

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: THE RHODE ISLAND DISTRIBUTED :
GENERATION BOARD'S RECOMMENDATIONS :
FOR THE 2020 RENEWABLE ENERGY : DOCKET NO. 4983
GROWTH PROGRAM YEAR :

Recommendations for the
2020 Renewable Energy Growth Program Year

**DISTRIBUTED-GENERATION BOARD
& OFFICE OF ENERGY RESOURCES**

OCTOBER 22, 2019

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DISTRIBUTED-GENERATION BOARD'S RECOMMENDATIONS

Background

In accordance with R.I. Gen. Laws § 39-26.6-4(a)(1), the Distributed-Generation Board (“DG Board”) hereby submits its recommendations for the 2020 Renewable Energy Growth Program Year (“RE Growth 2020 PY”) to the Public Utilities Commission (“Commission” or “PUC”). The recommendations set forth herein, regarding classes, tariff term lengths, ceiling prices, allocation plan, solar carport adder, and consumer protection disclosure forms, were approved by the DG Board and endorsed by the Office of Energy Resources (“OER”). In accordance with R.I. Gen. Laws § 39-26.6-4(b), OER, in consultation with the DG Board, engaged Sustainable Energy Advantage, LLC (“SEA”) to develop recommended ceiling prices for review and approval by the DG Board and to provide other technical assistance regarding the RE Growth Program.

Goals and Objectives

The purposes of the RE Growth Program are “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 purposes, the anticipated outcomes for the RE Growth 2020 PY are the following:

- A diversified renewable energy program with a portion of the megawatt

(“MW”) capacity to support each sector.

- When appropriate, continued decreases in ceiling prices in certain renewable energy classes.
- Economic development with the State’s renewable energy market.
- Maintaining a consistent and predictable RE Growth Program and capacity targets from year-to-year for both residential and commercial customer focused and stand-alone generation 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”).

Composition of the DG Board

Please see **Table 1** below for the composition of the DG Board as of the time that the recommendations set forth herein were approved.

Table 1 - DG Board Members	
Name	Area of Representation
Carol Grant	OER Commissioner (ex officio, non-voting)
Ian Springsteel	National Grid (ex officio, non-voting)
Annie Ratanasim	Commerce Corporation (ex officio, non-voting)
Jeremy Licht (Chair)	Energy and regulation law
William H. Ferguson (Vice Chair)	Large commercial/industrial users
Samuel J. Bradner	Small commercial/industrial users
Karen A. Stewart	Residential users
Vacant	Low income users
Sheila Dormody	Environmental issues pertaining to energy
Laura C.H. Bartsch	Construction of renewable generation

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), please see **Table 2A** below which contains the DG Board's recommendations for renewable energy classes and eligible system sizes for the RE Growth 2020 PY.

Table 2A - Recommended Renewable Energy Classes 2020 PY	
Renewable Energy Class	Eligible System Sizes
Small Solar I	1 to 10 kW DC
Small Solar II	11 to 25 kW DC
Medium Solar	26 to 250 kW DC
Commercial Solar	251 to 999 kW DC
Large Solar	1 to 5 MW DC
Wind	0 to 5 MW AC
Anaerobic Digestion	≤ 5 MW AC
Small Scale Hydropower	≤ 5 MW AC
Community Remote – Commercial Solar	251 to 999 kW DC
Community Remote – Large Solar	1 to 5 MW DC
Community Remote – Wind	0 to 5 MW AC

The changes between the approved classes for the 2019 PY and the recommended classes for the 2020 PY are illustrated in **Table 2B** below. Please see the pre-filed direct testimony of Christopher Kearns, OER, for an explanation of the changes (Pages 19-20).

[Table 2B starts on next page]

Table 2B – Renewable Energy Classes: Approved 2019 PY vs Recommended 2020 PY	
PUC Approved 2019 PY	DG Board Recommended 2020 PY
Small Solar I	Small Solar I
Small Solar II	Small Solar II
Medium Solar	Medium Solar
Commercial Solar	Commercial Solar
Large Solar	Large Solar
Small Wind	Wind
Large Wind	
Anaerobic Digestion	Anaerobic Digestion
Small Scale Hydropower	Small Scale Hydropower
Community Remote – Commercial Solar	Community Remote – Commercial Solar
Community Remote – Large Solar	Community Remote – Large Solar
Community Remote – Wind	Community Remote – Wind

Tariff Term Lengths

Consistent with R.I. Gen. Laws § 39-26.6-4(a)(1), please see **Table 3A** below which contains the DG Board's recommendations for tariff lengths for the RE Growth 2020 PY.

Table 3A – Recommended Tariff Lengths 2020 PY	
Renewable Energy Class	Tariff Length
Small Solar I	15 Years
Small Solar II	20 Years
Medium Solar	20 Years
Commercial Solar	20 Years
Large Solar	20 Years
Wind	20 Years
Anaerobic Digestion	20 Years
Small Scale Hydropower	20 Years
Community Remote – Commercial Solar	20 Years
Community Remote – Large Solar	20 Years
Community Remote – Wind	20 Years

The changes between the approved tariff lengths for the 2019 PY and the recommended tariff lengths for the 2020 PY are illustrated in **Table 3B** below. Please see the pre-filed direct testimony of Christopher Kearns, for an explanation of the changes (Page 20).

Table 3B – Tariff Lengths: Approved 2019 PY vs Recommended 2020 PY		
Renewable Energy Class	PUC Approved 2019 PY	DG Board Recommended 2020 PY
Small Solar I	15 Years & 20 Years	15 Years
Small Solar II	20 Years	20 Years
Medium Solar	20 Years	20 Years
Commercial Solar	20 Years	20 Years
Large Solar	20 Years	20 Years
Wind	20 Years (Small Wind)	20 Years
	20 Years (Large Wind)	
Anaerobic Digestion	20 Years	20 Years
Small Scale Hydropower	20 Years	20 Years
Community Remote – Commercial Solar	20 Years	20 Years
Community Remote – Large Solar	20 Years	20 Years
Community Remote – Wind	20 Years	20 Years

Ceiling Prices

Consistent with R.I. Gen. Laws § 39-26.6-5(d) and § 39-26.2-5, please see **Table 4A** below which contains the DG Board’s recommendations for ceiling prices for the RE Growth 2020 PY.

[Table 4A starts on next page]

Table 4A - Recommended Ceiling Prices 2020 PY	
Renewable Energy Class	Ceiling Price (¢/kWh)
Small Solar I	29.65
Small Solar II	23.45
Medium Solar	21.15
Commercial Solar	18.25
Large Solar	13.65
Wind	21.40
Anaerobic Digestion	21.15
Small Scale Hydropower	27.05
Community Remote – Commercial Solar	20.99
Community Remote – Large Solar	15.70
Community Remote – Wind	23.85

The changes between the approved ceiling prices for the 2019 PY and the recommended ceiling prices for the 2020 PY are illustrated in **Table 4B** below. For additional information, please see the pre-filed testimony and schedules of Jim Kennerly, SEA, (Pages 49-57; 68-70).

Table 4B – Ceiling Prices: Approved 2019 PY vs Recommended 2020 PY		
Renewable Energy Class	PUC Approved 2019 PY	DG Board Recommended 2020 PY
Small Solar I (15 Years)	28.45 (15 Years)	29.65
	24.95 (20 Years)	
Small Solar II	27.65	23.45
Medium Solar	23.55	21.15
Commercial Solar	17.85	18.25
Large Solar	15.15	13.65
Wind	24.05 (Small Wind)	21.40
	19.35 (Large Wind)	
Anaerobic Digestion	20.85	21.15
Small Scale Hydropower	27.15	27.05
Community Remote – Commercial Solar	20.53	20.99
Community Remote – Large Solar	17.42	15.70
Community Remote – Wind	21.65	23.85

Ceiling price trends from 2011-2020 are illustrated in **Table 4C** (Solar), **Table 4D** (Wind), **Table 4E** (Anaerobic Digestion), and **Table 4F** (Hydropower) below.

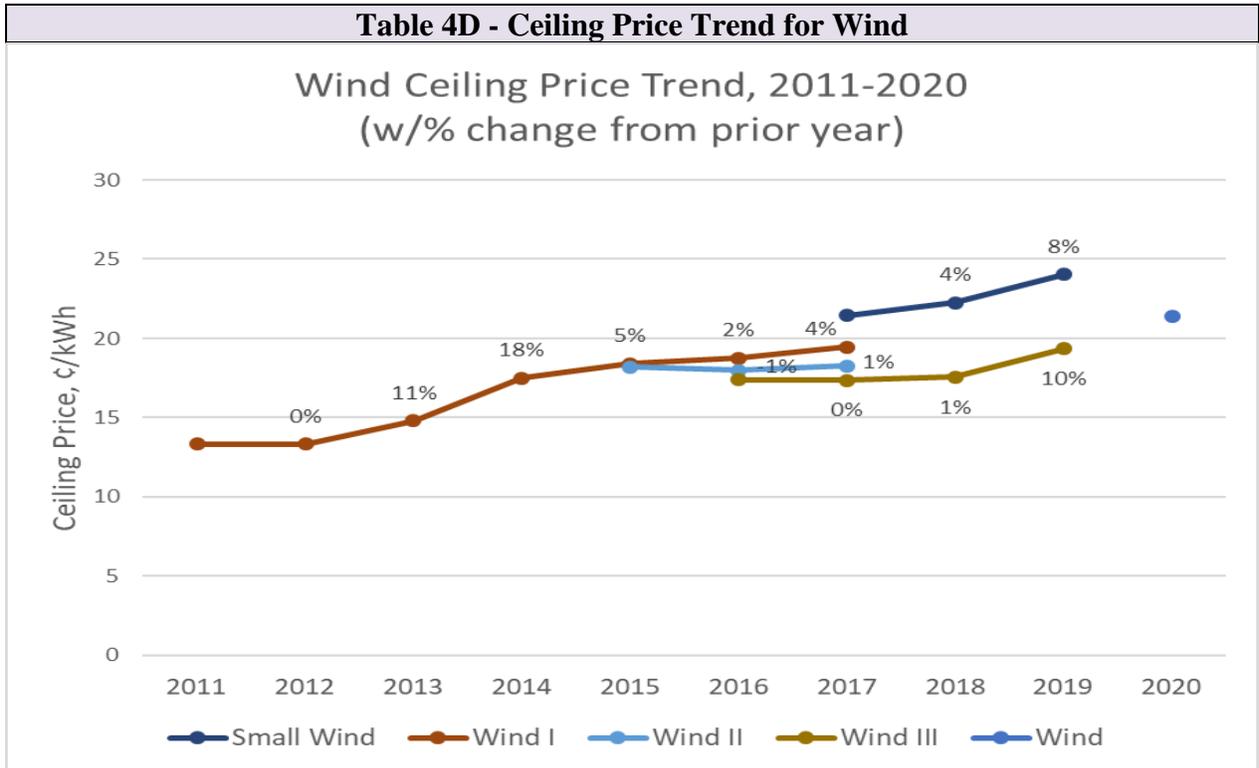
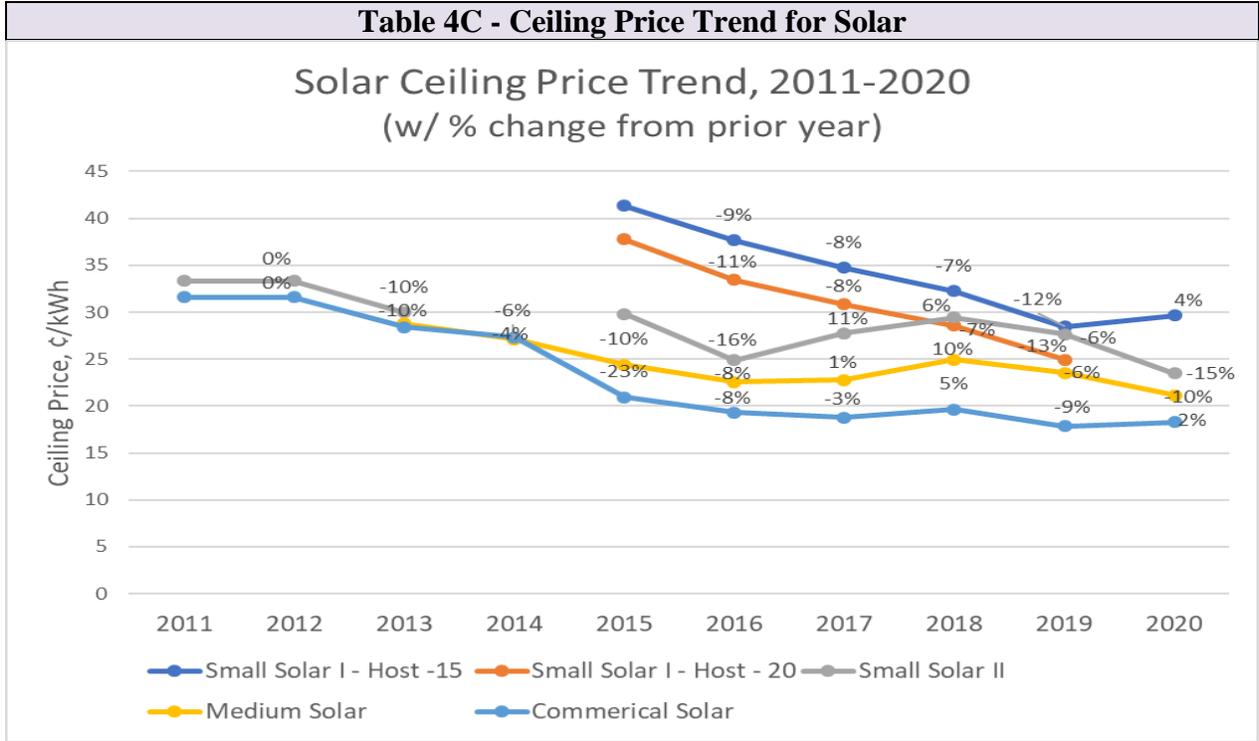


Table 4E - Ceiling Price Trend for Anaerobic Digestion

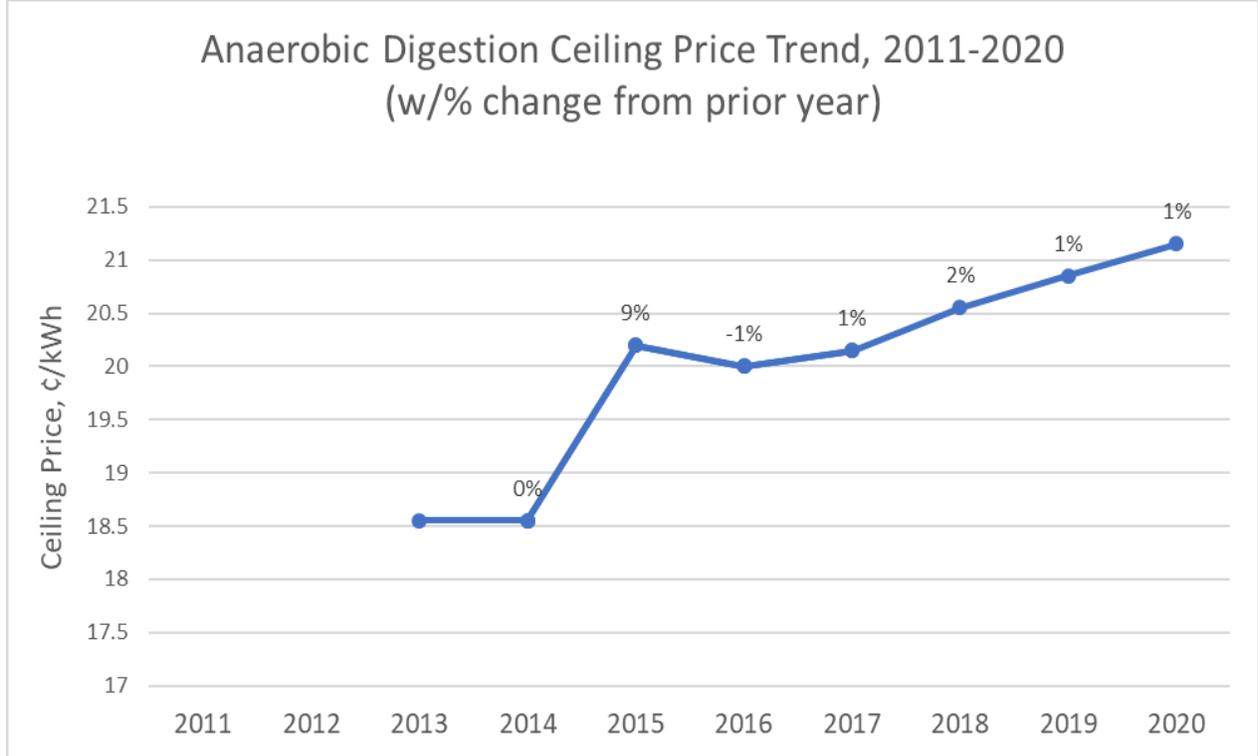
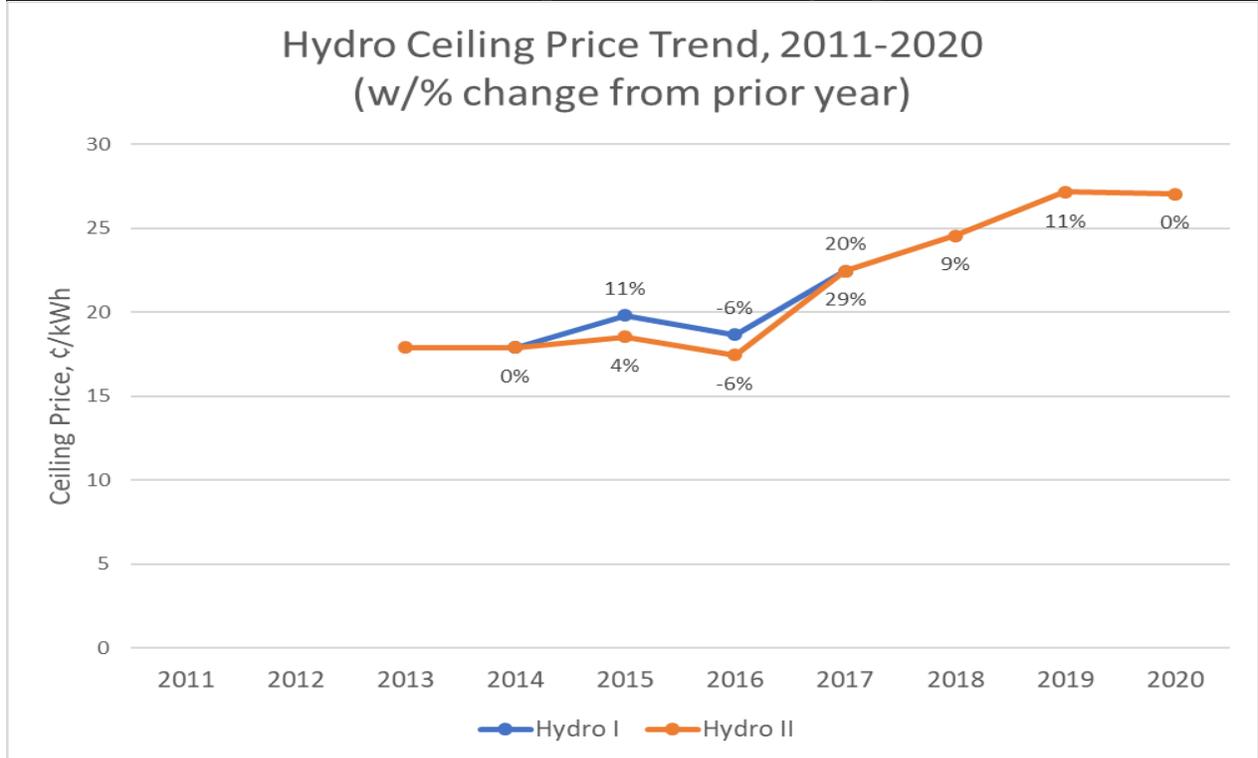


Table 4F - Ceiling Price Trend for Hydropower



Allocation Plan

Consistent with R.I. Gen. Laws § 39-26.6-12(c)(5), please see **Table 5A** below which contains the DG Board's recommended allocation plan for the RE Growth 2020 PY.

Table 5A - Recommended Allocation Plan 2020 PY	
Renewable Energy Class	Allocation in MW
Small Solar I & II	6.950
Medium Solar	3
Commercial Solar	8.244
Large Solar	18.294
Wind	3
Community Remote – Wind	
Anaerobic Digestion	1
Small Scale Hydropower	
Community Remote – Commercial Solar	3
Community Remote – Large Solar	3
Total	46.488

The changes between the approved allocation plan for the 2019 PY and the recommended allocation plan for the 2020 PY are illustrated in **Table 5B** below. Please see the pre-filed direct testimony of Christopher Kearns, OER, for an explanation of the changes (Pages 20-21).

[Table 5B starts on next page]

Table 5B – Allocation Plan: Approved PY 2019 vs Recommended PY 2020		
Renewable Energy Class	PUC Approved 2019 PY (MW)	DG Board Recommended PY 2020 (MW)
Small Solar I & II	12.23	6.950
Medium Solar	6.8	3
Commercial Solar	7.3	8.244
Large Solar	11.3	18.294
Wind	.4 (Small Wind)	3
Community Remote – Wind	6	
Anaerobic Digestion	1	1
Small Scale Hydropower		
Community Remote – Commercial Solar	5	3
Community Remote – Large Solar	5.3	3
Total	55.33	46.488

Table 5C below contains the recommended allocation for the first commercial enrollment for the RE Growth PY 2020.

Table 5C - Recommended Allocation for First Enrollment 2020 PY	
Renewable Energy Class	Allocation in MW
Small Solar I & II	6.950*
Medium Solar	3
Commercial Solar	6.244**
Large Solar	14.294***
Wind	3
Community Remote – Wind	
Anaerobic Digestion	1
Small Scale Hydropower	
Community Remote – Commercial Solar	3
Community Remote – Large Solar	3
Total	40.488

*The Small Solar classes will be filled through a continuous enrollment program that begins on April 1, 2020 and runs until filled or through March 31, 2021. The remaining classes

will be filled through competitive solicitations.

**2 MW will be preserved for the 3rd enrollment, which will be conducted in the fall, to provide an opportunity for carport project applications to be submitted as part of the Commercial Solar class. This is due to the carport market being new in Rhode Island and the market needing time to develop projects, submit interconnection applications to National Grid and local municipal ordinances/planning boards being new to the solar carport subject.

***4 MW will be preserved for the 3rd enrollment, which will be conducted in the fall, to provide an opportunity for carport project applications to be submitted into the Large Solar class. This is due to the carport market being new in Rhode Island and the market needing time to develop projects, submit interconnection applications to National Grid and local municipal ordinances/planning boards being new to the solar carport subject.

The second (August) and third (October) enrollment quantities will be dependent on the results of the first enrollment.

Solar Carport Adder

Consistent with R.I. Gen. Laws § 39-26.6-22, the DG Board collaborated with National Grid, and developed the following recommendation for an incentive-payment adder for solar carports during the RE Growth 2020 PY. The recommended adder will be part of the Commercial and Large Solar classes. The recommended amount of the adder is \$0.06/kWh.

The Board recommends defining a solar carport for the purposes of the RE Growth Program as “the portion of the direct current (DC) nameplate capacity of a Solar DG Project that is installed above a permeable and/or non-permeable existing or new parking area and associated access and walkway areas (as recognized by the local municipal building and/or zoning department), which is installed in a manner that maintains the function of the area beneath the

carport.”

For additional information on the solar carport adder, please see the pre-filed direct testimony of Christopher Kearns, OER (Pages 21-22); Schedule CK-1 (Pages 25-26); the pre-filed direct testimony of Shauna Beland, OER (Pages 30-32); the pre-filed direct testimony of Jim Kennerly, SEA (Pages 59-63); Schedule JK-6 (Pages 71-76); Schedule JK-7 (Pages 77-79); and Schedule JK-8 (Page 80).

Solar Disclosure Forms

The DG Board is committed to consumer protection efforts within the RE Growth Program. As such, the DG Board approved solar consumer protection disclosure forms to be utilized through the RE Growth Program.

For additional information on the solar consumer protection disclosure forms, please see the pre-filed direct testimony of Christopher Kearns, OER (Pages 21-23); pre-filed direct testimony of Shauna Beland, OER (Pages 28-30) and Schedule SB-2 (Pages 35-41).

Conclusion

After an extensive and transparent development process¹, the DG Board voted at its September 23, 2019 meeting to approve the recommendations set forth herein. The DG Board and OER, through its testimony, respectfully request the PUC to approve such recommendations for the RE Growth 2020 PY.

¹ For materials associated with the development of the recommendations for the RE Growth 2020 PY, please visit: <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>.

1 **PRE-FILED DIRECT TESTIMONY OF CHRISTOPHER KEARNS**

2 **Introduction**

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

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

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

7 A. I am employed by the Office of Energy Resources (“OER”) and my title is Legislative
8 Liaison and Interdepartmental Manager.

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

10 A. My testimony is designed to: (1) Provide an overview of the Renewable Energy
11 (“RE”) Growth Program; (2) Describe OER’s perspective on the recommendations
12 made by the Distributed-Generation Board (“DG Board”) relating to the RE Growth
13 2020 PY; (3) Explain the rationale behind the recommended changes from last year;
14 and (4) Address how the recommendations advance some of the goals contained
15 within the guidance document entitled *Public Utilities Commission’s Guidance on*
16 *Goals, Principles and Values for Matters Involving the Narraganset Electric*
17 *Company d/b/a National Grid* (referred to herein as the “Docket 4600 Goals”).

18 **RE Growth Program Overview**

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

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

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

23 A. Pursuant to R.I. Gen. Laws § 39-26.6-2, the RE Growth Program is designed to

1 finance the development, construction, and operation of renewable-energy
2 distributed-generation projects through a performance-based incentive system that is
3 designed to achieve specified megawatt targets at reasonable cost through competitive
4 processes.

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

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

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

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

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

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

- 20 • Add, eliminate, or adjust renewable-energy classes in
21 accordance with R.I. Gen. Laws § 39-26.6-3(15);
- 22 • Establish the make-up of renewable-energy classifications in
23 accordance with R.I. Gen. Laws § 39-26.6-4(a)(1);

- 1 • Add classifications of solar projects other than as prescribed
- 2 by R.I. Gen. Laws § 39-26.6-7(a) in accordance with R.I. Gen.
- 3 Laws § 39-26.6-7(c);
- 4 • Adopt ceiling prices and annual targets in accordance with R.I.
- 5 Gen. Laws § 39-26.6-4(a)(1);
- 6 • Establish the tariff term for each renewable-energy class in
- 7 accordance with R.I. Gen. Laws § 39-26.6-5(c);
- 8 • Adjust the size categories of the solar classes in accordance
- 9 with R.I. Gen. Laws § 39-26.6-7(c);
- 10 • Establish the annual megawatt (“MW”) target in accordance
- 11 with R.I. Gen. Laws § 39-26.6-12(b);
- 12 • Establish the MW target for each enrollment within a RE
- 13 Growth Program Year in accordance with R.I. Gen. Laws § 39-
- 14 26.6-12(b);
- 15 • Establish the MW target for each renewable-energy class in
- 16 accordance with R.I. Gen. Laws § 39-26.6-12(b); and
- 17 • In collaboration with National Grid, include incentive-
- 18 payment adders to achieve geographical, technical, or public
- 19 policy objectives in accordance with R.I. Gen. Laws § 39-26.6-
- 20 22.

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

22 A. OER is inherently involved in the DG Board’s recommendations process. In
23 accordance with R.I. Gen. Laws § 39-26.6-2, the DG Board acts in consultation with

1 OER. In addition, the OER commissioner serves an ex officio non-voting member of
2 the DG Board pursuant to R.I. Gen. Laws § 39-26.2-11(a). OER also provides
3 staffing and assistance to the DG Board.

4 **OER's Perspective – DG Board's Recommendations for the RE Growth 2020 PY**

5 **Q. What elements of the RE Growth Program did the DG Board make**
6 **recommendations on?**

7 A. The DG Board approved making recommendations to the PUC for the RE Growth
8 2020 PY on classes, tariff term lengths, ceiling prices, and allocation plan. The DG
9 Board, in coordination with National Grid also approved making a recommendation
10 to the PUC to include a solar carport incentive-payment adder. In addition, the DG
11 Board approved a recommendation to utilize consumer protection disclosure forms to
12 enhance quality assurance.

13 **Q. Are you familiar with the recommendations for the RE Growth 2020 PY that**
14 **were submitted by the DG Board to the PUC?**

15 A. Yes

16 **Q. Does OER support the recommendations?**

17 A. Yes.

18 **Approved 2019 PY vs. Recommended 2020 PY**

19 **Q. In regard to classes, do any of the 2020 PY recommendations vary from the**
20 **approved 2019 PY?**

21 A. Yes. The DG Board recommends combining the Small Wind class and the Large
22 Wind class into one class.

23 **Q. What is the basis for the DG Board's recommendation to combine the Small**

1 **Wind class and the Large Wind class into one class?**

2 A. The change is based on no applications submitted for the Small Wind category over
3 the past few years. In addition, we received no stakeholder comments in removing the
4 Small Wind category.

5 **Q. In regard to tariff term lengths, do any of the 2020 PY recommendations vary**
6 **from the approved 2019 PY?**

7 A. Yes, there is one recommended change. The recommended tariff term length for
8 Small Solar I is limited to 15 years as opposed to 15 years and 20 years. The DG
9 Board’s recommendation to elimination the 20-year option for Small Solar I is made
10 in response to Small Solar installer requests and a predominance of customers
11 selecting 15-year tariffs.

12 **Q. In regard to ceiling prices, do any of the 2020 PY recommendations vary from**
13 **the approved 2019 PY?**

14 A. Yes. Please see the pre-filed direct testimony and schedules of Jim Kennerly,
15 Sustainable Energy Advantage, LLC (“SEA”) for how the recommended ceiling
16 prices were developed and for the cost drivers behind the price changes from last year
17 (Pages 49-59; 64; 66-70).

18 **Q. In regard to the allocation plan, do any of the 2020 PY recommendations vary**
19 **from the approved 2019 PY?**

20 A. Yes. The annual target for the RE Growth 2020 PY is set by R.I. Gen. Laws § 39-
21 26.6-12(c)(5). Consistent with the statute, the RE Growth 2020 PY will provide
22 46.488 MW of total nameplate capacity (40MW plus the additional capacity
23 stemming from terminated projects that were awarded tariff capacity from the 2016-

1 2018 PYs that were made available since the capacity was set for the 2019 PY) for
2 fixed price and competitively bid projects. There will be 6.950 MW of capacity
3 available for fixed priced projects with the Small Solar program and 39.538 MW
4 available through a competitive bidding process. Overall, approximately 85% of the
5 RE Growth 2020 PY would be competitively bid. The allocation plan continues to
6 serve one of the DG Board's primary objectives of having a consistent and predictable
7 program for the renewable market, including interested homeowners, businesses,
8 municipalities, farmers and other participants.

9 **Q. Did the DG Board make additional recommendations that are different from**
10 **last year?**

11 A. Yes, the DG Board, in coordination with National Grid, is recommending an
12 incentive-payment adder for carports. In addition, the DG Board is recommending
13 the utilization of consumer protection disclosure forms to enhance quality assurance.

14 **Q. What is the DG Board's authority to make such recommendations?**

15 A. The DG Board's authority to recommend an incentive-payment adder for carports
16 stems from R.I. Gen. Laws § 39-26.6-22 which permits National Grid, in consultation
17 with the DG Board and with authorization from the Commission, to utilize incentive-
18 payment adders to achieve public policy objectives. The DG Board's authority to
19 recommend the utilization of consumer protection disclosure forms to enhance quality
20 assurance stems from R.I. Gen. Laws § 39-26.6-4(a)(1) and (3).

21 **Q. What is the proposal regarding the incentive-payment adder for carports?**

22 A. OER and the DG Board, in coordination with National Grid, are proposing a carport
23 adder to be part of the Commercial and Large Solar classes. OER and the DG Board

1 approved a definition for carports with the assistance of National Grid. OER and the
2 DG Board expect that the proposal will help the RE Growth Program achieve
3 important public policy objectives stemming from the involvement of and
4 cooperation with local stakeholders.

5 **Q. What are the projected costs of the proposed incentive-payment adder for**
6 **carports?**

7 In regard to the costs, OER worked with National Grid and went through different
8 scenarios using the recommended \$0.06/kWh adder and made comparisons to the
9 Massachusetts Smart Program. Please see **CK Schedule 1 – 2020 REG Program –**
10 **Carport Adder Cost Scenarios** (Pages 25-26).

11 **Q. Is there a cost/benefit analysis of the proposed incentive-payment adder for**
12 **carports?**

13 A. Yes. OER asked SEA to conduct an analysis from a qualitative perspective. Please
14 see **JK Schedule 6 – Memorandum Offering Qualitative Analysis of Docket 4600**
15 **Benefits and Costs of Proposed Solar Carport Adder**, which is attached to the pre-
16 filed direct testimony of Jim Kennerly, SEA (Pages 71-76).

17 **Q. Is there a Docket 4600 analysis of the proposed incentive-payment adder for**
18 **carports?**

19 A. Yes, OER asked SEA to perform a high-level analysis. Please see **JK Schedule 7 –**
20 **SEA Analysis of Carport Adder Given Docket 4600 Broad Goals**, which is
21 attached to the pre-filed direct testimony of Jim Kennerly, SEA (Pages 77-79).

22 **Q. What is the proposal regarding the consumer protection disclosure forms?**

23 A. OER and the DG Board are committed to enhancing quality assurance within the RE

1 Growth Program. To that end, OER and the DG Board are proposing the use of
2 consumer protection disclosure forms. For more information on quality assurance
3 and the consumer protection disclosure forms, please see the pre-filed direct
4 testimony of Shauna Beland, OER and attached schedules (Pages 27-41).

5 **Docket 4600 Goals**

6 **Q. Are you familiar with the PUC guidance document entitled *Public Utilities***
7 ***Commission’s Guidance on Goals, Principles and Values for Matters Involving***
8 ***The Narragansett Electric Company d/b/a National Grid (“PUC Guidance***
9 ***Document”)?***

10 A. Yes

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

14 A. Yes

15 **Q. Is it fair to say that the PUC’s acceptance of the DG Board’s recommendations**
16 **for the RE Growth 2020 PY would advance these goals?**

17 A. Yes.

18 **Q. Could you explain?**

19 A. Yes. OER believes that the acceptance of the DG Board’s recommendations for the
20 RE Growth 2020 PY achieves some of the goals identified in the Guidance Document,
21 while achieving the statutory requirements of the law adopted by the General
22 Assembly. Specifically, OER believes that elements are achieved through
23 diversifying the state’s energy resources with a variety of scale and eligible

1 distributed generation renewable resources; strengthens the state's economy through
2 jobs associated with renewable energy development; assists in achieving the state's
3 climate change objectives in reducing greenhouse gas emissions through distributed
4 generation deployment of systems across the state; compensates the value that
5 distributed energy resources provide through the recommended 2020 ceiling prices
6 developed by SEA; and appropriately compensates the distribution utility for
7 administering and overseeing all of the pending and active projects over the next
8 fifteen to twenty years through its remuneration compensation, which is a requirement
9 of the law.

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

11 A. Yes

CK Schedule 1 – 2020 REG Program – Carport Adder Cost Scenarios

2020 REG Program - Large Solar Class Scenarios with the Carport Adder

Assumption – Using the average large solar ceiling price (11.18 cents) from the 1st competitive large solar enrollment solicitation of the 2019 REG Program Year as the awarded competitive price for 2020 large solar projects and then applying the 6-cent adder.

Scenarios

- If 2 MW (from the allocated 11 MW to the large solar class) were awarded to carport projects from the large solar class in the 2020 REG Enrollment period, what would the annual adder cost be for those **2 MW** of projects when spread across the ratepayer classes over the 20-year tariff?

National Grid Answer -- Cost of Carport Adder - \$2,994,869

- If 4 MW (from the allocated 11 MW to the large solar class) were awarded to carport projects from the large solar class in the 2020 REG Enrollment period, what would the annual adder cost be for those **4 MW** of projects when spread across the ratepayer classes over the 20-year tariff?

National Grid Answer -- Cost of Carport Adder - \$5,989,738

2020 REG Program - Commercial Solar Class Scenarios with the Carport Adder

Assumption – Using the average commercial solar ceiling price (17.12 cents) from the 1st competitive commercial solar enrollment solicitation of the 2019 REG Program Year as the awarded competitive price for 2020 commercial solar projects and then applying the 6-cent adder:

Scenarios

- If 1 MW (from the allocated 6.5 MW to the commercial solar class) were awarded to carport projects from the commercial solar class in the 2020 REG Enrollment period, what would the annual adder cost be for those **1 MW** of projects when spread across the ratepayer classes over the 20-year tariff?

National Grid Answer -- Cost of Carport Adder - \$1,497,434

- If 3 MW (from the allocated 6.5 MW to the commercial solar class) were awarded to carport projects from the commercial solar class in the 2020 REG Enrollment period, what would the annual adder cost be for those **3 MW** of projects when spread across the ratepayer classes over the 20-year tariff?

National Grid Answer -- Cost of Carport Adder - \$4,492,303

RI REG Program to MA SMART Program -- Carport Adder Pricing Comparison

Large Solar Class Scenario

Question - If National Grid were to award a 1.5 MW large solar system in the 2020 REG Program and the competitive price was 11.18 cents plus the adder of 6 cents and resulting in an awarded tariff of 17.18 cents, how would that price compare to similar projects (1 MW to 2 MW) awarded under the MA Smart Solar Program and the Carport Adder? Would RI total price (competitive bid + adder) be higher or lower than the awarded total prices with the MA program adder?

Answer - SMART Program systems that have conditional approval in the 1-2 MW DC range would be compensated at rates between 17.69 cents/kWh and 22.43 cents/kWh, based on their base rate and the canopy adder. Some may receive more than this due to other adders they qualify for such as community shared solar. The MA projects would all receive more than the RI REG project with the Carport adder.

Commercial Solar Class Scenario

Question - If National Grid were to award a 900 kW commercial solar system in the 2020 REG Program and the competitive price was 17.12 cents plus the adder of 6 cents and resulting in an awarded tariff of 23.12 cents, how would that price compare to similar commercial (900 kW to 1 MW) projects awarded under the MA Smart Solar Program and the Carport Adder? Would RI price (competitive bid + adder) be higher or lower than the awarded total prices with the MA program adder?

Answer - There are only four MA projects in the conditional approval list between 800 and 1000 kW DC in the National Grid SMART queue. With the Canopy Adder, these projects would receive between 19.96 and 21.78 cents/kWh, which is less than the amount under the RI REG Program Commercial Class ceiling price with the Carport Adder.

MA Carport Adder – Forecasted Value of Adder with 2020 MA SMART Program

Question - Does National Grid anticipate that the value of the Carport Adder (based on National Grid's percentage of MW capacity associated with the MA SMART Program in 2020) to be reduced from 6 cents to a lower cents value in 2020?

Answer - DOER's 400 MW Review of the SMART program to date resulted in a recommendation that location-based adders will no longer decline in value going forward. The Canopy Adder is still in its first tranche with most capacity through Block 8 accounted for in National Grid territory, and thus would remain at 6 cents in the expansion of the program.

Questions and Answers prepared by the Office of Energy Resources and National Grid

1 **PRE-FILED DIRECT TESTIMONY OF SHAUNA BELAND**

2 **Introduction**

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

4 A. My name is Shauna Beland. My business address is One Capitol Hill, Providence,
5 RI 02908.

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

7 A. I am employed by the Office of Energy Resources (“OER”) and my title is Chief of
8 Program Development.

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

10 A. The purposes of my testimony are to: (1) Provide a status update on the DG Board’s
11 commitment to quality assurance including implementation of the solar consumer
12 protection disclosure forms; (2) Expound upon the definition of a solar carport; and
13 (3) Provide an update on the National Electric Code.

14 **Quality Assurance Measures**

15 **Q. What steps has OER and the DG Board taken to enhance quality assurance**
16 **within the Renewable Energy (“RE”) Growth Program?**

17 A. OER engaged a consultant, the Cadmus Group (“Cadmus”), to study and report on
18 quality assurance (“QA”) for the RE Growth Program. Cadmus has conducted QA
19 work for the RE Growth Program over the past three years. A first QA report was
20 published on April 20, 2017 and a second one on November 16, 2018. Cadmus is
21 also working on a 2019 QA report that is expected to be published later this month.
22 To view the 2017 and 2018 QA reports, please see the QA section on OER’s website
23 at: <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>.

1 OER is also seeking to procure QA work for future years. On or around October 10,
2 2019, the Division of Purchases, on behalf of OER, issued Solicitation # 7599811 (the
3 “RFP”) to solicit proposals for such quality assurance work. To view the RFP, please
4 see the Division of Purchases’ website at:

5 <http://www.purchasing.ri.gov/RIVIP/StateAgencyBids/7599811.pdf>.

6 **Q. Were quality assurance recommendations offered by the consultant through the**
7 **2017 and 2018 QA reports?**

8 A. Yes.

9 **Q. Can you go through the quality assurance recommendations that were issued in**
10 **advance of the RE Growth 2019 PY and provide a status update?**

11 A. Yes. Please see **SB Schedule 1 – Quality Assurance Status Update** (Pages 33-34).

12 **Q. Are there any quality assurance recommendations being undertaken in advance**
13 **of the RE Growth 2020 PY?**

14 A. Yes, implementation of Solar Consumer Protection Disclosure Forms which are
15 attached as **SB Schedule 2 – Solar Consumer Protection Disclosure Forms** (Pages
16 35-41).

17 **Q. Is this the first year that a Solar Consumer Protection Disclosure Form will be**
18 **included with the interconnection application for the RE Growth Program?**

19 A. Yes. In lieu of legislation in 2019, OER committed to implementing a Solar PV
20 Consumer Protection Disclosure form for both the RE Growth Program and the
21 Renewable Energy Fund (“REF”).

22 **Q. Did OER collect feedback from National Grid and the solar industry in**
23 **developing the Solar Consumer Protection Disclosure Forms?**

1 A. Yes, OER requested feedback on the Solar Consumer Protection Disclosure Forms
2 from multiple stakeholders, including solar installers/developers, National Grid, the
3 Clean Energy States Alliance, and the DG Board. In addition to emails requesting
4 direct feedback, OER also presented on the draft forms at the July 19, 2019 Solar
5 Stakeholder meeting. Additional phone calls between OER and National Grid staff
6 were held to discuss the intake process for the forms.

7 **Q. Will the REF, which is administered by Commerce RI, also be implementing the**
8 **same forms for the 2020 REF Program Year?**

9 A. Yes, but with some differences. For example, only one form for direct purchase PV
10 projects will be needed as third party owned and self-installed systems are not allowed
11 to participate in the REF Small Scale program. The content of the direct purchase
12 form will be similar to the form for the Small Scale RE Growth Program.

13 **Q. What is the timeframe for implementation of the Solar Consumer Protection**
14 **Disclosure form with the REF Small Scale program?**

15 A. It is expected that the first round of funding in early 2020 will begin requiring the
16 form.

17 **Q. Are you aware of other states that have adopted similar solar consumer**
18 **protection forms over the past few years?**

19 A. Yes, there are several states that require solar consumer protection disclosure forms.
20 OER solicited input from the Clean Energy States Alliance (“CESA”) on the draft
21 form because they are actively involved with other states on consumer protection.
22 OER staff attended a CESA sponsored Solar Consumer Protection Workshop on May
23 16, 2018 and learned about similar disclosure form efforts from other states including

1 Massachusetts (which the RI forms are modeled after), Florida, Maryland, Nevada,
2 New Mexico, and New York.

3 **Q. What size systems in the RE Growth Program will the Solar Consumer**
4 **Protection Disclosure Forms be required?**

5 A. All Small Scale RE Growth projects, both residential and commercial, will be
6 required to submit the form.

7 **Solar Carport Definition**

8 **Q. What is the proposed solar carport definition in connection with the**
9 **recommended adder for the RE Growth 2020 PY?**

10 A. Solar carport will be defined as “the portion of the direct current (“DC”) nameplate
11 capacity of a Solar DG Project that is installed over above a permeable and/or non-
12 permeable existing or new parking area and associated access and walkway areas (as
13 recognized by the local municipal building and/or zoning department), which is
14 installed in a manner that maintains the function of the area beneath the carport.”

15 **Q. Was this proposed definition designed with input from National Grid and**
16 **stakeholders?**

17 A. The carport draft definition went through several rounds of discussion with solar
18 stakeholders, National Grid, and REF staff. They include the following activities:

19 • On July 15, 2019, OER and REF staff held a small stakeholder meeting
20 with developers who had installed carports in Rhode Island to discuss the
21 proposed carport definition.

22 • At a July 19, 2019 meeting, OER presented the draft solar carport
23 definition to solar stakeholders and announced a two-week public

1 comment period.

- 2 • On July 22, 2019, OER sent an email to solar stakeholders with the drafted
3 definition for a two-week public comment period.

4 In addition to these public outreach activities OER held meetings and phone calls with
5 National Grid over the summer to discuss the draft definition, which MW allocation
6 classes the adder would be allowed, and proposed language changes from
7 stakeholders.

8 **Q. Would a developer be able to propose doing a roof mounted solar system and a**
9 **carport solar project with the proposed filing? If yes, please explain how that**
10 **would occur?**

11 A. Yes. In order to maximize competition in the various classes, projects would bid into
12 an open enrollment period for the size project they are bidding. The adder would then
13 be calculated by finding the ratio of the project size that will be on a carport to the
14 total project size and then multiplying this ratio by the adder. The amount would be
15 added to the winning bid price of the project and added to all of the kWh output of
16 the total facility once operational. By using this method, developers can submit bids
17 for PV projects that include both a carport and ground mounted system or a carport
18 and roof mounted system but only receive the adder on the carport component of the
19 total system.

20 **Q. The carport adder would only be applicable to a location that meets the criteria**
21 **of the proposed definition. Is that correct?**

22 A. Yes.

23 **Q. Would the developer need to provide evidence to National Grid with its**

1 **submitted application that the project location is an existing or pending parking**
2 **lot?**

3 A. Yes.

4 **National Electric Code**

5 **Q. What version of National Electric Code is Rhode Island currently using?**

6 A. Rhode Island adopted National Electric Code 2017 (“NEC17”) on August 1, 2019.
7 There will be a three-month grace period until November 1, 2019 during which time
8 solar installers and developers can choose which version of NEC (NEC14 or NEC17)
9 they will be using during construction. After November 1, 2019 all PV projects
10 installed in Rhode Island must use NEC17.

11 **Q. Why is National Electric Code important to OER and the DG Board?**

12 A. National Electric Code includes certain standards for electric equipment as well
13 provides guidance for newer technologies that must be installed. An example of this
14 in NEC17 was the introduction of “rapid shutdown”. Section 690.12 in NEC17 calls
15 for module-level shutdown of the PV system instead of an array-level shutdown. All
16 conductors within an array’s 1-foot boundary have to be reduced to 80 volts or less
17 within 30 seconds of rapid shutdown initiation. In addition, NEC17 indicates that
18 for one-and two-family dwellings, the rapid shutdown switch must be located outside
19 of the building. These changes to code are important for regulators, municipal
20 inspectors, and solar installers to be aware of especially since it helps resolve a safety
21 issue for first responders.

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

23 A. Yes.

SB Schedule 1 – Quality Assurance Status Update

Progress on the 2019 Recommendations:

- 1. National Grid will collect RI General Contractor registration numbers on the interconnection application for Small Scale projects.**

Action: OER and National Grid agreed that the solar permit would be collected at the time of interconnection application because the General Contractor’s registration number is a required field on the solar permit application. OER planned to “spot audit” approximately 60 solar permits to ensure the registration number was accurate. During the 2019 audit National Grid and OER discovered that information carried over from the solar permit application to the solar permit itself varied between municipalities. Some permits did not include General Contractors’ numbers. As such, OER recommends that National Grid collect the Solar Permit application in addition to the solar permit for the 2020 program year.

- 2. Total Project Cost Data Reporting – Total project cost should be a required field on the interconnection application.**

Action: National Grid added language in the 2019 RE Growth program rules requiring that total project cost become a mandatory field in the application. In addition, OER and National Grid created a definition of total project cost. All applications in the 2019 program year provided total project cost.

- 3. Inspection language added to require inspections.**

Action: National Grid’s legal team created language indicating that inspections may be

required and that customers utilizing the program agree that they will grant access to their property for an inspection by OER’s third party consultant. Cadmus indicated that this new language change helped with inspection scheduling during the 2019 program year.

4. Self-Installers and New Program Participants Education.

Action: Self-Installers and new installers who had not installed a RE Growth Small Scale project prior to the 2019 are now required to watch a mandatory recorded webinar which discusses the Minimum Technical Guidance and the unique interconnection requirements of the RE Growth program. This training was developed by Cadmus prior to the start of the 2019 program year. The link to the training (<https://cadmusgroup.com/es/reg-sign-in/>) may be accessed through OER’s website at: <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>. OER and Cadmus maintain a list of individuals who have watched the webinar.

5. Creation of Minimum Technical Guidance (“MTG”)

Action: OER, Cadmus, and National Grid created an MTG document including electrical diagrams of interconnection types and arrangements National Grid allows for the RE Growth Small Scale program. This document was published on the OER website before the beginning of the 2019 program year at:

http://www.energy.ri.gov/documents/renewable/RI-REG-Minimum-Technical-Guidance_2019.pdf.

SB Schedule 2 – Solar Consumer Protection Disclosure Forms

Renewable Energy Growth Small Scale Participant Customer Disclosure Form Direct Ownership

The purpose of this form is to provide consumers with a uniform and transparent resource to evaluate potential solar transactions under the Renewable Energy Growth (REG) Program. This form is intended to be completed by the solar installer installing the system and submitted with the interconnection application.

CUSTOMER INFORMATION			
Customer Name:			
Site Address:			
City, State, Zip:			
Phone:			
Email:			
INSTALLER CONTACT INFORMATION	PRIMARY SERVICE CONTACT INFORMATION		
Company:	Company:		
Street Address:	Street Address:		
City, State, Zip:	City, State, Zip:		
Phone:	Phone:		
Email:	Email:		
CONTRACT, COST, AND ESTIMATED PERFORMANCE INFORMATION			
System Size (kW DC):			
Where in the contract is the warranty information located?			
Are all warranties transferrable? Yes or No			
Has a shading analysis been completed for the property? Yes or No			
How much production is expected to be lost due to shading? (%):			
How many arrays are included in the solar PV system?			
	Array 1	Array 2	Array 3
Ordinal Direction of Array			
Array Production %			
Estimated Year One Production (kWh):			
What is the Final Purchase Price for the system before any rebates or other incentives (\$)?			
FINANCING INFORMATION*			
Does the above-listed Final Purchase Price include any dealer fees or other finance-related charges that would not be charged to a customer in a similar cash transaction? Yes or No			
Amount of dealer fees or other finance-related charges in the Total Project Cost (\$):			
OTHER INFORMATION			
Is the customer aware of National Grid’s Tax Policy Document and the reason you must provide a W-9 to National Grid? Yes or No			
Did the installer and the customer discuss the condition of the roof and the potential cost for removing and reinstalling the array in the event that repair or replacement of the roof is needed? Yes or No			
Did the installer and the customer discuss all available solar state and federal incentives? Yes or No			
Describe any system performance or electricity production guarantees:			

KEY RESPONSIBILITIES CHECKLIST	PRIMARY INSTALLER	SYSTEM OWNER
System Operations and Maintenance		
Submission of Interconnection Application to Utility		
Securing the Required Solar Permit		
Obtaining Engineering Approvals		
Scheduling Inspections		
Participation in Inspections		
OWNERSHIP OF INCENTIVES	PRIMARY INSTALLER	SYSTEM OWNER
Owner of REG Incentive Payments		X
Owner of Federal Investment Tax Credit		X

* If your System is financed, carefully read any agreement and/or disclosure forms provided by your lender. Your installer may not be aware of the terms of your financing agreement, which may include fees not listed above. This disclosure does not contain the terms of your financing agreement. If you have any questions about your financing arrangement, contact your finance provider before signing a contract.

**The Rhode Island Contractors' Registration and Licensing Board ("CRLB") is the agency charged with regulating contractors in the State of Rhode and is governed by Rhode Island General Laws § 5-65-1 et seq. The CRLB claim process is an administrative alternative for property owners who are unsatisfied with the work of a contractor and who wish to resolve the dispute outside of court. To learn more about the law visit <http://www.crb.ri.gov/>

NOTE 1: A Renewable Energy Certificate (REC) represents the Environmental Attributes associated with one megawatt-hour of renewable energy as defined by Rhode Island law. RECs generated by the facilities participating in the REG Program are transferred to the utility company in exchange for the incentive payments made to the facility owner under the program. Therefore, while you cannot claim that you are using the solar power generated by the facility, your purchase of a solar array does support solar development in Rhode Island and increase the amount of solar energy consumed by all electric ratepayers in the State.

NOTE 2: All solar PV projects installed under the REG program may be subject to a mandatory third-party inspection.

NOTE 3: Solar installation companies that do not provide accurate information on disclosure forms may be subject to penalties including but not limited to, being named in the annual Office of Energy Resource's Quality Assurance Report.

I, _____, hereby confirm that I have received and understand the above information. I further confirm that I have had a chance to ask questions of my provider and have received sufficient answers, if applicable.

Customer Name: _____ **Date:** _____

I, _____, hereby confirm that I have provided the customer the above information.

Installer Name: _____ **Date:** _____

Relevant Links and Contact Information

Rhode Island Office of Energy Resources
 Website: <http://www.energy.ri.gov/>

Attorney General's Office
 Website: <http://www.riag.ri.gov/>

Renewable Energy Growth Small Scale Participant Customer Disclosure Form (Third Party Ownership)

The purpose of this form is to provide consumers with a uniform and transparent resource to evaluate potential solar transactions under the Renewable Energy Growth (REG) Program. This form is intended to be completed by the solar installer installing the system and submitted with the interconnection application.

CUSTOMER INFORMATION		SYSTEM OWNER CONTACT INFORMATION	
Customer Name:	Company:		
Site Address:	Street Address:		
City, State, Zip:	City, State, Zip:		
Phone:	Phone:		
Email:	Email:		
INSTALLER CONTACT INFORMATION		PRIMARY SERVICE CONTACT INFORMATION	
Company:	Company:		
Street Address:	Street Address:		
City, State, Zip:	City, State, Zip:		
Phone:	Phone:		
Email:	Email:		
CONTRACT, COST, AND ESTIMATED PERFORMANCE INFORMATION			
System Size (kW DC):			
Contract Effective Date:			
Contract End Date:			
Option to Renew: Yes or No			
Option for Buyout: Yes or No			
Starting Rate (\$/month or \$/kWh):			
Rate Increase Frequency (Monthly, Quarterly, Annually, etc.):			
Amount of Rate Increase (\$/month, \$/kWh, or percentage):			
Has a shading analysis been completed for the property? Yes or No			
How much potential solar production is expected to be lost due to shading? (%):			
How many arrays are included in the solar PV system?			
	Array 1	Array 2	Array 3
Ordinal Direction of Array			
Array Production %			
Estimated Year One Payments (\$):			
Is the contract transferrable? Yes or No			
Where in the contract is the warranty information located?			
Are all warranties transferrable?			
OTHER INFORMATION			
Is the customer aware of National Grid’s Tax Policy Document and the reason you must provide a W-9 to National Grid? Yes or No			
Did the installer and the customer discuss the condition of the roof and the potential cost for removing and reinstalling the array in the event that repair or replacement of the roof is needed? Yes or No			
Must the customer continue to make payments in the event of an extended system shutdown? Yes or No			

Will a filing at the Registry of Deeds be made pursuant to this system? Yes or No
Describe any protections for the customer in the event that the service provider goes out of business:

KEY RESPONSIBILITIES CHECKLIST	PRIMARY INSTALLER / OWNER	CUSTOMER
System Operations and Maintenance		
Submission of Interconnection Application to Utility		
Securing Required Solar Permit		
Obtaining Engineering Approvals		
Scheduling Inspections		
Participation in Inspections		
OWNERSHIP OF INCENTIVES	PRIMARY INSTALLER / OWNER	CUSTOMER
Owner of REG Incentive Payments		
Owner of Federal Investment Tax Credit	X	

*The Rhode Island Contractors' Registration and Licensing Board ("CRLB") is the agency charged with regulating contractors in the State of Rhode and is governed by Rhode Island General Laws § 5-65-1 et seq. The CRLB claim process is an administrative alternative for property owners who are unsatisfied with the work of a contractor and who wish to resolve the dispute outside of court. To learn more about the law visit <http://www.crb.ri.gov/>

NOTE 1: A Renewable Energy Certificate (REC) represents the Environmental Attributes associated with one megawatt-hour of renewable energy as defined by Rhode Island law. RECs generated by the facilities participating in the REG Program are transferred to the utility company in exchange for the incentive payments made to the facility owner under the program. Therefore, while you cannot claim that you are using the solar power generated by the facility, your purchase of a solar array does support solar development in Rhode Island and increase the amount of solar energy consumed by all electric ratepayers in the State.

NOTE 2: All solar PV projects installed under the REG program may be subject to a mandatory third-party inspection.

NOTE 3: Solar installation companies that do not provide accurate information on disclosure forms may be subject to penalties including but not limited to, being named in the annual Office of Energy Resource's Quality Assurance Report.

I, _____, hereby confirm that I have received and understand the above information. I further confirm that I have had a chance to ask questions of my provider and have received sufficient answers, if applicable.

Customer Name: _____ **Date:** _____

I, _____, hereby confirm that I have provided the customer the above information.

Installer Name: _____ **Date:** _____

Relevant Links and Contact Information

Rhode Island Office of Energy Resources
 Website: <http://www.energy.ri.gov/>

Attorney General's Office
 Website: <http://www.riag.ri.gov/>

Renewable Energy Growth Self Installer Customer Disclosure Form

The purpose of this form is to provide self-installers with basic information related to the residential solar PV system under the Renewable Energy Growth (REG) Program. This form is intended to be completed by either the homeowner or the electrician installing the system. This form can be used to provide information related to the solar system should the property be sold.

Homeowner Information	Electrician Information (if not the homeowner)
Homeowner Name:	Company:
Site Address:	Street Address:
City, State, Zip:	City, State, Zip:
Phone:	Phone:
Email:	Email:
Contract, Cost, and Estimated Performance Information	
System Size (kW DC):	
Do you have the equipment specification sheets? Yes or No	
Are all warranties transferrable? Yes or No	
Is the electrician (if not the homeowner) providing a workmanship warranty? Yes or No	
If yes, how long is the workmanship warranty (in years)?	
Has a shading analysis been completed for the property? Yes or No	
How much production is expected to be lost due to shading? (%):	
Estimated Year One Production (kWh):	
What is the Final Purchase Price for the system before any rebates or other incentives (\$):	
Other Information	
Are you aware of National Grid's Tax Policy Document and the reason you must provide a W-9 to National Grid? Yes or No	
How old is the roof (in years)?	

Key Responsibilities Checklist	Homeowner	Electrician
System Operations and Maintenance		
Submission of Interconnection Application to Utility		
Securing the Required Solar Permit		
Obtaining Engineering Approvals		
Scheduling Inspections		
Participation in Inspections		
Ownership of Incentives	Homeowner	
Owner of REG Incentive Payments	X	
Owner of Federal Investment Tax Credit	X	

Note 1: All self-installed PV projects under the REG program are required to watch the “Webinar for Self-Installers and New Program Participants.

Note 2: A Renewable Energy Certificate (REC) represents the Environmental Attributes associated with one megawatt-hour of renewable energy as defined by Rhode Island law. RECs generated by the facilities participating in the REG Program are transferred to the utility company in exchange for the incentive payments made to the facility owner under the program. Therefore, while you cannot claim that you are using the solar power generated by the facility, your purchase of a solar array does support solar development in Rhode Island and increase the amount of solar energy consumed by all electric ratepayers in the State.

Note 3: All self-installed solar PV projects installed under the REG program are subject to a mandatory third-party inspection.

I, _____, hereby confirm that I have received and understand the above information. I further confirm that I have had a chance to ask questions of my provider and have received sufficient answers, if applicable.

Homeowner: _____

Date: _____

Relevant Links and Contact Information

Rhode Island Office of Energy Resources REG Program Website

Website: <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>

Email: energy.resources@energy.ri.gov

Attorney General’s Office

Website: <http://www.riag.ri.gov/>

PRE-FILED DIRECT TESTIMONY OF JIM KENNERLY

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Q. Please state your name, employer and title.

A. My name is Jim Kennerly. I am employed as a Senior Consultant by Sustainable Energy Advantage, LLC (SEA).

Q. Can you please provide your background related to renewable energy technologies?

A. I have over ten years of experience with climate and energy policy and its impact on markets for clean energy technologies, and eight years of professional experience directly related to renewable energy market and policy development. At SEA, I lead the company’s public policy analytics practice and co-lead its distributed energy analytics practice.

In addition to the Rhode Island Office of Energy Resources (OER) and Distributed Generation Contracts Board (DG Board), our distributed energy team has undertaken custom consulting work for the Massachusetts Department of Energy Resources (MA DOER), the New Jersey Board of Public Utilities (NJ BPU), Massachusetts Clean Energy Center, the New York State Energy Research and Development Authority (“NYSERDA”), the New Hampshire Office of Consumer Advocate, the Massachusetts Attorney General’s Office, the Connecticut Green Bank, the Clean Energy States Alliance, the Natural Resources Council of Maine and a wide variety of buy-side and sell-side solar and distributed energy market participants.

Prior to working at SEA, I was a Senior Policy Analyst at the North Carolina Clean Energy Technology Center (“NCCETC”) at North Carolina State University, where I served as the senior analyst for the energy policy team, which manages the Database

1 of State Incentives for Renewables and Efficiency (“DSIRE”), and where I led the
2 NCCETC’s participation in a national technical assistance and research grant for the
3 United States Department of Energy’s SunShot Initiative. Prior to that, I was a
4 Regulatory and Policy Analyst at the North Carolina Sustainable Energy Association,
5 where I managed the organization’s regulatory, legislative and utility rates analysis.

6 I have a Master of Public Affairs degree from the Lyndon B. Johnson School of Public
7 Affairs at the University of Texas at Austin, and a Bachelor’s Degree in Politics from
8 Oberlin College.

9 **Q. Can you please provide SEA’s background related to renewable energy**
10 **technologies?**

11 A. SEA is a consulting advisory firm that has been a national leader on renewable energy
12 policy analysis, market analysis and program design for over 20 years. In that time,
13 SEA has supported the decision-making of more than two hundred (200) clients,
14 including more than forty (40) governmental entities, through the analysis of
15 renewable energy policy, strategy, finance, projects and markets. SEA is known and
16 respected widely as an independent analyst, a reputation earned through the firm’s
17 ability to identify and assess all stakeholder perspectives, conduct analysis that is
18 objective and valuable to all affected, and provide advice and recommendations that
19 are in touch with market realities and dynamics.

20 **Q. What role has SEA played in the development of the Renewable Energy Growth**
21 **(REG) program?**

22 A. Since 2011, SEA has served as a technical consultant to OER and, beginning in 2014,
23 to the DG Board in their implementation of the Distributed-Generation Standard

1 Contracts Program (“DG Program”), R.I. Gen. Laws § 39-26.2-1 et seq., and the REG
2 Program, R.I. Gen. Laws § 39-26.6-1 et seq. SEA’s role has been and is to advise
3 OER and the DG Board on the path to making informed recommendations with
4 respect to technology- and size-specific ceiling prices based on detailed research and
5 analysis.

6 **Q. What was SEA’s role in the development of the 2020 REG program?**

7 A. SEA was hired by OER and the DG Board to conduct detailed research and analysis
8 of regional distributed renewable energy markets, collect additional insight through
9 public meetings, written comments, and interviews, and then to recommend ceiling
10 prices for each technology-, ownership- and size-specific class established by OER
11 and the DG Board.

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

14 A. SEA acts as a joint facilitator of a lengthy process, reproduced each year, to request,
15 gather and analyze cost and performance data from current and prospective market
16 participants and other interested parties. Throughout the process, SEA solicits
17 empirical evidence from stakeholders regarding market trends and practices and
18 offers multiple opportunities for interested parties to participate in public meetings
19 and submit written comments, which are encouraged to address both general market
20 observations and to respond directly to specific data requests and draft proposed
21 ceiling price recommendations. SEA also conducts interviews with active market
22 participants each year. However, we undertook fewer live interviews for the 2020
23 Ceiling Price process than in prior years. SEA incorporates all the intelligence gained

1 from this market research into its modeling of Ceiling Prices, utilizing the National
2 Renewable Energy Laboratory (“NREL”) Cost of Renewable Energy Spreadsheet
3 Tool (“CREST”) model to generate recommended ceiling prices through multiple
4 rounds of analysis. The process included three presentations to the DG Board and
5 stakeholders. At the final presentation, the DG Board discussed and approved the
6 recommendations proposed by SEA which are reflected in the Report.

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

8 A. SEA’s first presentation was delivered at a public meeting on July 19, 2019 in
9 Lincoln, RI, during which it presented the first draft of proposed ceiling price inputs
10 and results for all technology categories. SEA presented the second draft of proposed
11 inputs and results at a stakeholder meeting in Providence, RI on August 28, 2019.
12 The final ceiling price recommendations for all technology categories were presented
13 at a DG Board public meeting in Providence, RI on September 23, 2019.

14 **Q. Are those presentations available to view?**

15 A. Yes. They may be accessed through OER’s website at:
16 <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>.

17 Specifically:

18 The July 19, 2019 presentation may be viewed at:

19 <http://www.energy.ri.gov/documents/renewable/ri-reg-2020-mtg-1-july-2019.pdf>.

20 The August 28, 2019 presentation may be viewed at:

21 [http://www.energy.ri.gov/documents/renewable/ri-reg-mtg-2-august-2019-final-for-](http://www.energy.ri.gov/documents/renewable/ri-reg-mtg-2-august-2019-final-for-delivery-to-stakeholders.pdf)
22 [delivery-to-stakeholders.pdf](http://www.energy.ri.gov/documents/renewable/ri-reg-mtg-2-august-2019-final-for-delivery-to-stakeholders.pdf).

23 The September 23, 2019 presentation may be viewed at:

1 [http://www.energy.ri.gov/documents/renewable/ri-reg-2020-mtg-3-dg-board-voting-](http://www.energy.ri.gov/documents/renewable/ri-reg-2020-mtg-3-dg-board-voting-mtg-sept-2019-final-revised.pdf)
2 [mtg-sept-2019-final-revised.pdf.](http://www.energy.ri.gov/documents/renewable/ri-reg-2020-mtg-3-dg-board-voting-mtg-sept-2019-final-revised.pdf)

3 **Q. Can you please explain the Cost of Renewable Energy Spreadsheet Tool**
4 **(“CREST”) model?**

5 A. Yes. The CREST model is a discounted cash flow analysis tool published by the
6 National Renewable Energy Laboratory (NREL). SEA was the primary architect of
7 the CREST model, which was developed under contract to NREL. The CREST model
8 is available to the public without charge, and is fully transparent (that is, all formulas
9 are visible to, and traceable by, all users). CREST was created to help policymakers
10 develop cost-based renewable energy incentives and has been peer reviewed by both
11 public and private sector market participants. The model is designed to calculate the
12 cost of energy, or minimum revenue per unit of production, necessary for the modeled
13 project to cover its expenses, service its debt obligations (if any), and meet its equity
14 investors’ assumed minimum required after-tax rate of return. CREST was developed
15 in Microsoft Excel, so it offers the user a high degree of flexibility and transparency,
16 including full comprehension of the underlying equations and model logic.
17 Beginning in 2015, NREL re-released CREST models that allow the user to edit
18 formulas, without limit.

19 **Q. Were the CREST models made available to stakeholders?**

20 A. Yes. The CREST models are always available to the public. Any stakeholder may
21 download a CREST model from NREL’s website, without charge, and enter any
22 number of different input configurations – including all inputs used by SEA during
23 the ceiling price analysis. This allows all stakeholders to replicate SEA’s modeling

1 process and results at any time.

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

4 A. The number of responses to both the data request and survey, including those obtained
5 via interviews and follow-ups, are summarized in **JK Schedule 1 – Data Request**
6 **and Survey Responses** (Page 66). Relative to the 2019 process, which had three
7 rounds of requests and response, SEA successfully followed up with stakeholders
8 regarding issues of concern in a single supplemental round of data requests, which
9 were closed following the second stakeholder meeting (described above). However,
10 SEA made clear that stakeholders were free to offer formal and informal comments
11 throughout the process.

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

15 A. SEA received comments regarding three of the four eligible technologies (solar, wind,
16 hydroelectric) from a combination of project developers, financiers and The
17 Narragansett Electric Company d/b/a National Grid (“National Grid”). We received
18 no feedback from Anaerobic Digestion stakeholders during the process. Throughout
19 the process, SEA vetted all the stakeholder feedback and made more than a dozen
20 adjustments to inputs or calculation methodologies as a direct result of stakeholder
21 feedback. For summaries of comments provided by stakeholders and how SEA
22 responded to them, please see the SEA presentations at
23 <http://www.energy.ri.gov/policies-programs/programs-incentives/reg-program.php>.

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

2 A. No. While stakeholder input is critical to understanding aspects of the project cost,
3 financing and market landscape specific to Rhode Island, basing all aspects of the
4 proposed ceiling prices on the self-reported assumptions of the entities seeking tariff
5 compensation, particularly if inputs and comments are received from a limited
6 number of project developers in a given technology or size category, would be
7 difficult to justify, and would risk over-compensating project owners at the expense
8 of ratepayers. Thus, the 2020 recommended ceiling prices take other recent data
9 sources into account, particularly with respect to cost and financing trends, to
10 incentivize the development of projects in Rhode Island that are cost-competitive with
11 similar projects throughout the Northeast.

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

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

19 **Q. Did SEA, on behalf of the Board, consider all the stakeholder feedback given in**
20 **the development of recommended 2020 ceiling prices?**

21 A. Yes. While we did not adopt every stakeholder suggestion, we solicited, carefully
22 considered, and incorporated stakeholder feedback throughout the entire process.
23 SEA's presentation of multiple draft ceiling prices, and associated explanation of

1 changes in response to stakeholder feedback, substantiates this consideration.

2 **Q. Are those recommendations reflected in the DG Board's Recommendations**
3 **submitted to the Commission?**

4 A. Yes.

5 **Q. Were there any SEA recommendations that were not included in the Report and**
6 **Recommendations?**

7 A. No.

8 **Q. Can you verify the 2020 ceiling prices included in the Report and**
9 **Recommendations?**

10 A. Yes. The recommended ceiling price for each category is summarized in **JK**
11 **Schedule 2 – Ceiling Price Verification** (Page 67).

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

15 A. Yes.

16 **Q. Do the proposed 2020 ceiling prices differ from the 2019 ceiling prices? If yes,**
17 **please quantify the percentage change for each category.**

18 A. Yes. The percentage change between the proposed 2020 ceiling prices and the final
19 2019 ceiling prices can be seen in **JK Schedule 3 – Ceiling Price Change from 2019**
20 (Page 68).

21 **Q. Please describe the most impactful drivers of changes in the proposed ceiling**
22 **prices for the Solar categories relative to those approved for the 2019 Program**
23 **Year.**

1 A. The proposed 2020 ceiling prices were designed to reflect more changes that place
2 upward pressure on costs and prices than has been typical in recent years. These
3 factors notwithstanding, our proposed 2020 ceiling prices for the Solar categories still
4 reflect the strong tendency in Northeast markets toward the same sustained cost
5 reduction and cost competitiveness trends observed over the past decade.

6 ***Sources of Upward Pressure on Proposed 2020 Solar Ceiling Prices***

- 7
- 8 • *Federal Investment Tax Credit (ITC) Step-Down:* The main factor placing
9 across-the-board upward pressure on our proposed 2020 ceiling prices for
10 Solar projects is the step-down in the federal ITC for individual and business
11 taxpayers from 30% to 26% on January 1, 2020. This change affects all Solar
12 projects, and (as shown in **JK Schedule 5 – Comparison of Proposed Prices**
13 **to 2019 Prices With Reduction in ITC Percentage**) (Page 70) increases all
14 Solar ceiling prices by about 4%-5% relative to the values approved for the
15 2019 Program Year.
 - 16 • *Rapid Shutdown Requirements in National Electric Code 2017:* On November
17 1, 2019, the 2017 version of the National Electric Code will officially enter
18 effect in Rhode Island. The new code includes requirements for rapid
19 shutdown at the module level, which we assumed (based on developer
20 feedback) to be \$40/kW for all projects.
 - 21 • *Increased Cost of Sponsor Equity Capital:* In response to feedback from
22 multiple stakeholders that a 10% assumed after-tax return for sponsor equity
23 was unrealistically low, we increased the assumed IRR for sponsor equity by
100 basis points (to 11%) for all solar projects above 25 kW. However, as

1 discussed below, the impact of this change was substantially mitigated by an
2 assumed increase in the assumed share of debt in the capital stack for solar
3 projects in the wake of the expected ITC step-down. In addition, sponsor
4 equity remains, even with the ITC at 26%, no more than 25% of the assumed
5 equity in the project.

- 6 • *Small Solar I Installed Costs and Financing Assumptions:* Relative to the 2019
7 approved Small Solar I prices, our assumed 2020 installed costs for Small
8 Solar I (which are sourced from publicly-available Northeastern state
9 databases and from revealed pricing data supplied by solar market platform
10 EnergySage) rose by \$94/kW. In addition, our team overhauled financing
11 assumptions for Small Solar I and II projects to reflect the emergence of solar
12 loans and home equity lines of credit (HELOCs) as the dominant form of
13 financing for solar projects. In the case of Small Solar I, these adjustments
14 resulted in a slight ceiling price increase relative to the previous financing
15 assumptions (which assumed a simple discount rate of 5%).

16 ***Sources of Downward Pressure on Proposed 2020 Solar Ceiling Prices***

- 17 • *Reduction in Interest on Term Debt Across the Board:* Based on discussions
18 with market participants and financiers developing and financing projects
19 across the Northeast, we reduced the assumed cost of debt by 50 basis points
20 relative to the 2019 approved prices.
- 21 • *Increased Debt Share in Capital Stack:* With the reduction in the ITC, we
22 assume that project developers, to mitigate cost increases, will increase the
23 share of debt in the capital stack (which has a lower financing cost than either

1 tax or sponsor equity) by 5%. This results in an equal reduction in the
2 combined share of sponsor and tax equity in the capital stack. Based on
3 discussions with stakeholders and financiers, I believe this is a reasonable
4 assumption, given the fixed, bundled nature of the purchase of energy,
5 capacity and RECs provided by National Grid in exchange for a project's as-
6 bid tariff rate, which financiers see as reducing the risk of default. I also find
7 this to be a reasonable assumption in light of our expectation that the cost of
8 borrowing will fall further during calendar year 2020.

- 9 • *Region-Wide Installed Cost Reductions and 2019 1st Open Enrollment*
10 *Results for Solar Projects Greater Than or Equal To 25 kW:* Our main sources
11 for Solar project installed costs (the most significant driver of Solar project
12 ceiling prices) for Medium, Commercial and Large Solar are:
 - 13 ○ Installed cost estimates associated with bids submitted into the First
14 Open Enrollment of the 2019 Program Year (obtained confidentially
15 from National Grid, who obtains them from project developers); and
 - 16 ○ Publicly-available installed cost data from Rhode Island and other
17 Northeastern states.

18 **JK Schedule 4 – Installation Costs** (Page 69) illustrates the final assumed
19 installed costs for the 2019 approved and 2020 proposed ceiling prices for
20 Medium, Commercial and Large Solar.

- 21 • *Year-on-Year Upfront Cost Decline Rates:* After analyzing forecasted
22 installed cost decline rates published by NREL and consulting firm Wood
23 Mackenzie, the Solar categories all include 2019 to 2020 installed cost decline

1 rates, ranging from 3.5% for Small Solar I and II and 4.5% for Solar projects
2 greater than 25 kW.

3 • *Small Solar II Financing Assumptions:* Given that we previously assumed that
4 Small Solar II projects are fully equity-financed, our research found that such
5 projects tend to take out more debt (in the form of solar loans and HELOCs)
6 over longer terms than we had previously understood. Since interest on term
7 debt has lower costs than both sponsor and tax equity, this means that
8 financing costs ended up significantly lower for Small Solar II in 2020 than
9 as approved in 2019.

10 **Q. Despite the expected step-down in the federal Investment Tax Credit (ITC) from**
11 **30% to 26% during Calendar Year 2020, do you believe that the Ceiling Prices**
12 **for Solar projects still reflect the effects of competition and cost reduction?**

13 A. Yes, I do. As shown in **JK Schedule 5 – Comparison of Proposed Prices to 2019**
14 **Prices With Reduction in ITC Percentage** (Page 70), relative to the 2019 approved
15 prices for Solar projects, reducing the ITC percentage from 30% to 26% increases
16 Ceiling Prices by approximately 4%-5%, which suggests something close to a linear
17 relationship between the tax credit and ceiling prices. However, when accounting for
18 the factors putting downward pressure on ceiling prices, the proposed 2020 prices, at
19 the very least, do not exceed the assumed increase in ceiling prices attributable to the
20 step-down, and at best (in the case of Small Solar II, Medium and Large Solar) include
21 price reductions of 14%-20% relative to the impact of the step-down.

22 **Q. Why did the proposed price for Commercial Solar rise, when the proposed price**
23 **of Medium and Large Solar fell?**

1 A. While the assumed installed costs for Medium and Large Solar fell 12% and 15%
2 respectively, our assumed installed cost for Commercial Solar fell only by 5%.
3 Furthermore, we were able to obtain three Rhode Island-specific site lease agreements
4 from a solar market participant, which indicated that we had been underestimating
5 site lease payments by \$7,500/year for Commercial Solar projects and by \$3,750/year
6 for Medium Solar projects. For Commercial Solar, this increase in ongoing fixed
7 costs, coupled with the 4% ceiling price impact of the ITC step-down, offset the 5%
8 decrease in assumed installed costs.

9 **Q. Please describe the most impactful drivers of changes to the proposed ceiling**
10 **prices for the Wind category.**

11 A. The primary driver for the change in the proposed price for Wind is the scheduled
12 expiration of the federal Production Tax Credit (PTC) on January 1, 2020. As a result,
13 wind project developers nationwide will no longer be able to benefit from the
14 Investment Tax Credit (ITC) in lieu of the PTC. Therefore, the eligible ITC
15 percentage for Wind projects will drop from 12% to 0%. As with the Solar proxy
16 projects, we assume Wind developers compensate for the loss of tax equity capital in
17 the capital stack, we assume that developers will increase the percent of the project
18 financed by debt by 5%, given that debt has a lower cost for developers than sponsor
19 equity. However, we also now assume that target after-tax sponsor equity IRRs rise
20 to 10%, which our market research suggests is a more typical sponsor equity return
21 for a wind project without tax equity in the capital stack.

22 **Q. Did SEA shift its assumptions in how it estimates federal and state tax benefits**
23 **for Wind projects in order to accommodate these changes in federal tax law? If**

1 **so, please describe these changes and how they were factored into the proposed**
2 **Ceiling Price for Wind projects.**

3 A. Yes. In the initial draft of the 2020 Ceiling Prices, SEA assumed that wind developers
4 would claim 100% federal bonus depreciation to offset the loss in the federal tax
5 credit. When a project's owner(s) can write off 100% of the cost of a newly-developed
6 asset in the first tax year in which it begins operation, it provides a substantial tax-
7 related benefit for that owner. However, we heard from several stakeholders
8 (including a Wind stakeholder) that it is not always possible for sponsor equity
9 investors to elect to receive the full 100% bonus depreciation, and projects thus
10 choose to utilize the Modified Accelerated Cost Recovery System (MACRS)
11 schedule. Further, stakeholders pointed out that 100% bonus depreciation may only
12 be claimed on a project owner's federal tax return, and cannot also be claimed on
13 Rhode Island returns.

14 To develop the final proposed ceiling price, we chose to assume that some project
15 owners have enough tax liability to elect to receive the full value of bonus
16 depreciation, while others cannot, and instead utilize the average of the resulting
17 ceiling prices for:

- 18 • A proxy project that can claim 100% bonus depreciation at the federal level
19 (but utilizes MACRS on their Rhode Island taxes); and
- 20 • A proxy project that depreciates its assets according to the MACRS schedule
21 for both its federal and state taxes.

22 We took this approach because we understand that not all projects will be able to
23 claim 100% bonus depreciation, but we also recognize that some projects will be

1 structured such that the sponsor equity is able to utilize the value of 100% bonus
2 depreciation. Thus, we believe that this approach balances fairness to project
3 developers while limiting the increase in the proposed 2020 ceiling price for Wind.

4 **Q. Did SEA confirm its interpretation of how these benefits can be applied to Wind**
5 **projects with appropriate tax authorities?**

6 A. Yes. Our team, working through OER, requested clarification from the Rhode Island
7 Department of Revenue (DOR) on the allowable depreciation schedules for Rhode
8 Island income tax purposes. DOR was able to confirm to OER in writing that R.I.
9 Gen. Laws § 44-61-1 prohibits project owners from applying any amount of Federal
10 bonus depreciation to their Rhode Island income taxes, but that those projects may
11 use any other depreciation schedule allowed under federal statute. Therefore, we
12 assume a project may use the 5-year MACRS schedule on its Rhode Island taxes,
13 regardless of whether it claims 100% bonus depreciation on its Federal taxes.
14 Therefore, SEA adjusted the CREST model used to calculate the 2020 ceiling prices
15 to depreciate assets on a 5-year MACRS basis for state income tax purposes,
16 including when the project opts to claim 100% bonus depreciation at the federal level.
17 In addition, to confirm our understanding of the treatment of the federal MACRS and
18 bonus depreciation provisions, we consulted relevant IRS publications regarding
19 appropriate ways to depreciate property.

20 **Q. Please describe the most impactful drivers of changes in the proposed Ceiling**
21 **Prices for the Anaerobic Digestion (AD) and Small Scale Hydropower (Hydro)**
22 **categories.**

23 A. Given the limited bidding activity in these categories, we did not adjust any cost

1 inputs for AD and Hydro projects. However, we did increase the target after-tax
2 equity IRR to match the one assumed for Wind projects. While we initially increased
3 the assumed interest on term debt by 50 basis points in the first draft of the 2020
4 proposed ceiling prices to reflect a rising interest rate environment, we ultimately
5 returned interest rates back to the 2019 assumed inputs (7.0%) to reflect the magnitude
6 of both recent and expected future cuts in the Federal Funds rate.

7 **Q. How does compensation in the RI REG program differ relative to the Solar**
8 **Massachusetts Renewable Target (MA SMART) Program?**

9 A. The highly variegated incentives offered under the MA SMART program, as well as
10 MA DOER's decision to offer the MA SMART incentives on the basis of projects'
11 Alternating Current (AC) nameplate capacity (rather than Direct Current (DC), a
12 choice discussed further in sections of my testimony below) renders a precise
13 comparison of volumetric compensation between the two programs very difficult.
14 However, I believe it is reasonable to consider the expected returns to investors in
15 projects in both programs to be comparable for three reasons:

- 16 1. Upfront capital costs tend to be very similar in both states;
- 17 2. (Related to #1) Demand for available capacity in both programs has been
18 robust during the past year, which suggests that both programs offer
19 incentives that match the cost profiles of projects in their states; and
- 20 3. Both programs are intended to represent a fixed-price, bundled purchase
21 of energy, capacity and renewable energy certificates (RECs) from project
22 owners. In our experience, this means that they represent a nearly identical
23 risk profile for debt and equity investors, and thus allow financiers to offer

1 nearly identical financing terms in both states.

2 **Q. Did SEA assist the MA Department of Energy Resources (MA DOER) in its**
3 **development of incentive levels in the MA SMART program?**

4 A. In 2016, MA DOER hired SEA for assistance in developing incentive levels for a
5 successor program to the Solar Carve Out II (SREC II) program. The product of our
6 analysis was the report entitled *Developing a Post-1,600 MW Solar Incentive*
7 *Program*², which outlined the revenue requirements on a \$/MWh basis for a variety
8 of different types of solar projects. Ultimately, MA DOER settled on a two-part
9 incentive approach for eligible and qualified projects that included:

- 10 • Base Compensation Rates (BCRs, which are based strictly on a qualified
11 project’s nameplate capacity); and
- 12 • A variety of Compensation Rate Adders based on a project’s offtaker, its
13 location, or its owners’ choice to install an energy storage system (referred to
14 throughout this testimony as “adders”).

15 MA DOER ultimately calculated the BCRs and adders internally by subtracting our
16 estimate of the levelized revenue requirements for greenfield ground-mounted
17 projects one megawatt and larger from our levelized revenue requirement estimates
18 for various distributed solar projects.

19 **Q. Was the methodology that SEA employed for *Developing a Post-1,600 MW Solar***
20 ***Incentive Program* similar to the methodology utilized for developing the 2020**
21 **proposed REG Ceiling Prices?**

² SEA’s report for MA DOER can be found at: <https://www.mass.gov/files/documents/2016/10/nf/developing-a-post-1600-mw-solar-incentive-program.pdf>

1 A. Yes, it was very similar. While we utilized a variety of assumed inputs for project
2 cost and financing risk (which were mainly a function of the difference in program
3 designs being considered by MA DOER), both analyses utilized data provided by
4 stakeholders and other forms of Northeast-specific public and confidentially-shared
5 market intelligence to populate the CREST model and estimate levelized required
6 revenue on a \$/MWh basis for certain proxy project types.

7 **Q. Did MA DOER calculate the MA SMART Canopy adder using analysis**
8 **originally undertaken by SEA?**

9 A. Yes, it did. I have attached excerpts from a publicly-circulated spreadsheet containing
10 DOER's calculations of the MA SMART Canopy adder, as well as our calculations
11 on which the adder value was based, as **JK Schedule 8 – MA DOER Derivation of**
12 **Original MA SMART Program Solar Canopy Adder (Based on 2016 SEA Cost**
13 **Analysis)** (Page 80). Tariffs to implement this incentive design that were filed by
14 Massachusetts' electric distribution companies (EDCs, including Massachusetts
15 Electric Company, d/b/a National Grid) were approved by the MA Department of
16 Public Utilities (DPU) on September 26, 2018, prior to the opening of the program on
17 November 26, 2018.

18 **Q. Since the opening of the program, has the MA SMART Canopy adder spurred**
19 **Canopy development in Massachusetts?**

20 A. Yes, it has. As of October 9, 2019, MA DOER has issued Statements of Qualification
21 to 36.1 MW_{AC} of capacity seeking the Carport adder, while an additional 2.4 MW_{AC}
22 are still undergoing qualification review.³ It is unclear from the "SMART

³ Up-to-date estimates of MA SMART Canopy capacity issued a Statement of Qualification or submitting an

1 Applications List” (most recently published August 19, 2019) if any of the projects
2 have reached commercial operation.⁴

3 **Q. Do you agree with the DG Board’s recommendation that Carport projects in the**
4 **REG program receive the \$0.06/kWh Canopy adder value currently available in**
5 **Massachusetts?**

6 A. Yes. Given that OER aims to mitigate the risk that local siting disputes could
7 undermine the effectiveness of the REG program and encourage solar siting on
8 disturbed parcels, I believe that a specific, performance-based adder for Carports
9 offers an appropriate means for signaling this shift in preference to the Rhode Island
10 solar market.

11 **Q. Do you believe \$0.06/kWh an appropriate Carport incentive level for Rhode**
12 **Island?**

13 A. Yes. Given the material impetus the Canopy adder has given to development of
14 carport projects in Massachusetts, as well as our finding that Massachusetts and
15 Rhode Island compensate distributed solar projects at similar levels leads me to
16 believe that making an adder at that value available to Commercial and Large Solar
17 projects would likely spur development in Rhode Island.

18 **Q. Does it concern you that the Canopy adder in the MA SMART program is based**
19 **on production from solar projects at nameplate capacity values denominated in**
20 **AC, rather than Direct Current (DC), the measurement approach for eligible**

application for a Statement of Qualification that is under review can be found at [masmartsolar.com](https://www.masmartsolar.com).

⁴ The Application Report can be found on MA DOER’s SMART program page at: <https://www.mass.gov/info-details/solar-massachusetts-renewable-target-smart-program>

1 **capacity in the REG program?**

2 A. No, it does not. When an incentive is denominated in AC (as it is in the MA SMART
3 program), SEA has found (based on information shared on a confidential basis by
4 solar developers) that it is typical for developers to size their solar array (which
5 produces direct current (DC) electricity) to be larger than the maximum AC output of
6 the inverter. Developers choose to oversize the array relative to the project’s inverter
7 because even though it results in some amount of “clipping” loss (because the DC
8 array’s maximum capacity is over-sized relative to the AC inverter’s maximum
9 capacity) over-sizing the array relative to the inverter can substantially increase
10 production in AC terms, and allow a developer to build to a more significant system
11 scale in DC terms (thereby lowering the \$/kW upfront project cost). This makes
12 comparing BCRs in SMART to REG Ceiling Price and/or bid values more difficult
13 for projects greater than 25 kW, because the typical production and upfront capital
14 cost values can be substantially different than those assumed for the REG program.
15 Regardless, it is possible to discern (based on typical DC-AC ratios of 1.3-1.5 and
16 sometimes above) that on an AC basis, the SMART Canopy adder, when given on an
17 AC basis, has a greater “effective” value than \$0.06/kWh, because the developer can
18 count on more production to pay off lower upfront capital costs.
19 Despite MA DOER’s choice to denominate MA SMART incentives based on the
20 project’s AC nameplate capacity, our initial calculations for Canopy project revenue
21 requirements for *Developing a Post-1,600 MW Incentive Program* were undertaken
22 with the assumption that the program would have its capacity denominated in DC
23 with DC capacity factors. Since the REG program is denominated in the same manner

1 (and the indication from solar industry stakeholders that the incremental costs
2 associated with a Carport system have not changed dramatically in the intervening
3 time) we are confident that this initial value is likely to closely approximate the
4 incremental cost of a Carport. In addition, no solar industry stakeholder has indicated
5 disagreement with the proposed \$0.06/kWh value proposed.

6 **Q. Do you believe that OER and the Board’s approach of launching a carport adder**
7 **as part of the 2020 REG program effectively on a “pilot” basis to evaluate the**
8 **possible results (applications filed) and collect RI-specific solar carport project**
9 **data will be helpful in continuing or proposing modifications for future REG**
10 **program years for the PUC to consider with future filings?**

11 A. Yes. If project developers submit successful bids for Commercial or Large Solar
12 capacity during the 2020 Program Year that receive the proposed Carport adder, such
13 bids (along with the expected installed cost of the system) should provide valuable
14 data for benchmarking future Carport adder values. However, if no bids are successful
15 (or no bids are received), this information will also be valuable for determining if a
16 Carport adder should be proposed for the 2021 Program Year as well.

17 **Q. Have solar projects mounted on carports been developed under the REG**
18 **program without a specific adder or incentive projects mounted on a Carport?**

19 A. Yes, some projects have qualified under the REG program through bidding into
20 regular Open Enrollments, including a Medium Solar project in the Second Open
21 Enrollment of the 2019 Program Year. However, these projects are relatively few and
22 far between, and the penetration of carport-mounted projects in Rhode Island has been
23 limited. This suggests to us a clearer market signal is likely to reliably increase

1 carport penetration levels in Rhode Island and provide developers a viable alternative
2 to siting Commercial and Large Solar projects on greenfield parcels.

3 **Q. Have you undertaken an evaluation of proposed Carport adder that utilizes the**
4 **Benefit-Cost Framework developed by the PUC in Docket 4600?**

5 A. Yes, I have.

6 **Q. Do you support the analysis and observations filed in JK Schedule 6 –**
7 **Memorandum Offering Qualitative Analysis of Docket 4600 Benefits and Costs**
8 **of Proposed Solar Carport Adder (Pages 71-76)?**

9 A. Yes. While the budget for SEA’s support to OER and the DG Board for the 2020
10 Ceiling Price development process did not envisage a quantitative analysis of benefits
11 and costs as specified in the Framework, we have furnished a memorandum that
12 qualitatively outlines the potential benefits and costs of adopting the Carport adder as
13 **JK Schedule 6 – Memorandum Offering Qualitative Analysis of Docket 4600**
14 **Benefits and Costs of Proposed Solar Carport Adder** (Pages 71-76). Also, please
15 see **JK Schedule 7 – SEA Analysis of Carport Adder Given Docket 4600 Broad**
16 **Goals** (Pages 77-79), in which we furnish SEA’s analysis of the Carport adder in
17 terms of the PUC’s broader goals emerging from Docket 4600.

18 **Q. Outside of designing a specific renewable class and ceiling price for solar carport**
19 **projects (as was proposed in the 2019 REG program filing) or the proposed**
20 **carport adder for the 2020 REG program, is SEA aware of any other potential**
21 **REG program design options for enhancing Carport project development?**

22 A. It is possible (as I noted in my testimony filed in Docket 4892) to calculate a Ceiling
23 Price for the Commercial and Large Solar categories that assumes the proxy

1 Commercial and Large Solar project is a Carport project. However, such a step would
2 largely eliminate the benefits to ratepayers associated with competition obtained
3 through regular REG procurements for Commercial and Large Solar projects that do
4 not mount their proposed projects on Carports. Setting a price for Commercial and
5 Large based on a carport-mounted proxy project would also limit future price declines
6 associated with such competition. Thus, OER and the Board concluded that providing
7 incremental revenue to Carports through an adder is more likely to appropriately
8 balance development with limiting ratepayer costs.

9 **Q. Does SEA believe that the importance of both policy objectives and cost-**
10 **effectiveness were considered in its analysis and recommendations?**

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

13 **Q. Does SEA believe that the recommended 2020 REG ceiling prices, ceiling price**
14 **categories and allocation plan approved by the DG Board on September 23, 2019**
15 **and recommended to the Commission are reasonable, reflect a diverse mix of**
16 **distributed renewable energy projects that will result in tangible benefits for the**
17 **State of Rhode Island and its ratepayers, and meet the renewable program's**
18 **goals and objectives?**

19 A. Yes.

20 **Q. Does SEA believe that the ceiling price development process used for the 2020**
21 **REG program was consistent with all prior years in which the PUC has**
22 **approved the Ceiling Prices?**

23 A. Yes.

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

2 **A. Yes.**

JK Schedule 1 – Data Request and Survey Responses

JK Schedule 1 – Data Request and Survey Responses		
Technology	Total Stakeholder Responses Submitted by Category	
	1 st Round ⁵	2 nd Round ⁶
Solar	28	11
Wind	0	1
Anaerobic Digestion	0	0
Small Scale Hydropower	2	0

⁵ Ahead of July 19, 2019 Presentation. In addition, we note that the July 19 presentation included a reference to three “Non-Solar” survey respondents. Upon examination of those survey responses, it appears that a Solar stakeholder mis-identified themselves as developing Non-Solar projects.

⁶ Ahead of August 28, 2019 Presentation

JK Schedule 2 – Ceiling Price Verification

Ceiling Price Verification		
Category	Tariff Term (Years)	Ceiling Price (¢/kWh)
Small Solar I	15	29.65
Small Solar II	20	23.45
Medium Solar	20	21.15
Commercial Solar	20	18.25
Large Solar	20	13.65
Wind	20	21.40
Anaerobic Digestion	20	21.15
Small Scale Hydropower	20	27.05

Ceiling Price Verification		
Category	Tariff Term (Years)	Ceiling Price (¢/kWh)
Community Remote – Commercial Solar	20	20.99
Community Remote – Large Solar	20	15.70
Community Remote – Wind	20	23.85

JK Schedule 3 – Ceiling Price Change from 2019

Ceiling Price Change from 2019		
Category	Tariff Term (Years)	% Change (2019-2020)
Small Solar I	15	4%
Small Solar II	20	-15%
Medium Solar	20	-10%
Commercial Solar	20	2%
Large Solar	20	-10%
Wind	20	11%
Anaerobic Digestion	20	3%
Small Scale Hydropower	20	-0.4%

Ceiling Price Change from 2019		
Category	Tariff Term (Years)	% Change (2019-2020)
Community Remote – Commercial Solar	20	2%
Community Remote – Large Solar	20	-10%
Community Remote – Wind	20	10%

JK Schedule 4 – Installation Costs

Installation Costs			
Category	2019 Approved	2020 Proposed	% Change
Medium Solar	\$2,678	\$2,360	-12%
Commercial Solar	\$2,093	\$1,988	-5%
Large Solar	\$1,876	\$1,602	-15%

JK Schedule 5 – Comparison of Proposed Prices to 2019 Prices With Reduction in ITC Percentage

Comparison of Proposed Prices to 2019 Prices With Reduction in ITC Percentage				
Category	Tariff Term (Years)	% Change in 2019 Prices (Assuming ITC Step-Down)	Proposed 2019-2020 % Change	% Change Net of ITC Step-Down
Small Solar I	15	4%	4%	0%
Small Solar II	20	5%	-15%	-20%
Medium Solar	20	5%	-10%	-15%
Commercial Solar	20	4%	2%	-2%
Large Solar	20	4%	-10%	-14%

Comparison of Proposed Prices to 2019 Prices With Reduction in ITC Percentage				
Category	Tariff Term (Years)	% Change in 2019 Prices (Assuming ITC Step-Down)	Proposed 2019-2020 % Change	% Change Net of ITC Step-Down
Community Remote – Commercial Solar	20	4%	2%	-2%
Community Remote – Large Solar	20	4%	-10%	-14%

**JK Schedule 6 – Memorandum Offering Qualitative Analysis of Docket 4600 Benefits and
Costs of Proposed Solar Carport Adder**



Sustainable Energy Advantage, LLC

161 Worcester Rd, Suite 503, Framingham, MA 01701 • 508.665.5850 • www.seadvantage.com

Memorandum

To: Rhode Island Public Utilities Commission

From: Jim Kennerly, Sustainable Energy Advantage, LLC

Date: October 21, 2019

Re: Qualitative Analysis of Docket 4600 Benefits and Costs of Proposed Solar Carport Adder (Docket 4983)

Background and Purpose

On July 31, 2017, the Rhode Island Public Utilities Commission (PUC) issued [PUC Report and Order No. 22581](#). With the Report and Order, the PUC adopted a [Stakeholder Report](#) and attached Benefit-Cost Framework. The Framework was intended to provide guidelines for analysis of (as written verbatim in the Stakeholder Report):

- Costs and benefits that can be evaluated across any and all programs or policies;
- The level at which and where physically on the system these costs and benefits can be quantified;
- How to best measure such costs and benefits; and
- The visibility required to measure such costs and benefits.¹

At several points, the Report and Order, as well as the Stakeholder Report, suggest that the purpose of the benefit-cost Framework (as well as the Docket 4600 process as a whole) is to add enhanced quantitative detail to the various costs and benefits of different proposals before the PUC whenever possible.

On September 23, 2019, the Rhode Island Distributed Generation Contracts Board (DG Board) approved the proposed Ceiling Prices for the 2020 Renewable Energy Growth (REG) program for filing at the PUC. A portion of the proposed Ceiling Prices (as well as a package of program definitions, rules and other guidelines for participation) pertained to a specific Carport adder open to projects eligible for the Commercial Solar (251-999 kW) and Large Solar (1-5 MW) capacity allocations.² To support this proposal, Sustainable Energy Advantage, LLC has been requested by both the Narragansett Electric Company (d/b/a National Grid) and the Office of Energy Resources (OER) to provide a qualitative assessment of the benefits and costs of the proposed Carport Adder. The purpose of this memorandum is to outline the potential areas of benefit and cost associated with the proposed Carport adder relative to ground-mounted and/or

¹ See p. 6 of the [Stakeholder Report](#).

² For purposes of efficiency, please refer to the Solar Carport Adder section of the DG Board's Recommendations for a summary of the Solar Carport adder proposal. While the scope of SEA's services for the Office of Energy Resources have been, to date, limited to stakeholder engagement, research, quantitative analysis and justification of an upcoming Program Year's proposed Ceiling Prices, neither our agreements with OER nor our budgets for said services called for a full quantitative benefit-cost assessment. After consulting with OER and National Grid, SEA concluded that the best means to assess potential Carport adder benefits and costs with the resources available would be from a qualitative perspective.

building-mounted solar installations³ at the Power System, Customer, and Societal levels outlined in the Benefit-Cost Framework. We also describe the potential limitations on these benefits and costs, and furnish our reasoning behind a recommendation for the approval of the adder.

Power System-Level Impacts

Likely Benefits (or Avoided Costs) to Power System: While no 2020 Program Year projects have yet submitted bids or requests for qualification, we believe that it is reasonable to assume that non-Carport distributed solar projects sited relatively distant from load (such as non-Carport Large Solar, and some Commercial Solar), or in more solar saturated portions of National Grid’s distribution system⁴ have higher distribution system upgrade costs to interconnect the system than those closer to load (or those in more saturated areas of the grid).⁵ Thus, it is also reasonable to assume that Carport projects in areas closer to load or in less saturated areas will likely require less distribution system upgrade cost to interconnect.

Costs at the Power System Level: Relative to non-Carport projects, we believe that Carport projects are unlikely to incur incremental costs on the power system, given that under the REG program, they are not expected to operate in a way that is different to other non-Carport building- or ground-mounted projects sited close to load.

Scale/Limitations of Benefits and Costs: The scale of the benefits and costs described above would be in direct proportion to the level of uptake of the adder amongst the Commercial and Large Solar bidders in the 2020 Open Enrollments. However, the benefits are likely to be greater (and costs are likely to be lower) for Carport projects that displace development of Commercial or Large Solar projects on greenfield parcels (rather than those mounted on existing buildings or other structures), as well as those in more saturated areas of Rhode Island’s grid.

Customer-Level Impacts

Likely Benefits (or Avoided Costs) to Customers: As proposed by National Grid⁶, Solar projects seeking the Carport adder would be required to submit a competitive bid (at or below the Ceiling Price) into the Commercial or Large Solar categories during an Open Enrollment, before separately requesting the Carport adder for the portion of its capacity qualifying under the definition of a Carport. As discussed in the Power System Level benefits section above, Carport systems are likely to have lower costs of interconnection, particularly if those systems are sited close to load. Since the cost of interconnection is assumed to be borne by developers (and thus ultimately borne by ratepayers via REG cost recovery

³ “Greenfield parcel(s)” are informally defined herein as parcels that have never been subject to industrial development or “disturbed” in any material way by industrial development. This definition would exclude landfills, brownfields, and any disturbed surfaces over which a Solar Carport, by definition, must cover.

⁴ See National Grid’s Rhode Island System Data Portal, available at:
<https://ngrid.apps.esri.com/NGSysDataPortal/RI/index.html>

⁵ This interpretation has been discussed and confirmed with National Grid. However, we note that these costs, even though they are related to the power system, would not flow through to ratepayers via the ISR factor (since the costs of the upgrades are borne directly by project developers), but instead through the REG factor, since these costs are ultimately factored into REG tariff compensation.

⁶ This analysis is based on information provided by National Grid to SEA. National Grid’s formal proposal will be filed with the Commission through its proposed changes to the REG Program tariffs and rules.

provisions), incenting more capacity with lower interconnection costs to bid into the Commercial Solar and Large Solar categories by adopting the Carport adder would (all other factors being equal) likely result in incrementally lower future Ceiling Prices influenced by bids in those categories, and thereby directly benefit non-participating ratepayers.⁷

On a more indirect basis (and relative to all non-Carport Solar projects), Carport adder-eligible systems could also provide, as referred to in the Framework, incremental benefits related to enhanced "consumer empowerment and choice." For example, the installation of a Carport structure could (as is the case with the Division of Public Utilities and Carriers' own carport project) offer potential future opportunities for installing electric vehicle supply equipment (EVSE). These options, if adopted, could incent greater uptake of distributed energy resources through the electrification of the transportation system. Furthermore, installing EVSE would also have incremental financial benefits to users of the EVSE (as well as direct societal benefits, as described in the Societal-Level Impacts section of this memorandum), particularly associated with utilizing less gasoline (and thus reducing the need for exploration for, and production of, crude oil).

Customer-Level Added Costs: National Grid's customers (and in particular, non-participating ratepayers) would bear the cost of the \$0.06/kWh adder, since that amount would be passed entirely on to ratepayers via its REG Program Cost Recovery Provision. The impact of this provision would depend on the level of uptake of the adder amongst the Commercial and Large Solar bidders in the 2020 Open Enrollments.

Scale/Limitations of Benefits and Costs: The scale of the benefits and costs described above would be in direct proportion to the level of uptake of the adder amongst the Commercial and Large Solar bidders in the 2020 Open Enrollments. However, the Ceiling Price related benefits for both Carport and non-Carport Commercial and Large Solar projects are likely to be more significant if Carport projects displace development of projects with higher assumed interconnection costs (i.e., projects further from load or in more saturated areas of the grid).

Societal-Level Impacts

Likely Direct and Indirect Societal Benefits: We believe the Carport adder is likely to add the following direct and indirect societal benefits relative to the development and deployment of other forms of distributed solar PV:

- *Direct Value Category #1: Preservation of Carbon Sink Value:* Depending on how they are anchored in the soil, projects mounted on greenfield parcels can disrupt the carbon absorption capacity of forests, open space and farmland alike. Thus, projects mounted on Carports (which, by definition, must be elevated relative to a disturbed surface) do not incrementally disrupt the carbon absorption capacity of the parcel (given that the surface has already been disturbed by the construction of a parking lot). However, we would note the lack of an incremental benefit if Carports displace projects that would have already been sited on a disturbed parcel (e.g. on a building, a gravel pit, a brownfield, etc.).

⁷ We note that, as with the other categories of potential benefit, that we are not stating that this individual benefit alone, or in combination with the other benefits, necessarily outweighs the cost of the Carport adder – a conclusion that can only be substantiated with quantitative analysis.

- *Direct Value Category #2: Non-Carbon Value of Open Space:* The preservation of open space can also provide (as discussed in the Framework) conservation and community benefits not specifically related to the greenhouse gas absorption potential of the parcel. The benefits of open space that overlap with avoidance of siting solar on greenfield parcels may include (as described in the Framework) “loss of sink, habitat, historical value, (and) sense of place.” However, we note that these benefits are likely to be site-specific and would be difficult to estimate with substantial precision without knowing the location of projects expected to be incented during the 2020 Program Year.
- *Direct Value Category #3: Potential Avoided Environmental Damage Associated with Gasoline Use for Transportation:* The final category of direct value concerns avoided environmental damage associated with the use of internal combustion engine (ICE) vehicles, which can be realized through use of EVSE (as described in the Customer-Level Impacts section above).⁸
- *Indirect Value Category #1: Meeting State Renewable Energy Objectives:* As described in R.I.G.L. § 39-26.6-1, the stated purpose of the REG program is to “facilitate and promote installation of grid-connected generation of renewable-energy”, which is necessary to meet Rhode Island’s Renewable Electricity Standard (R.I.G.L. § 39-26-4) requirements of 38.5% by 2035. These policies were enacted by the General Assembly with the specific intent to aid in the reduction in greenhouse gas emissions, a form of direct societal benefit. Thus, adoption of a Carport adder would provide an avenue for a higher portion of REG-eligible megawatts to reach commercial operation, even if opposition to siting Solar projects on greenfield parcels continues to mount. Conversely, it is possible that the failure to adopt the adder could allow fewer renewable energy projects to reach commercial operation overall, particularly if more areas of the state become functionally unavailable for the development of renewable energy due to the adoption of strict municipal siting rules. Thus, it is possible to imagine a scenario in which enough REG attrition takes place to pose challenges to reaching Rhode Island's stated goals associated with developing renewable energy markets and with carbon reduction.

Societal-Level Added Costs: Beyond the potential for environmental impacts associated with manufacturing the steel and aluminum structures upon which the modules in a Carport installation are mounted, we are unaware of specific potential categories of societal cost associated with the deployment of more Solar Carports, relative to the deployment of similarly-situated building- or ground-mounted Solar projects. However, we are also unaware if solar carport structures are manufactured in Rhode Island, or if their manufacture can be clearly traced to added greenhouse gas or criteria air pollution.

Scale/Limitations of Benefits and Costs: The direct benefits in this category are limited to Carport adder-eligible Commercial and Large Solar projects that displace the development of Commercial and Large Solar projects on greenfield parcels, since projects mounted on new or existing buildings would, by definition, avoid the direct land use impacts of projects sited on greenfield parcels.

Discussion and Analysis

⁸ These specific potential benefits would be strictly limited to projects that also choose to install EVSE, which the Carport adder is not calibrated to include the cost of.

Relative to the Benefit-Cost Framework, in its Report and Order linked above, the PUC found that:

(T)he (Benefit-Cost) Framework should be relied upon, but...it should not be the exclusive measure of whether a specific proposal should be approved. For example, there may be outside factors that need to be considered by the PUC regardless of whether a specific proposal is determined to be cost-effective or not.

In addition, PUC found that:

(I)f persuasive evidence is presented where a proposal that does not pass the screening is nonetheless found to be beneficial to the system **and/or furthers state energy goals** (*emphasis added*), it (*the proposal*) may be approved.

While the Carport proposal does cause ratepayers to incur added direct costs, our analysis of the Carport adder proposal suggests that the PUC could reasonably conclude that there are several categories of potential direct and indirect benefits at the Customer, Power System and Societal levels described in the Benefit-Cost Framework. While these benefits have not been quantified herein, many can be quantified with the proper resources to conduct said analysis (as well as with more locational distribution system data from National Grid).

In addition, without more options for siting on disturbed parcels, we conclude that the PUC could reasonably envision a scenario in which siting challenges for potential future REG-eligible projects could continue to mount, limiting the program's capacity to reach REG program targets (and thus Renewable Energy Standard targets). Thus, we also believe that the PUC could reasonably conclude that approval of the proposed Carport adder could help mitigate the risks posed to the State's goals by renewable energy siting challenges and concerns.

JK Schedule 7 – SEA Analysis of Carport Adder Given Docket 4600 Broad Goals

SEA Analysis of Carport Adder Given Docket 4600 Broad Goals		
Docket 4600 Goals	Directional Impact (+, -, Neutral, N/A)	Potential Impact
Provide reliable, safe, clean and affordable energy to Rhode Island customers over the long term.	Positive Impact	The REG program is a central tool in Rhode Island’s efforts to incentivize distributed renewable energy and help decarbonize the local grid at the lowest reasonable cost to ratepayers, pursuant to Rhode Island General Laws. By reducing the amount of Commercial and Large Solar capacity that might be subject to local siting challenges, the Carport adder is likely to increase the number of projects under the REG program that reach commercial operation and advance the statutory goals of the program).
Strengthen the RI economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures	Positive Impact	By increasing the diversity in types of projects that can increase the number of qualified renewable energy projects likely to reach commercial operation under the REG program, the Carport adder is likely to either maintain (or allow for expansion of) employment and economic benefits associated with the distributed renewable energy industry. In addition, solar carport projects create new opportunities to extract economic value from brownfield sites.
Address the challenge of climate change and other forms of pollution	Positive Impact	Since Carport projects can only be sited above parcels that have already been disturbed, approving the Carport adder is likely to improve the GHG-related benefits of the REG program by displacing some amount of development on greenfield parcels (including forested land, prime farmland, etc.) that would otherwise provide value as a net GHG sink.
Prioritize and facilitate increasing customer investment	Not Applicable	The Renewable Energy Growth Act encourages competition between various types of distributed renewable energy projects to arrive at the lowest

SEA Analysis of Carport Adder Given Docket 4600 Broad Goals		
Docket 4600 Goals	Directional Impact (+, -, Neutral, N/A)	Potential Impact
in their facilities where that investment provides recognizable net benefits		reasonable cost for resource-specific REG tariff compensation. In this instance, the Carport adder will create new opportunities for participating customers to invest in their facilities and extract new benefits from brownfield sites – particularly when other existing infrastructure (e.g. unsuitable roof for solar PV; small parcels that prevent ground-mounted projects) creates barriers to capturing the economic, environmental, and energy benefits of renewable distributed generation. These benefits include, but are not limited to, new revenue from fallow parcels; reduction of carbon footprints when other types of renewables are unsuitable for existing infrastructure; and optimization of clean energy investments, e.g. projects paired with EVSE equipment.
Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society	Positive Impact	Overall, SEA’s qualitative assessment of the Carport adder is that a full quantitative analysis of the benefits to the electricity system, customers and society would likely show the benefits as comparable to, or outweigh, the costs to customers and/or the power system.
Appropriately charge customers for the cost they impose on the grid	Positive Impact	Since Carport projects are typically sited closer to load, the Carport adder is likely to incentivize more projects that require fewer system upgrades, resulting in lower interconnection costs, and thereby resulting in lower costs to ratepayers through the REG factor.
Appropriately compensate the distribution utility for the services it provides	Neutral	The REG factor provides for the recovery from distribution customers of reasonable costs incurred by the electric distribution company in furtherance of statutory purposes, but does not specify any additional financial remuneration for

SEA Analysis of Carport Adder Given Docket 4600 Broad Goals		
Docket 4600 Goals	Directional Impact (+, -, Neutral, N/A)	Potential Impact
		the utility.
Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentives	Positive Impact	The design of the REG program is already largely optimized to enhance competition and encourage development of distributed renewable energy resources. However, requiring potential Commercial and Large Solar projects looking to receive the adder to bid as a typical Commercial or Large project prior to seeking the adder preserves this balance of benefits for project developers and ratepayers.

JK Schedule 8 – MA DOER Derivation of Original MA SMART Program Solar Canopy Adder (Based on 2016 SEA Cost Analysis)

MA DOER Derivation of Original MA SMART Program Solar Canopy Adder (Based on 2016 SEA Cost Analysis)

Source for Project LCOEs: Developing a Post-1,600 MW Solar Program: Evaluating Needed Incentive Levels and Potential Policy Alternatives

NOTE #1: The forecasted levelized cost estimates below were developed in 2016 by Sustainable Energy Advantage (SEA) as part of its support to the Massachusetts Department of Energy Resources (DOER) in developing a successor to the SREC I and SREC II programs, which ultimately became the Solar Massachusetts Renewable Target (SMART) Program. However, the calculation of the difference between a 1 MW Large-Scale Greenfield and 1 MW Solar Canopy was undertaken by DOER staff. Staff established the value of the adder as the higher of the Third-Party Owned and Host-Owned values, and rounded up to \$60/MWh (\$0.06/kWh).

NOTE #2: All estimates represent expected revenue requirements (\$/MWh) under a policy design (ultimately selected by DOER) that include the risk profile of a bundled purchase of energy, capacity and RECs (the ultimate design of the SMART program). The perceived risk profile of SMART is highly similar in this regard to the risk profile of the REG program. Finally, all "Not Executed" entries were not modeled.

Medium Cost Large-Scale Greenfield (1 MW) (Hybrid Competitive Bid/Standard Offer & Declining Block Incentive Policy Types, 20-year, Host-Owned, Cost Basis, \$/MWh)

Installed Capital Cost Trajectory	2017	2018	2019	2020	2021	2022
Base	\$ 145	\$ 133	\$ 122	\$ 121	\$ 115	\$ 112

Medium Cost Large-Scale Greenfield (1 MW) (Hybrid Competitive Bid/Standard Offer & Declining Block Incentive Policy Types, 20-year, Third Party-Owned, Fair Market Value, \$/MWh)

Installed Capital Cost Trajectory	2017	2018	2019	2020	2021	2022
Base	\$ 131	\$ 119	\$ 107	\$ 102	\$ 95	\$ 102

Solar Canopies (1 MW) (Hybrid Competitive Bid/Standard Offer & Declining Block Incentive Policy Types, 20-Year, Host-Owned, Cost Basis, \$/MWh)

Installed Capital Cost Trajectory	2017	2018	2019	2020	2021	2022
Base	\$ 204	\$ 189	\$ 173	\$ 175	\$ 169	\$ 167

Solar Canopies (1 MW) (Hybrid CB/SO & DBI, 20-Year, Third Party-Owned, Fair Market Value, \$/MWh)

Installed Capital Cost Trajectory	2017	2018	2019	2020	2021	2022
Base	\$ 184	\$ 168	\$ 152	\$ 147	\$ 139	\$ 150

Solar Canopies \$/MWh Premium Over Large-Scale Greenfield (2017 Base Case, Host Owned)	\$ 59
Solar Canopies \$/MWh Premium Large-Scale Greenfield (2017 Base Case, Third-Party Owned)	\$ 53