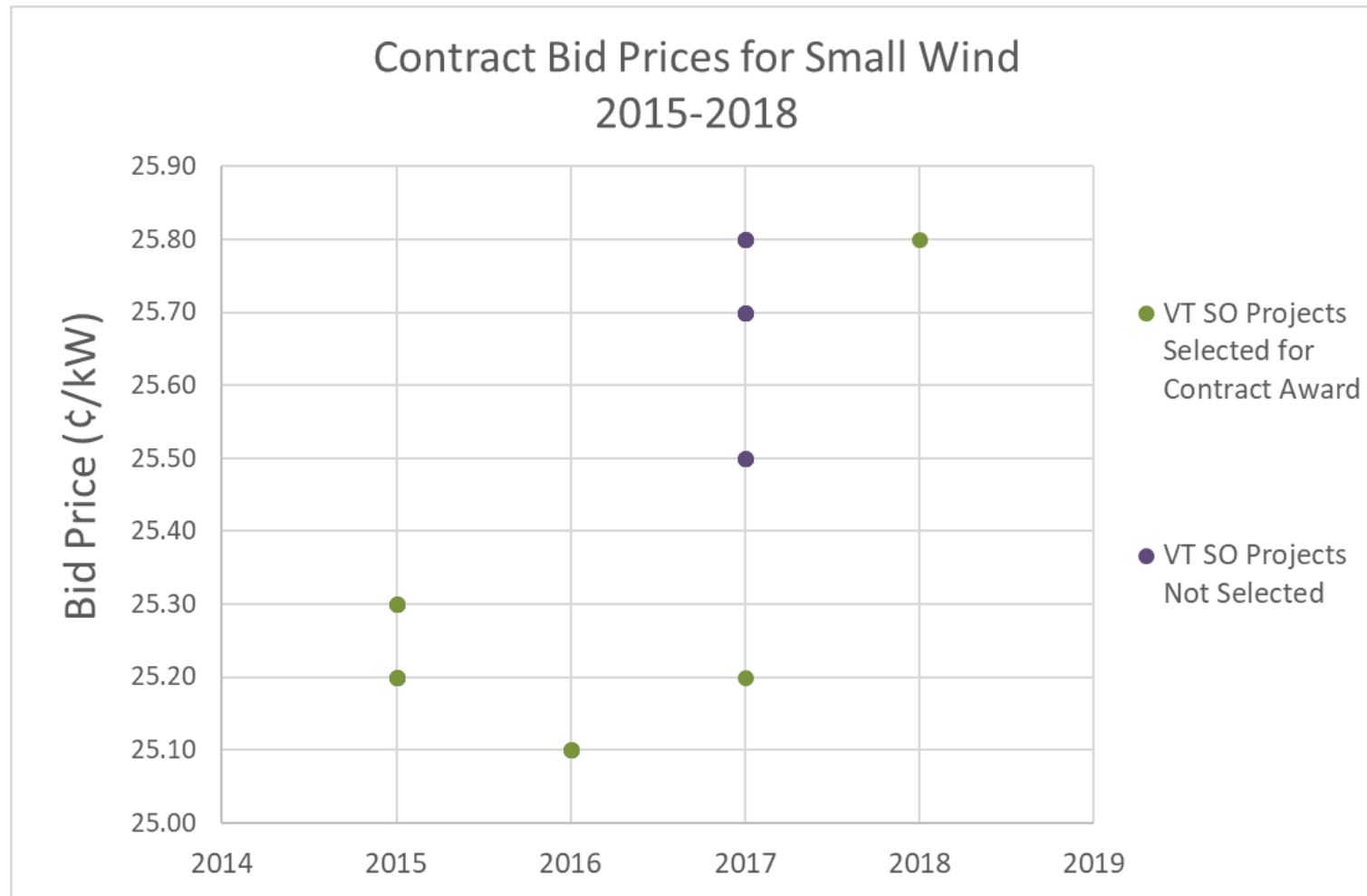
***Bid Price is shown as reported. Projects were not selected due in part to bid price being greater than allowable under program rules.*



Comparison of RI DG Standard Contract/REG & VT Standard Offer Bid Price History: Large Wind

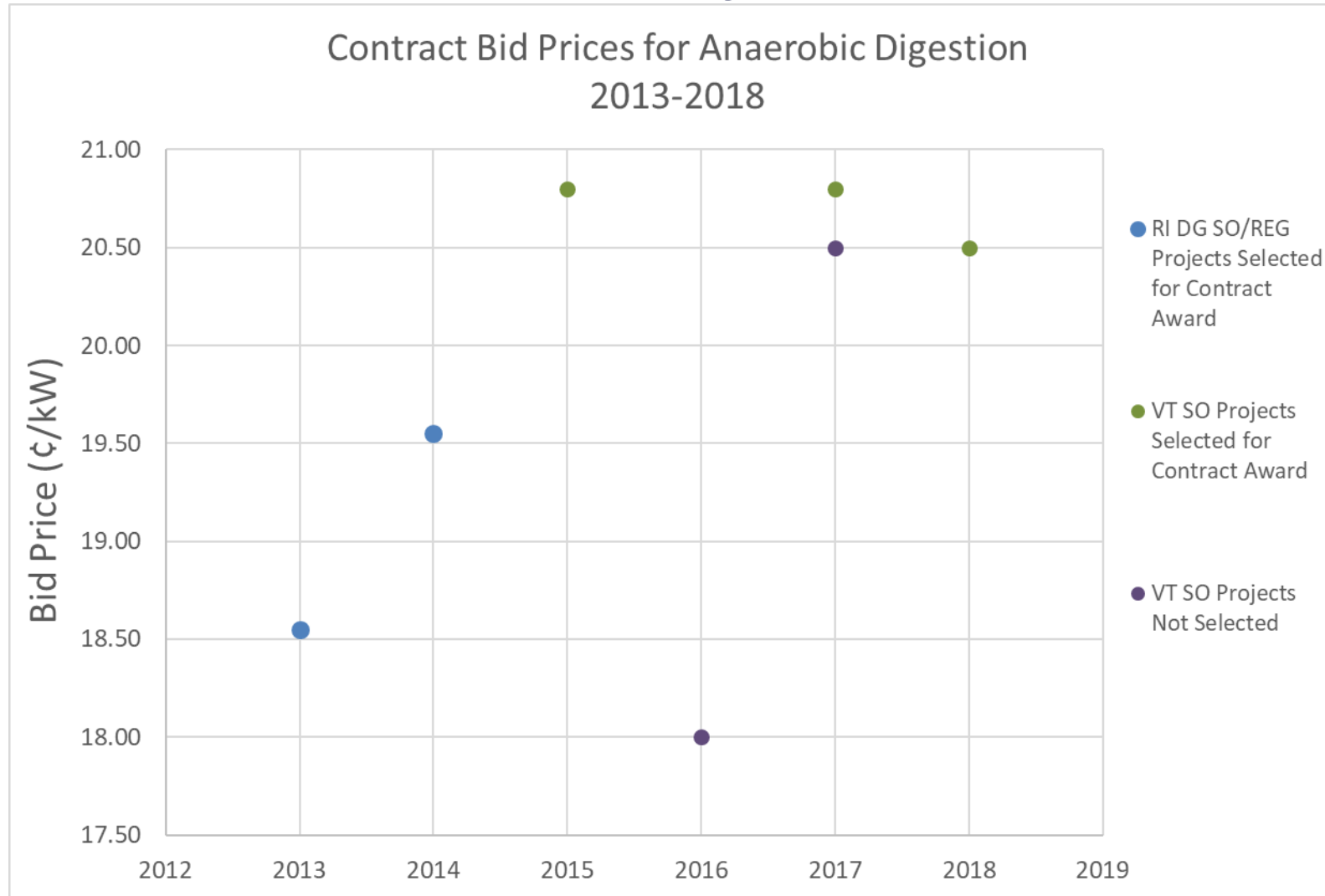


Comparison of RI DG Standard Contract/REG & VT Standard Offer Bid Price History: Small Wind



** Note that there were multiple projects bid in at each price point in the graph above.*

Comparison of RI DG Standard Contract/REG & VT Standard Offer Bid Price History: AD



** Note that no AD Bids were made prior to 2013.*

VT Standard Offer 2018 Bid Prices: NON-SOLAR

Small Wind

Project Name	Project Size (kW)	Bid Price (/kWh)
Tomlinson Wind	90	\$0.258

Highlighted Blue=
Projects awarded a
contract
(recommended)

Food Waste

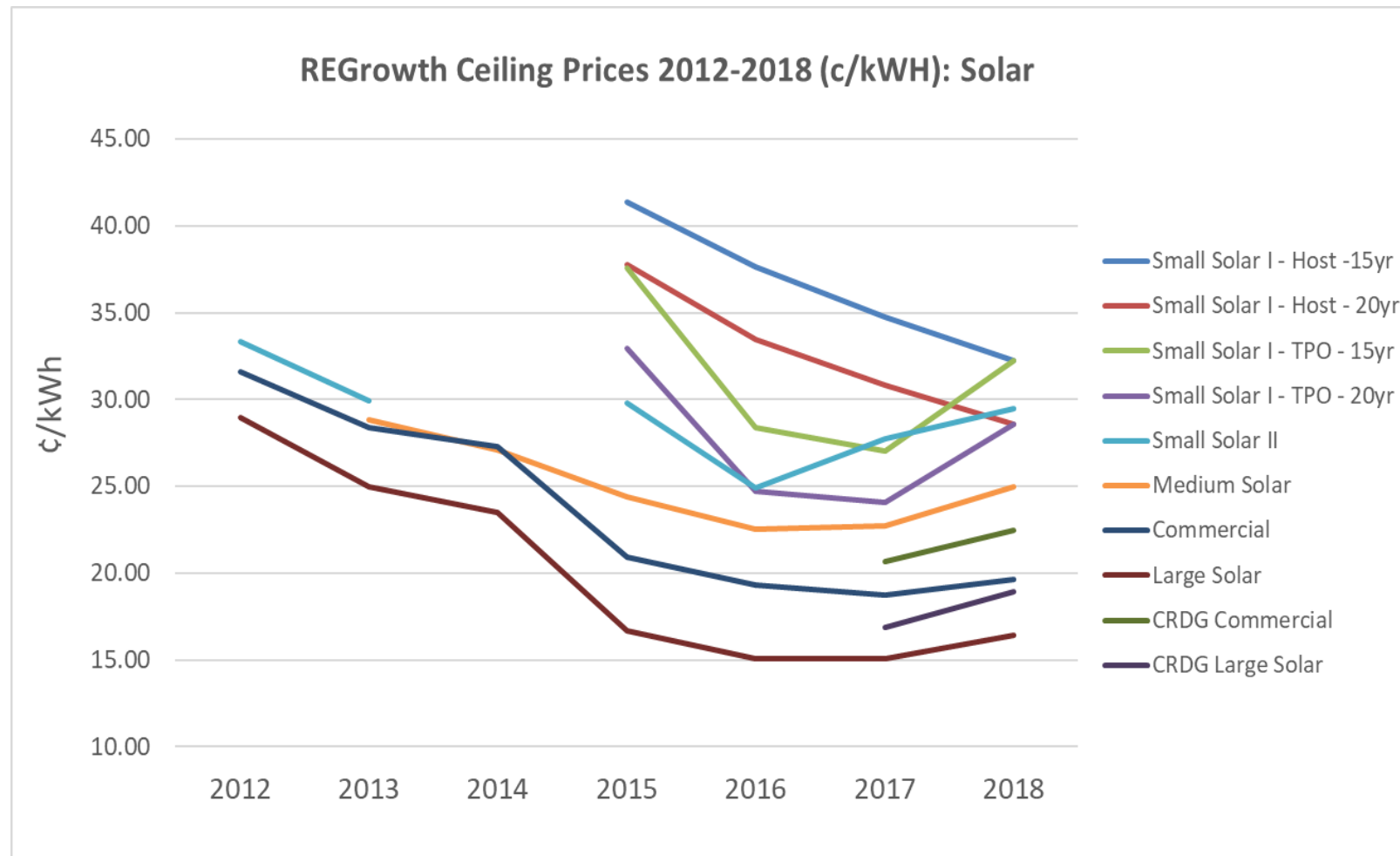
Project Name	Project Size (kW)	Bid Price (/kWh)
Middlebury Resource Recovery	1,014	\$0.205

Hydro

Project Name	Project Size (kW)	Bid Price (/kWh)
North Hartland Unit 3	500	\$0.13



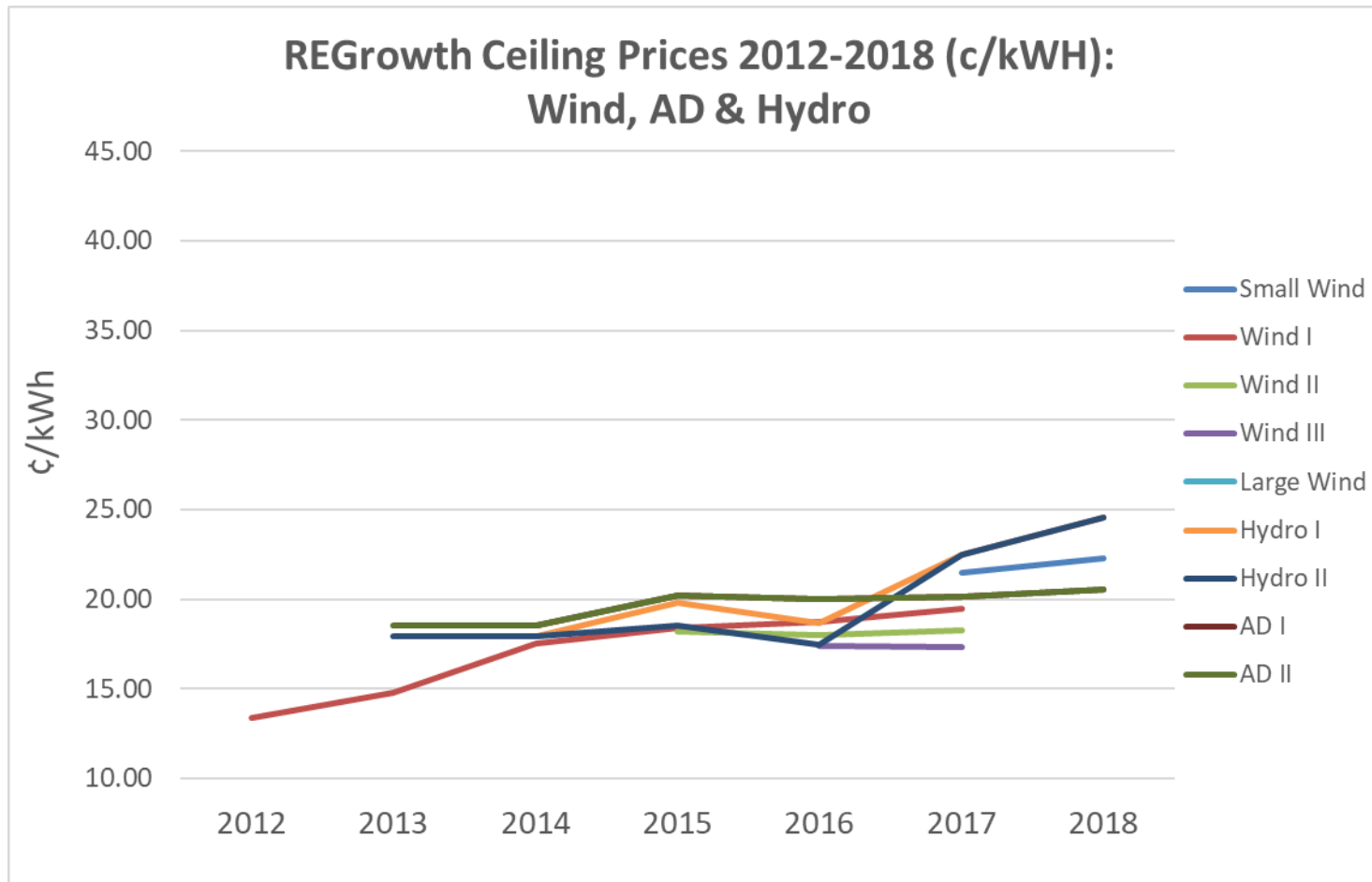
Summary of Ceiling Prices: 2012 – 2018 (Solar)



Percent Change in Ceiling Prices				
Technology Class	2015-2016	2016-2017	2017-2018	2015-2018
Small Solar I - Host -15yr	-9%	-8%	-7%	-22%
Small Solar I - Host - 20yr	-11%	-8%	-7%	-24%
Small Solar I - TPO - 15yr	-25%	-5%	NA	NA
Small Solar I - TPO - 20yr	-25%	-3%	NA	NA
Small Solar II	-16%	11%	6%	-1%
Medium Solar	-8%	1%	10%	2%
Commercial	-8%	-3%	5%	-6%
Large Solar	-10%	0%	9%	-1%
CRDG Commercial	NA	NA	9%	9%
CRDG Large Solar	NA	NA	12%	12%

Note: Graph for Demonstration Purposes only. Ceiling Price Classes have changed over time, making cross-comparison across enrollments tenuous.

Summary of Ceiling Prices: 2012 – 2018 (Non-Solar)



Percent Change in Ceiling Prices				
Technology Class	2015-2016	2016-2017	2017-2018	2015-2018
Small Wind	NA	NA	4%	4%
Wind I	2%	4%	NA	NA
Wind II	-1%	1%	NA	NA
Wind III	NA	0%	NA	NA
Large Wind	NA	NA	NA	NA
Hydro I	-6%	20%	9%	24%
Hydro II	-6%	29%	9%	32%
AD I	-1%	1%	2%	2%
AD II	-1%	1%	2%	2%

Note: Graph for Demonstration Purposes only. Ceiling Price Classes have changed over time, making cross-comparison across enrollments tenuous.

Tax Credits

- Solar:
 - All projects selected in 2019 solicitations are assumed able to qualify for a 30% ITC by commencing construction by 12/31/2019.
 - No monetization “haircut” assumed.
- Wind
 - All projects selected in 2019 solicitations are assumed to qualify for ITC in lieu of PTC
 - ITC value modeled reflects a reduction of 40% to face value.
 - No monetization “haircut” assumed.
- AD & Hydro
 - No PTC (or ITC in lieu thereof) for facilities commencing construction after 12/31/2016.



Depreciation Benefits

- MACRS depreciation creates deduction benefit by reducing taxable income.
- Where depreciation expense is $>$ operating income, the project will experience a net operating loss (NOL) for the specified year.
- This NOL is passed through to the facility owner, creating a benefit by reducing that entity's eligible taxable income.
- NOL benefits are assumed to be applied “as generated” to both state and federal tax liabilities
- Bonus Depreciation:
 - Based on year of commercial operation
 - Majority of projects selected under 2019 enrollments assumed to come on-line in 2019
 - However, given stakeholder feedback, most projects are opting not to take bonus depreciation. Therefore, 5 year MACRS assumed.
 - Hydro assumed to come on-line in 2020 or later. Therefore, no bonus depreciation is applied.

Post-Tariff Market Value of Production

- Applied after tariff expires, for remainder of modeled useful life, if applicable.
 - Solar (years 21 through 25)
 - Hydro (years 21 through 30)
 - Does not apply to wind and AD, modeled as 20-year useful life
- Purpose = to take full useful life and market revenues into account when recommending ceiling price
- Methodology
 - Wholesale energy revenue +
 - Production-weighted for solar
 - All-hours for hydro
 - (Nominal) REC revenue (\$5)

Post-Tariff Market Value of Production

Project Year	Calendar Year	Market Value of Production (incl. energy & RECs) (cents/kWh)	
		Solar	Hydroelectric
16	2034	5.87	
17	2035	6.03	
18	2036	6.33	
19	2037	6.52	
20	2038	6.78	
21	2039	7.02	6.75
22	2040	7.25	6.97
23	2041	7.47	7.18
24	2042	7.62	7.33
25	2043	7.78	7.48
26	2044	7.95	7.64
27	2045	8.12	7.80
28	2046	8.29	7.97
29	2047	8.46	8.14
30	2048	8.64	8.31





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DRAFT – NOT YET VOTED ON BY DG BOARD

Distributed Generation Board Meeting

Monday, September 24, 2018

4:00-5:30PM

Department of Administration – Conference Room B

Meeting Minutes

Board Members Present: Kenneth Payne, Bill Ferguson, Samuel Bradner, Sheila Dormody, Annie Ratanasim, Ian Springsteel, Laura Bartsch, Karen Stewart, Carol Grant.

Others Present: Chris Kearns, Shauna Beland, Kate Daniel, Jorge Souza, John Kennedy, Bryan Evans, Matt Piantedosi, Mabel Hodnett

Call to Order: Chairman Kenneth Payne called the meeting to order at 4:02PM

1. Approval of August Meeting Minutes

Chairman Payne requested a motion to approve the August 2018 meeting minutes. Mr. Bradner made a motion to approve the meeting minutes, and Mr. Ferguson seconded it. All Approved.

2. Voting on the 2019 REG Program Plan

A. 2019 MW Allocation Plan

Chairman Payne asked for a motion, motion made by Mr. Ferguson and seconded by Ms. Bartsch. Mr. Chris Kearns provided an update on the most recent version of the MW allocation plan which was before the Board for a vote. He also provided background on the statute which allows for previous year excess capacity to be rolled into the 2019 program year. OER agreed to report to the Board in the next few months, before the beginning of the 2019 program year in April, to provide updates on any extra capacity that may come available in the coming months due to project cancellations.

The motion was approved unanimously.

B. 2019 Ceiling Prices designed by Sustainable Energy Advantage

Chairman Payne asked for a motion, motion made by Ms. Dormody, seconded by Mr. Bradner.

Ms. Kate Daniels from SEA provided an overview about what changed from the previous document seen by the Board during the August public presentation on the 2019 ceiling prices.

Mr. Springsteel raised a concern by National Grid on the value of the Small Solar II ceiling price. It was originally assumed that Small Solar II would be used for commercial customers, however larger PV

projects on residents were also using it. The ceiling price modeling process should take this into account as the current process considers this category as commercial rather than residential.

Ms. Beland mentioned that OER had not received consistent data on the Small Scale solar program prior to July 2018. However, this would be something that OER could monitor and continue discussing with SEA during the 2020 ceiling price development process.

Ms. Bartsch asked for additional data regarding the adoption rate of the 20 year tariff vs the 15 year tariff. OER will monitor this and report back to the board at the October Board meeting with this data.

Mr. Ferguson complimented OER and SEA on a terrific job ensuring consistency regarding reducing pricing in the REG program year over year as well as meeting program goals and objectives.

The motion was approved unanimously.

C. Solar Quality Assurance Items relating to the 2019 tariff filing documents by National Grid – Recommendations by OER

Chairman Payne asked for a motion, motion made by Mr. Bradner and seconded by Ms. Stewart.

Mr. Bradner recommended that OER provide an update only on what had changed in the document before the Board as this was the third meeting discussing the recommendations. Ms. Beland went through the four recommendations and provided updates on what changed or did not change.

a) New State Licensing Requirement Disclosure

Mr. Springsteel indicated that National Grid was supportive of this recommendation but would like to see the data collected on the building permit rather than an input in the interconnection application as the Interconnection Tariff would need to be opened in order to make this change.

Ms. Beland recommended that the recommendation move forward without specifying which document would be required to be collected at this time.

Chairman Payne asked if this could be an amendment to this recommendation.

Ms. Beland agreed and read back the recommendation with the changes. The revised recommendation language is, "National Grid shall incorporate and require that renewable energy firms holding RI General Contractors registration provide their license number."

b) Total Project Cost Data Reports

Mr. Springsteel indicated National Grid is supportive of this recommendation and there was no Board discussion.

c) Contracted through OER – Inspections of Solar System Sites

Mr. Springsteel recommended that the mandatory language reference OER's contractor performing inspection services rather than National Grid. Mr. Kearns indicated that this would be reflected in the tariff language.

d) Self-Installers and New Program Participants

Mr. Springsteel recommended a change to the location where the certificate of completion would be uploaded in order to minimize changes to the Interconnection Tariff. Mr. Kearns and Ms. Beland agreed to continue working with National Grid about the details of implementation of this recommendation in the coming weeks.

Ms. Bartsch asked where the information regarding these changes would be posted. Ms. Beland said that all efforts would be made to inform the solar industry of this new change to the REG program, including updating both the OER and National Grid websites, emails to the solar stakeholder email list, and informing building and electrical inspectors at upcoming trainings. Ms. Stewart asked that as much outreach be done as possible so this would not be a surprise to a new installer.

Ms. Beland said that there was a missing word in the recommendation and recommended an amendment to fix the language. She read back the correct second sentence of the recommendation, "A larger sample size of the new installer solar installation would require mandatory inspections."

Mr. Payne asked for a motion to approve with the two amendments. Ms. Dormody made the motion, Ms. Bartsch seconded. The motion passed unanimously.

3. Discussion on Reconciliation Funding matters for the Oct. Board Meeting

Mr. Kearns provided an update that the Board would be voting on the reconciliation request in October for SEA to work on the 2020 ceiling prices.

Ms. Beland mentioned that Cadmus will be presenting the results of the 2018 Quality Assurance report at the October Board meeting. The Board will also be voting on the reconciliation funding request for Cadmus to continue Quality Assurance work in 2019.

Mr. Springsteel mentioned that the Board can expect a small over-enrollment in the 2018 Small Scale program year and that the PUC should have ruled on the degree of flexibility National Grid will have to accept projects on hold when the program cap has been reached. He will provide a future update on this.

4. Public Comments

None.

5. Adjourn

Chairman Kenneth Payne requested a motion to adjourn the meeting. Mr. Bradner made a motion, and Ms. Bartsch seconded it.

The meeting was adjourned at 5:18PM.

**Distributed Generation Board Meeting
Monday, August 28, 2018**

4:00-5:30PM

Department of Administration – Conference Room B

Meeting Minutes

Board Members Present: Kenneth Payne, Bill Ferguson, Samuel Bradner, Sheila Dormody, Annie Ratanasim and Chris Kearns.

Others Present: Shauna Beland, Sara Canabarro.

Call to Order: Chairman Kenneth Payne called the meeting to order at 4:04PM

1. Approval of July Meeting Minutes

Chairman Payne requested a motion to approve June's meeting minutes. Mr. Ferguson made a motion to approve the meeting minutes, and Ms. Dormody seconded it. All Approved.

2. Brief Update on the 2019 Renewable Energy Growth Program Development by the Office of Energy Resources

Mr. Kearns reported that they did not receive a lot of public comments during the open comment period. SEA is working on the 2nd draft for the ceiling prices and will share with the DG Board members within the next two weeks. He noted that there is Carport category added to the 2019 Plan.

The DG Board will be voting on a final 2019 REG Program Plan Recommendations at the September meeting.

3. Continued Discussion on Recommendations for Solar Quality Assurance Matters for 2019 Renewable Energy Growth Program

Ms. Beland gave a brief intro about the Plan for Quality Assurance for the 2019 REG Program to be incorporated in National Grid's Tariff. She noted that that the DG Board members will be voting on these recommendations on the next meeting in September.

Ms. Beland stated that OER, National Grid and CADMUS had a phone call to discuss some legal issues they might face with these recommendations. Unfortunately, Mr. Springsteel isn't here to comment on it, however, National Grid's Tariff filings isn't until November, so OER will continue to work with them until then.

Ms. Beland highlighted that the recommendations up for today's discussion included the following:

1) Minimum Technical Requirements (MTR)

There was a brief discussion amongst the members. Mr. Ferguson asked what TSRF stands for, and if the DG Board is the one developing. Ms. Beland explained that it stands for "Total Solar Resource Fraction"- and this includes Tilt, orientation and shading, and Minimum Technical requirement would have to meet 80% criteria.

Ms. Ratanasim stated that there is a shading tool that makes it very easy for them to approve the projects. She believes this tool would be essential if they were to pass this requirement. She noted that this recommendation would help the REG program to be consistent with the REF program. However, she doesn't agree that the criteria requirements should be 80% - needs to be a lower percentage.

Mr. Kearns asked if any other states have an 80% requirement? – Ms. Beland stated that the State of Oregon has it, but MA does not because of the cost and additional trainings for National Grid.

Mr. Ferguson asked Ms. Ratanasim to share the cost data of what the REF program is, and roughly how many applications they go through a year. Mr. Kearns also asked what the estimate cost for CADMUS is to review applications, and what is the percentage of the mistakes they encounter.

Ms. Ratanasim will get these numbers ready by the next DG Board Meeting. Chairman Payne stated that this recommendation would be great to help and protect the consumers from bad companies/installers trying to take advantage.

2) Self- Installers

Ms. Beland quickly highlighted this recommendation. Ms. Dormody asked if Ms. Beland believes the Webinar is a better option? – she noted that Installers may not follow it.

After brief discussion amongst the members, the question raised was "what if National Grid says CADMUS has no legal right to inspect the property after the work is done?". Mr. Kearns stated that the DG Board can oppose to this, and PUC can withhold the tariff from not being awarded. Another option would be to simply remove the self-installers from this program.

Ms. Beland will raise the question about having another company do the inspection, so CADMUS can delegate their authority- she noted the volume is extremely high, but maybe CADMUS could focus on inspecting majority of the Self-Installers projects.

3) Inspection Violations

Ms. Beland suggested to hold this recommendation until the Board votes on the 2020 Plan.

Ms. Beland reported that sometimes takes up to months for installers to fix inspection violations, that this item would require more efforts to follow-up and then we'd have to figure out who would manage this process.

Mr. Bradner suggested maybe adding a different language and having something along the lines of a “disclaimer warning” that the DG Board is tracking these projects closely- even if the Board does not enforce it, at least the warning is there.

Chairman Payne stated that the installers need to do the minimum necessary to protect the consumer since they are trusting them with their work. REF has requirements and REG does not. Their certification needs to meet the safety standards.

Ms. Beland noted that the safety standards certification is to be included in the Minimum Technical Requirements.

Ms. Dormody asked if there’s a document available that provides information to the consumers on who to call if they have complaints, questions, etc. – Ms. Beland replied that the Residential Guide for Going Solar will have all the contacts and info.

4. Public Comments

None.

5. Adjourn

Chairman Kenneth Payne requested a motion to adjourn the meeting. Ms. Dormody made a motion, and Mr. Ferguson seconded it.

The meeting was adjourned at 4:58PM.

**Distributed Generation Board Meeting
Monday, July 23, 2018**

4:00-5:30PM

Department of Administration – Conference Room B

Board Members Present: Kenneth Payne, Bill Ferguson, Samuel Bradner, Sheila Dormody, Annie Ratanasim, Karen Stewart, Laura Bartsch, Carol Grant, Chris Kearns, and Ian Springsteel.

Others Present: Shauna Beland, Sara Canabarro, Bryan Evans, Doug Sabetti and Eric Martin.

Call to Order: Chairman Kenneth Payne called the meeting to order at 4:06PM

1. Introductions and Welcoming New Board Members

Chairman Payne asked the Board Members in the room to go around and introduce themselves.

2. Approval of June Meeting Minutes

Chairman Payne requested a motion to approve June's meeting minutes. Mr. Ferguson made a motion to approve the meeting minutes, and Ms. Dormody seconded it. All Approved.

3. National Grid Presentation – Operational Projects, Capacity and Municipal Locations of 2015 - 2017 Renewable energy Growth Systems

Mr. Springsteel went over the RI Reg Program Summary (2015-2017) Operational Capacity, which included: Medium- Scale Solar, Commercial-Scale Solar, Large-Scale Solar, and Small & Large Wind. He restated again that these are all operational capacity.

Mr. Kearns added that any capacity that wasn't used in the past years, are now going to be allocated towards the 2019 Plan.

Chairman Payne noted that the Office of Energy Resources and National Grid are working together to monitor these numbers (unused capacity), and expect to have a final count by October, and present it at the DG Board Meeting.

4. Continued Discussion on Recommendations for Solar Quality Assurance Matters for 2019 Renewable Energy Growth Program

Ms. Beland reported that there are 4 additional items on the Plan for Quality Assurance for the 2019 REG Program Year. These recommendations apply under: Self-Installers, Inspection Violations, Total Project Cost Data Reporting, and Inspection Language (refer to Recommendations Proposal Document).

Mr. Bradner stated that he sees a huge value on having the Total Project Cost Data Reporting recommendation. Ms. Beland noted that the developers will probably push-back on having to fill out the total project cost on the interconnection application. Mr. Bradner restated that he believes this is adding huge value to the process, and developers should be required to provide this information.

Mr. Springsteel agrees with the recommendation for the mandatory-training for Self-Installers. He noted that he is unsure about the Total Project Cost Data Reporting recommendation- he believes that the more complicated the detail is, the more unreliable is going to be. Also, Mr. Springsteel fears that they will start to miss out on applications because developers aren't filling out the required fields.

Ms. Stewart stated that she finds the training for self-installers to be a great recommendation. She hopes that this training will avoid any issues with poor installations in the future.

Ms. Ratanasim asked Ms. Beland about how inspections would be required under "Inspection Language". Ms. Beland explained that the inspections would be chosen at random. Mr. Springsteel stated that making the inspections a requirement, might turn into a legal issue.

Commissioner Grant stated that inspection violations should be taken seriously, and we should really focus on this matter, and how to avoid it in the future.

Ms. Dormody agreed with Commissioner Grant's comment. She stated that the Board should focus on a report about consumer protection. She noted that she doesn't want the same company/developer to keep going around providing bad service to multiple houses.

Chairman Payne agreed with both comments. He agreed that they should focus on a consumer protection report. He noted that most residents are not informed about possible violations or misleads, and they trust the installers. He added that it should be the Board's responsibility to try to help protect the residents.

Mr. Kearns stated that Shauna is already working on a consumer protection report, and it should be done by September. He suggested having this report as a requirement to distribute to buyers when developers approach them with a sale pitch.

Ms. Dormody stated that she is extremely concern about this turning into a liability issue since the Board is aware of who the bad installers/developers are and cannot share the information.

Mr. Springsteel suggested to have an offline conversation about this issue to figure out who the installers are since this is a violation of their license, and they need to have a process of this.

Mr. Kearns stated that he is going to set- up a meeting in August with OER, Legal Team, National Grid and Labor & Training to discuss this matter.

Ms. Bartsch asked if there's any cost for the installers to attend the training provided by CADMUS. Ms. Beland replied that there is no cost to the installers. Ms. Bartsch noted that if there's no cost, she believes this training should be mandatory for the installers to attend.

Chairman Payne asked the members to please send more suggestions/ideas to Shauna and Chris prior to the meeting in August.

5. Update on Megawatt Capacity Remaining with the 2018 Renewable Energy Growth - Small Solar Program

Chris Kearns reported that he expects the REG Solar Program to reach capacity by the end of this month.

6. Public Comments

Doug Sabetti stated that he agrees with the Consumer Protection Report, and believes they need to find ways to protect consumers, owners, and National Grid as well. He noted this is a multi-problem issue.

Mr. Sabetti reported that he often receives calls with complaints about safety, bad advertisement, bad quality installations, but mostly safety concerns. He stated that he tries to reach to OER and the Attorney General's office to report these situations.

Mr. Kearns asked Shauna to circulate the recommendation document with the Solar Stakeholders after OER meets with National Grid, Legal team, and Labor & Training. He noted he will follow up on the items mentioned today at the next meeting in August.

No additional comments were made.

7. Adjourn

Chairman Kenneth Payne requested a motion to adjourn the meeting. Mr. Ferguson made a motion, and Ms. Dormody seconded it.

The meeting was adjourned at 5:02PM.

**Distributed Generation Board Meeting
Monday, June 25, 2018**

4:00-5:30PM

Department of Administration – Conference Room B

Board Members Present: Kenneth Payne, Bill Ferguson, Sheila Dormody, Annie Ratanasim, Karen Stewart, Carol Grant and Chris Kearns.

Others Present: Shauna Beland, Sara Canabarro, Matt Piantedosi, Tyler Orcutt, Bryan Evans, Kiran Thakur, Scot Hennessey, Suzanne Sharkey, Rachel Sheinberh, Eric Martin and Misha Glazomitsky.

Call to Order: Chairman Kenneth Payne called the meeting to order at 4:03PM

1. Introductions and Welcoming New Board Members

Chairman Payne asked the Board Members in the room to go around and introduce themselves.

2. Cadmus Presentation – Quality Assurance Inspections of Renewable Energy Growth Installations

Matt Piantedosi gave a brief introduction and overview of the presentation of the Study of Renewable Energy Installation Quality in Rhode Island: Round 2 INTERIM Report.

Tyler Orcutt went over:

Reg QD Study Round 2 Purpose
Round 1 Vs Round 2 Study Approach
Sample Selection
INTERIM Results from On-Site Inspections, which included:
Key Findings; Scoring; Inspection Scores

Ms. Orcutt went over:

Self-Installer and Low Volume Installer PV Systems; Total Solar Resource Fraction

Mr. Piantedosi highlighted examples of common deficiencies, and reported their high, medium, and low- priority recommendations. He quickly went over the progress on April 2017 recommendations, and the next steps.

Mr. Ferguson asked what the 29% of critical issues were, and if they follow up after they are done with the inspection. Mr. Piantedosi explained that the 29% of critical issues represent a mix of models that aren't secured on the roof, properly mounted, damaged models, or missing joints.

Ms. Orcutt noted that they do follow up on the inspections that have been labeled with critical issues. She stated that they contact the Solar Installers on a weekly basis, by call/email until the issue is resolved.

Chairman Payne asked if there were any additional questions.

Suzanne Sharkey asked if CADMUS, or the Board has a list of companies/contractors that participated in this report available to the public so they can compare which company/contractor has the best and lowest scores.

Mr. Piantedosi stated that this report is anonymous, and for the most part, the same reoccurring errors showed on this report are being done by the same company/contractor.

Chairman Payne asked how can the Board prevent Self-Installers from receiving the REG Program Tariff + Installation Tariff. Chris Kearns states that OER will be working with CADMUS to add provisions to the 2019 Filings.

Sheila Dormody thanked OER and CADMUS for their continuous work.

3. Discussion of Memo on “Plan for Recommendations on Renewable Energy Growth Quality Assurance for 2019 Renewable Energy Growth Program

Shauna Beland quickly went over the Memo on Plan for Quality Assurance 2018-2018 Recommendations.

Sheila Dormody asked if all the Solar Installers had received the training led by Cadmus. Shauna replied that that the training is for RI building and electrical inspectors.

Karen Stewart asked about the Minimum Technical Requirements for the Small-Scale REG program. Shauna explained that by adding this to the REG program it will provide consistency with the requirements between REG and REF Programs.

Chairman Payne noted that there will be a vote on the 3 recommendations outlined in the Memo at the next July DG Board Meeting.

4. Office of Energy Resources – Update on 2019 Renewable Growth Program Development – Ceiling Prices and Megawatt Allocation Plan

Chris Kearns reported that the 1st Draft 2019 Ceiling Prices and Megawatt Allocation Plan is out for Public Comment (approximately 30days). This process is consistent with previous years, and there are opportunities with carports. Chris noted that there is a Solar Stakeholder Meeting on July 17th to cover 1st Draft 2019 Renewable Energy Growth Ceiling Prices Presentation to Stakeholders by Sustainable Energy Advantage.

5. Public Comments

A gentleman from the public asked to add guidelines under the 15-Year Tariff process that uses past data, and then carries over to New Homeowners. Chris stated that they have issues with this from time to time with National Grid.

Misha Glazomitsky quickly highlighted the cancelation process on a contract and stated that there should be a way for the REG program to see the unused amount once canceled by the contract.

No additional comments were made.

6. Adjourn

Chairman Kenneth Payne requested a motion to adjourn the meeting. Mr. Ferguson made a motion, and Ms. Dormody seconded it.

The meeting was adjourned at 5:36PM.

Rhode Island Distributed Generation Board
SURVEY TO INFORM 2019 CEILING PRICE DEVELOPMENT

DUE DATE: Friday June 15, 2018

Submit electronically to: jkennerly@seadvantage.com and Christopher.Kearns@energy.ri.gov

All Survey responses are voluntary and will be kept confidential in accordance with the State's Access to Public Record Act. Any information provided in response to this Survey will not be identified in relation to, or attributed to, an individual respondent in any public presentation or public document.

Dear Renewable Energy Industry Participants:

The Distributed Generation Board and Office of Energy Resources seek your input into the development of ceiling prices for renewable energy projects under the Renewable Energy Growth Program for the 2019 Program Year. The DG Board and the OER have an obligation to submit ceiling price recommendations to the RI Public Utilities Commission intended to support viable and cost-effective projects. Receiving current information from market participants is important to developing robust, accurate, and defensible ceiling price recommendations.

Please respond to as many of the following questions as you are able. Please be specific with your comments, recommendations and sources. Use as much room as you need. This is your primary opportunity to provide written comments and substantiating evidence. As in previous years, however, additional opportunities will also exist for both written comments and participation in public meetings. In general, the absence of a response to any of these questions will be treated as support for the current policy design.

IMPORTANT NOTE: Several questions regarding default financing assumptions reference the 2019 DG Board and OER Data Request spreadsheet attached to the initial email to stakeholders. If you are unable to access that sheet, please do not hesitate to contact Jim Kennerly at jkennerly@seadvantage.com.

Given the natural evolution of market conditions as well as the experience with the DG Standard Contracts (SC) and REG Programs to date, the DG Board and OER seek your feedback on several topics related to Ceiling Price development. This Survey requests descriptive explanations and source materials to complement the quantitative data provided in response to the Data Request.

If you have any questions about how to complete this survey, please contact Jim Kennerly at: jkennerly@seadvantage.com or (508) 665-5862.

*** 1. Please provide your name and contact information**

Name	<input type="text"/>
Company	<input type="text"/>
Address	<input type="text"/>
Address 2	<input type="text"/>
City/Town	<input type="text"/>
State/Province	<input type="text"/>
ZIP/Postal Code	<input type="text"/>
Country	<input type="text"/>
Email Address	<input type="text"/>
Phone Number	<input type="text"/>

2. What types of projects are you involved with?

- ☐ Small Solar (up to 25 kW)
- ☐ C&I or Large Solar
- ☐ Wind
- ☐ Hydroelectric
- ☐ Anaerobic Digestion

Quality Assurance

OER and the DG Board completed a 2017 Quality Assurance Study and Report from the Cadmus Group that proposed specific recommendations based on the findings of the report. Please provide feedback on the following:

* 3. The report found that the self-installs or homeowners installing solar on their own properties resulted in a low score during the inspection or declined an inspection completely. Providing a detailed explanation in the comments field, please note whether self-installs should:

- ☐ Continue to be allowed to participate in the program and apply to Small Scale I and II;
- ☐ Be eliminated from participating in the program and applying for the Small-Scale I and II;
- ☐ Be permitted only after receiving training provided by National Grid and/or OER prior to interconnection application or interconnection; Other (please explain)
- ☐ No opinion

Comments

* 4. The report recommended that National Grid check to see if the entity applying for interconnection for Small-Scale I and II projects has a General Contractor registration. Do you agree or disagree with this recommendation that entities applying to the program should provide their General Contractor registration number? Please provide details with your response.

- ☐ Agree
- ☐ Disagree
- ☐ No opinion
- ☐ Please provide an explanation with your response.

* 5. The report recommended that Minimum Technical Requirements for the Renewable Energy Growth Program are developed to ensure consistency in program installations. Do you agree or disagree with this recommendation? Please provide details with your response.

- ☐ Agree
- ☐ Disagree
- ☐ No opinion
- ☐ Please provide an explanation with your response.

Carport Installed Costs and Potential Incentives

6. Please provide the following information for solar carport systems throughout New England and the Northeast.

Average system size

Variance, if any, in permitting and interconnection cost compared to large solar

Variance, if any, between system design and engineering costs for 1 MW carport compared to 1 MW greenfield solar

Variance, if any, between balance of system costs for 1 MW carport compared to 1 MW greenfield solar

7. If the REGrowth program were to provide incentives to Carport installations during the 2019 Program year, how should the incentive be conveyed? Potential options include:

- ☐ A separate Ceiling Price category with its own capacity allocation;
- ☐ An adder that would increase the eligible Ceiling Price for Medium Solar, Commercial Solar or Large Solar (either with or without its own capacity allocation); or
- ☐ Other (please specify)

Solar Permitting and Program Design

8. The 2018 Ceiling Prices assumed a 10% reduction in permitting costs associated with new legislation creating a single statewide solar permit. Can you provide any evidence that this assumption was or was not accurate? If not, why and can you provide evidence suggesting that assuming a larger assumed reduction would not be reasonable?

9. In response to more rapid overall subscription rate in the Small Solar I and II, OER and the DG Board are considering changing the way the 2019 Small Solar I and II Ceiling Prices (and/or capacity allocations) are structured, with an eye to balancing the objectives of ratepayer cost moderation and business certainty. Please specify which approaches you think are appropriate, and comment on the positives and negatives on each. Potential approaches under consideration include:

- ☐ A two-tranche (or two-step) approach for each category, in which the first capacity tranche or step (set at 6.55 MW) would be at a higher cost-based rate, and the second tranche or step (set at a level exceeding 6.55 MW) would be at a lower cost-based rate; or
- ☐ A single-tranche (or single-step) approach for each category, in which the entire tranche would receive the same administratively-determined price at a rate that represented a relative midpoint between a higher cost-based rate and a lower rate (described in the example above).
- ☐ Other (please describe)

Please provide specific feedback on what you see as the positives and negatives of each approach.

Potential New Categories and Project Installed Cost

10. Please describe any other types of renewable energy projects that you believe should have their own Ceiling Price category.

11. Please provide, either as links or attachments, source data (e.g. reports, case studies and databases) substantiating your experience that the installed cost of renewable energy facilities located in Rhode Island is systematically similar to, or different from, the installed cost of renewable energy facilities in other Northeast markets.

12. Please explain what assumptions you have made in your Data Request response(s) with respect to major equipment replacements (i.e. inverters, gear boxes, etc.). Are these replacements covered by warranties? Reserve accounts? Other? The absence of a response will be treated as support for the current modeling approach and assumptions.

Federal Incentives

13. Tax credits are well understood by renewable energy investors, but this benefit is not always fully monetized. Please specify the value of available tax credits your project is realizing, or expects to realize. If your project does not expect to realize the full value of available tax credits, then please specify the percentage (out of 100%) that you expect to monetize and provide an explanation of why the full benefit cannot be captured.

- ☐ 100%
- ☐ Less than 100% (Specify % and provide explanation)

14. (For solar and wind market participants) Based on the pace of development in the REGrowth program (and except for Medium Solar and Small Solar I & II) it is assumed that all systems qualifying during the 2019 Program Year will receive (through commencement of construction, commercial operations, or other mechanism) Federal incentives in effect during the calendar year 2019. Please specify, and substantiate, any alternative proposals.

15. (For solar and wind market participants) In late 2017, the Tax Cuts and Jobs Act of 2017 was signed into law. A new provision in that law allows for up to 100% bonus depreciation for assets placed in service before January 1, 2023, 80% for assets placed in service before January 1, 2024, 60% for assets placed in service before January 1, 2025, 40% for those placed in service before January 1, 2026 and 20% for those placed in service before January 1, 2027.

Based on discussions with stakeholders associated with the 2018 Ceiling Price process, we assume that for solar and wind projects taking either the Investment Tax Credit (ITC), the Production Tax Credit (PTC) or the ITC in lieu of the PTC, bonus depreciation would not exceed 30%. Please specify if you agree, and provide and substantiate any alternative proposal.

- ☐ Agree
- ☐ Disagree
- ☐ No Opinion

Please elaborate. Describe and substantiate any alternate proposal

16. (For hydro and anaerobic digester (AD) participants) In late 2017, the Tax Cuts and Jobs Act of 2017 was signed into law. A new provision in that law allows for up to 100% bonus depreciation for assets placed in service before January 1, 2023, 80% for assets placed in service before January 1, 2024, 60% for assets placed in service before January 1, 2025, 40% for those placed in service before January 1, 2026 and 20% for those placed in service before January 1, 2027.

To date, hydro and AD projects have been assumed to have construction timelines too long to be assumed to be eligible to realize benefits associated with bonus depreciation. However, the extension of these benefits at 100% through 2022 suggest this may no longer be a limitation. As such, we plan to assume these projects will also take 30% bonus depreciation. Please specify if you agree, and provide and substantiate any alternative proposal.

- ☐ Agree
- ☐ Disagree
- ☐ No opinion

Please elaborate. Describe and substantiate any alternate proposal.

* 1. Please provide your name and contact information

Name

Company

Address

Address 2

Email Address

Phone Number

2. On June 22, 2018, the Internal Revenue Service (IRS) issued [IRS Notice 2018-59](#) regarding "commenced construction" requirements to qualify for the Investment Tax Credit (ITC) levels in a given year. As with qualification for the PTC, projects may qualify by starting significant physical work or incurring 5% or more of the total costs during the applicable tax year.

Given these new rules, is it reasonable to assume that projects participating in the 2019 Program Year will commence construction by 2019, even if the project is selected in the Third Open Enrollment in late Q3 or early Q4 2019? Why or why not?

3. Please provide any relevant information regarding typical all-in installed capital costs for a 1,000 kW (1 MW) Carport system. Please also submit any and all supporting documentation to Jim Kennerly at jkennerly@seadvantage.com.

4. During the initial round of stakeholder consultations, SEA received capacity factor estimates for Carport Solar projects that were substantially lower than that of comparable (and typical) ground- or roof-mounted systems.

If Carport Solar projects should be assumed to have a lower capacity factor than the 14%-15.3% values assumed for projects in Rhode Island, please explain why, and provide supporting documentation to Jim Kennerly at jkennerly@seadvantage.com.

5. On June 1, 2018, the Trump Administration began enforcing new import duties on steel (from all countries of origin save Argentina, Australia, Brazil and South Korea) and aluminum (from all countries of origin save Argentina and Australia) under Section 232 of the Trade Expansion Act of 1962.

Please comment and provide quantitative estimates of the impact of these additional import duties on the renewable energy project types incentivized by the Renewable Energy Growth (REGrowth) program, particularly for Carport Solar and Hydroelectric projects. Please also submit all supporting documentation to Jim Kennerly at jkennerly@seadvantage.com.

Stakeholder Contact Information/Solar Permitting

1. Stakeholder Data

Name

Company

2. For small and medium roof mounted projects: In your experience, how long does it take to receive the local building official's approval for the project?

Small Solar (up to 25 kW)

Medium Solar (26-250 kW)

Approval period

Comments:

3. For small and medium ground mounted projects: In your experience, how long does it take to receive the land use permit from zoning and/or planning boards and the new statewide solar building/electric permit approvals from the local building office for the project?

Small Solar (Up to 25 kW)

Medium Solar (26-250 kW)

Approval time

4. For small and medium ground mounted solar projects: Please estimate the total costs of acquiring necessary land use permits through the zoning and/or planning boards and the statewide solar building/electric permit? Provide comments describing what the total costs include (e.g., permit fees, legal representation at zoning or planning board meetings, engineering, staff time associated with preparing local applications and responding to questions from municipal officials).

Small Solar (up to 25 kW)

Medium Solar (~250 kW system)

5. For Commercial and Large Solar projects: In your experience, how long does it take to receive the land use permit from zoning and/or planning boards and the new statewide solar building/electric permit approvals from the local building office for the project?

Commercial Solar (Rooftop Systems)

Commercial Solar and/or Large Solar (Ground-Mount Systems)

Approval time

Comments

6. For Commercial and Large solar projects: Please estimate the total costs of acquiring necessary permits from municipal zoning and/or planning boards? Provide comments describing what the total costs include (e.g., permit fees, legal representation at zoning or planning board meetings, engineering, staff time associated with preparing applications and responding to questions from municipal officials).

Commercial Solar (251-999 kW) Ground Mounted Systems

Large Solar (1-5 MW) Ground Mounted Systems

Commercial Solar (251-999 kW) Roof Mounted Systems

Large Solar (1-5 MW) Roof Mounted Systems

7. (For Large Solar developers) Please elaborate on the percentage of the cost of permitting for a 1-5 MW system that is associated with non-ministerial permits (related to land use and zoning), rather than ministerial permits (related to building construction, electrical and other costs handled in standard municipal permitting).

8. Please provide any additional comments you have on permitting costs, approval timelines, and the impacts of the statewide solar permit on those costs and timelines

Additional Feedback and Information Requested

9. Please provide an estimate of the incremental cost of a solar carport sized at 500 kW relative to the cost assumptions associated with the 500 kW Commercial Solar project associated with the proposed 2019 Commercial Solar Ceiling Price.

10. Please provide specific \$/kW premiums your company expects to incur associated with the Trump Administration's steel and aluminum import duties.

11. Initial stakeholder feedback indicated Land Lease costs for Solar projects were higher than SEA's initial estimates. Please provide specific lease cost values for Medium Solar, Commercial Solar and Large Solar projects, and specify which category the estimates would belong to.

Medium Solar

Commercial Solar

Large Solar

Other Comments

12. In developing Ceiling Prices for Solar projects that are assumed by the National Renewable Energy Laboratory's 2018 Annual Technology Baseline to have declining installed capital costs from year to year, SEA has assumed year-on-year cost reductions from 2018 to 2019 of 4.48% for Small Solar, 4.16% for Medium and Commercial Solar and 3.54% for Large Solar. Please provide any third-party quantitative estimates of 2019 installed capital costs for these projects that would suggest that NREL's estimates are not reasonable as representations of change from 2018 to 2019.

13. (For Solar market participants) Some developers and installers have suggested to Sustainable Energy Advantage, OER and the DG Board that for a mix of residential and commercial on-site applications, National Grid is beginning to require relocating the entire electric meter and/or the point of common coupling from inside a customers' premises to outside, causing the customers to incur substantial unanticipated costs. Please indicate whether this has happened for any of your projects under the Renewable Energy Growth program, and detail your experience in this regard.

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