

Technical Meeting: Update Regarding 2020 REG Carport Solar Adder Pilot Analysis

Sustainable Energy Advantage, LLC
Mondre Energy, Inc.

Presented to the Rhode Island Public Utilities Commission on August 13, 2020
RIPUC Docket 4604

Outline of Presentation

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Initial Carport (and Non-Carport Baseline) Research



PUC Directives

- On February 18, 2020, the PUC approved a Carport Solar adder for up to 6 MWDC of Commercial and Large Solar capacity for 2020
 - PUC further ordered the reporting of certain "lessons learned" by OER and the DG Board.
- On June 2, 2020, the PUC further ordered Sustainable Energy Advantage, LLC (SEA, consultants to OER and the Board) to determine:
 - The existence of Carport adder-related benefits “worth further analysis”;
 - The differences between “carport installations and other installations” and “use that data and expertise to ascertain if those differences are reflected in the Docket 4600 benefit cost framework”; and
 - If sufficient evidence of benefits (specifically, those “identifiable...to customers”) that would be grounds for proceeding to “a full benefit cost analysis” of the Carport Solar adder pilot.

>25 kW Carport Projects Currently in Interconnection Process

Location	Size (kW _{DC})	IC Application Submission Date	Actual/Presumed Program (NGRID-Designated)	IC Status	REG Submitted/ Selected Project?	Estimated Total IC Cost \$/kW _{DC}
Providence	300*	6/11/2020	REG	Study	No (No Evidence of Submission or Selection)	\$5.83
Warwick	1,020*	9/19/2019	Net Metering	Conditional Approval	No (Enrolled in Net Metering)	\$6.96
Coventry	1,200*	Unknown	REG	Application	No (No Evidence of Submission or Selection)	\$2.08
Cranston	4,800*	Unknown	REG	Application	No (No Evidence of Submission or Selection)	\$0.52
Barrington	1,200*	Unknown	REG	Application	No (No Evidence of Submission or Selection)	\$2.09
Smithfield	123**	7/26/2017	REG	Connected - Final Accounting	Yes (Selected 2018 2 nd Open Enrollment)	\$2.26
East Providence	270**	11/25/2019	REG	Design	Yes (Selected 2020 1 st Open Enrollment)	\$120.75
Cumberland	254**	2/26/2019	REG	Design	Yes (Selected 2020 1 st Open Enrollment)	\$59.05
Providence	250*	2/21/2019	REG	Design-Construction Quote-Awaiting Payment	No (No Evidence of Submission or Selection)	\$141.79
Cumberland	225*	7/25/2018	REG	Withdrawn	No (No Evidence of Submission or Selection)	\$ 204.45

*Represents projects for which National Grid provided capacity in AC, and SEA converted this capacity based on a sample 1.2 DC-AC ratio

**Represents projects for which DC capacities for REG or Net Metering were confirmed

Findings to Date/Analysis Gaps

- Over a dozen questions were asked of stakeholders in the initial Data Request and Survey, all of which specifically pertained to the “learnings” promised to the PUC in the DG Board’s Docket 4983 data request response 1.8(e) and OER’s response 2.3(d)
- However, most questions received only between 1-3 responses (despite the survey as a whole receiving 21 responses from solar industry participants)
- In addition, the survey was not yet circulated to municipal planning staff and officials, which will be a key source for understanding (a step that is intended for a later stage of the process)
- As it stands, additional and more intensive research will be proceeding in coming weeks (as initially planned and discussed with PUC)
 - Timing of this research is guided by the timing of receipt of:
 - Results of 2nd Open Enrollment and
 - Information regarding selected Carport Solar projects

Next Steps to Address Gaps in Initial Analysis

- SEA has engaged its subcontractor Mondre Energy, Inc. to:
 - Develop a new survey to focus on the requested “learnings” discussed in the aforementioned data request responses;
 - Include questions in the new survey intended to tease out information regarding the marginality/additionality of the Carport Adder;
 - Survey a mix of municipal planning stakeholders and solar industry participants (with a focus on Carport developers);
 - Advise on development of the Docket 4600 BCA; and
 - Co-Develop the final program evaluation report.

Analysis of “Identifiable Benefits to Customers”



Initial Approach/Sources (1)

- As it does each year when developing Ceiling Prices, SEA requested (and received) data from National Grid regarding the cost of interconnecting DG projects
- SEA also made a supplementary request to National Grid to show interconnection costs for the most recent three REG Open Enrollments (2nd of 2019, 3rd of 2019 and 1st of 2020), including:
 - The total cost (including study costs, O&M and interconnection construction) of interconnecting such projects; and
 - The siting characteristics of the project (specifically, whether it is ground-mounted, roof-mounted, or mounted on a Carport)

Initial Approach/Sources (2)

- Methodology for Initial Analysis
 - Full Docket 4600 analysis would require comparing and levelizing interconnection costs (on a \$/kWh or \$/MWh basis) for Carport and other projects against the full baseline of other projects selected
 - It is possible to tell whether such analysis will produce a direct and “identifiable” benefit to customers by comparing
 - The direct upfront interconnection costs (in $\$/kW_{DC}$) for Carport/other beneficially-sited projects; and
 - The direct upfront interconnection costs (in $\$/kW_{DC}$) for all other Solar projects, and/or all other Commercial Solar project (depending on the philosophy behind making the comparison)

Initial “Identifiable Benefits to Customers” Analysis

Median, Average and Weighted Average Interconnection Costs and Cost Differences in Three Most Recent REG Solicitations (\$/kW _{DC})				
Project Class (Type)	N	Median	Average	Wtd. Avg.
Commercial-Scale Solar (Carport)	2	\$74.46	\$74.46	\$75.32
All Selected REG Commercial Solar	12	\$81.46	\$226.45	\$301.14
All Selected REG Solar Projects	36	\$76.56	\$181.34	\$185.80
Difference (Carport v. Comm'l)		\$28.08	\$207.70	\$344.89
Difference (REG Selected Carport v. All Selected REG Solar)		\$2.10	\$106.88	\$110.48

Median, Average and Weighted Average Interconnection Costs and Cost Differences in Three Most Recent REG Solicitations PLUS All Carport Solar Projects in Interconnection Process (\$/kW _{DC})				
Project Class (Type)	N	Median	Average	Wtd. Avg.
All Carports Currently in Interconnection Process (Representing Wide Range of Sizes)	11*	\$5.83*	\$46.81*	\$14.25*
All Selected REG Solar Projects	36	\$76.56	\$193.99	\$206.75
Difference (All Carports in IC Process v. All Selected REG Solar)		\$70.73	\$147.18	\$192.50

Source: National Grid interconnection database. NOTE: Some NGRID data includes capacity in AC, which SEA converted to DC utilizing a 1.2 DC/AC ratio. In addition, some costs for projects still in the IC process may change with more information verified (and as additional projects are selected). One observation from NGRID data is a project that was withdrawn.

*Includes projects with still-to-be-verified final interconnection study, application fee, construction and/or O&M costs (which were left blank in the data provided by National Grid. Categories of unverified final costs left blank assumed to be zero for purposes of this analysis.

Quantitative Program Evaluation Plan for 2020 REG Carports Adder Pilot



Docket 4600 Analysis Proposed Methodology - Costs

Docket 4600 "Level"	Docket 4600 Framework Category	Cost or Benefit?	Assessment Approach	Values Utilized	Units	Source	Potential Sensitivities	Output Units
Power System	Utility / Third Party Developer Renewable Energy, Efficiency, or DER costs	Cost	Quantitative	Incremental upfront capital cost of Carport projects (associated with Carport structure, and relative to greenfield projects)	\$/kW _{DC}	Total project cost estimate supplied by developers to National Grid	None (will comprise only upfront capital premia of selected projects)	\$/kWh or \$/MWh of Carport production
Power System	Utility / Third Party Developer Renewable Energy, Efficiency, or DER costs	Cost	Quantitative	Incremental Carport O&M or other operating expenses (relative to a greenfield project)	\$/kW _{DC} -yr	Incremental cost survey research in Task 3 (2021 Public Policy Adder Development)	May include range of O&M or other OpEx estimates (depending on survey response)	\$/kWh or \$/MWh of Carport production
Power System	Utility / Third Party Developer Renewable Energy, Efficiency, or DER costs	Cost	Quantitative	Incremental decrease in lifetime production associated with Carport projects (relative to assumed production from all selected projects)	kWh/MWh	Incremental cost survey research in Task 3 (2021 Public Policy Adder Development)	May include range of Carport Solar production estimates (depending on survey response)	Total kWh/MWh of Carport production



Docket 4600 Analysis Proposed Methodology - Benefits

Docket 4600 "Level"	Docket 4600 Framework Category	Cost or Benefit?	Assessment Approach	Values Utilized	Input Units	Source	Potential Sensitivities	Output Units
Societal	Conservation and community benefits	Benefit	Quantitative	The value of preserving carbon sequestration (as well as preserved ongoing sequestration potential)	<ul style="list-style-type: none"> Metric Tons per Acre Disturbed, \$/Metric Ton (Non-Embedded GHG Emission Cost) 	<ul style="list-style-type: none"> RI DEM Value of Forests Report, other DEM research as needed AESC 2018 	<ul style="list-style-type: none"> Scenarios with varying degrees of forest/other land use offset Multiple point estimates of Social Cost of Carbon 	\$/kWh or \$/MWh of Carport production
Power System	Utility / Third Party Developer Renewable Energy, Efficiency, or DER costs	Benefit	Quantitative	Avoided interconnection costs for Carport projects (which tend to be less expensive, and closer to load). Calculated as difference between IC costs for Carport projects and all other REG selected projects in past year	<ul style="list-style-type: none"> IC costs on a \$/kW_{DC} basis 	<ul style="list-style-type: none"> National Grid IC cost databases 	<ul style="list-style-type: none"> Utilizing different measures of central tendency to measure differences between Carport project IC costs and all other IC costs Utilizing non-REG projects (or projects not yet submitted into REG) 	\$/kWh or \$/MWh of Carport production

Docket 4600 Analysis Proposed Methodology - Benefits

Docket 4600 "Level"	Docket 4600 Framework Category	Cost or Benefit?	Assessment Approach	Values Utilized	Input Units	Source	Potential Sensitivities	Output Units
Societal	Conservation and community benefits	Benefit	Quantitative	Non-carbon value of open space/other "ecosystem services"	Value of historical environmental/conservation easements (as separate from sink value)	Likely DEM research or other environmental economic literature specific to Rhode Island	Unclear at this time	<ul style="list-style-type: none"> (If Quant.) \$/kWh or \$/MWh of Carport production (If Qual.) Thorough discussion of impact (esp. in Rhode Island context)
Customer	Program participant/prosumer benefits/costs	Benefit	May be Qualitative or Quantitative	Benefits to users of Carport structure (e.g. shading/cover for parking)	(If Quant. Or Qual.) Willingness to Pay (WTP) estimates	Literature review of similar estimates (if available), or potentially discussion of perceived benefits directly with host customer	Unclear at this time	<ul style="list-style-type: none"> See above



Timeline for Next Steps

- **Remainder of August/Early September 2020**
 - Outreach to Carport developers and Municipalities
- **September 2020:** Completion of Benefit-Cost Analysis
- **Late September/Early October 2020:** Drafting of Report/Findings
- **Late October 2020:** Completion of Report/Findings
- **November 2020:** Filing of Report/Findings at PUC



Q&A





Sustainable Energy Advantage, LLC
161 Worcester Road, Suite 503
Framingham, MA 01701
<http://www.seadvantage.com>

Contacts:

Jim Kennerly

☎ 508-665-5862

✉ jkennerly@seadvantage.com