



Solarize Tiverton Solar Installer Request for Proposals

November 12, 2014

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Applications will be accepted through December 9, 2014 by 4:00pm EST.



Solarize Pilot Round 1 Installer RFP

1. Opportunity Summary

The Rhode Island Commerce Corporation's Renewable Energy Fund (REF) is dedicated to increasing the role of renewable energy throughout the state. The REF provides grants and loans for renewable energy projects with the potential to create electricity in a cleaner, more sustainable manner, while stimulating job growth in the green technology and energy sectors of Rhode Island's economy. Using funds from the 'system benefit charge' on electric bills and Alternative Compliance Payments, Commerce RI helps offset the cost of renewable projects for businesses and homeowners.

The Rhode Island Commerce Corporation (Commerce RI), in conjunction with the Rhode Island Office of Energy Resources ("RIOER"), is requesting proposals from solar photovoltaic ("PV") Installers ("Installer(s)") to participate in Round 2 of the Solarize Rhode Island Pilot Program (the "Program"). This program will drive community adoption of solar (PV) projects through a partnership focused on localized marketing and installation efforts, which in turn will help to drive down the installation cost of small-scale solar PV installations within the selected community through a group purchasing model.

The towns chosen for Round 2 of the pilot are Tiverton and Little Compton. The town chosen for Round 1 of the pilot was North Smithfield. The program in North Smithfield is currently underway and that program is slated to end at the end of December 2014. *Installers are bidding on the pilot community of Tiverton in this RFP.*

Tiverton and Little Compton were chosen to be participants in the Solarize Rhode Island program because National Grid identified an electric distribution system load constraint in these two towns. The Solarize Tiverton and Solarize Little Compton programs, which are part of RIOER's System Reliability Procurement ("SRP") Solar DG Pilot Project, will help demonstrate how distributed solar generation could potentially help defer a multimillion dollar grid infrastructure upgrade, in concert with National Grid's existing SRP energy efficiency and demand response programs in these two towns. In order to help meet this goal, REF and RIOER will be working with The Cadmus Group to develop an additional incentive for west and southwest facing roofs. This incentive will be part of the REF Small Scale solar application (See Section 6 for more information regarding this incentive).

Commerce RI and RIOER are working with SmartPower during the course of the Pilot for the education and marketing to the three communities. SmartPower is a non-profit marketing firm with experience conducting community energy campaigns. SmartPower has been employed in





other regional states' Solarize programs to develop promotional materials, manage websites and social media, and coordinate local community outreach campaigns.

Commerce RI seeks proposals from Installer(s) that can provide competitive, tiered pricing for a direct-ownership model ("Purchase Price"), along with an optional leasing or power purchase agreement ("PPA") model ("Lease/PPA Price") for residential and small-scale commercial solar PV installations. It is expected that customers who purchase a system under the program will receive competitive tiered pricing that results in a progressively greater reduction in the total purchase cost as more people contract for solar PV in the community. Customers who enter into PPAs or Leases will receive a greater financial incentive from the Installer(s) as higher tiers of aggregate capacity within a community are reached.

A consortium consisting of more than one installer may bid collectively on Tiverton, provided that the consortium agrees to be identified by a single name (e.g., "Solarize Tiverton Installer Consortium") in the contracting process. The Consortium will be bound by the same tiered pricing structure and establish protocols for the consortium with regard to the assignment of individual projects to participating installers.

3 Proposals received from an Installer, or a consortium of installers, will be evaluated in order to provide Tiverton with the greatest opportunity to succeed in the Program. Commerce RI, RIOER, SmartPower collectively referred herein as "Program Administrators" and Tiverton will work to review the Installer proposals. Quality of the proposal, proposed equipment, experience of Installer (or consortium) installing solar PV, number of installations in Rhode Island, pricing and installation practices will be factors in the selection process. The selection team will also perform reference checks to ensure positive customer satisfaction from past solar installations. Refer to Section 17 for more information on the evaluation criteria.

2. Background

National Grid will also be working with the Program Administrators on the Solarize Tiverton and Little Compton programs as part of the SRP pilot.

System Reliability & Least-Cost Procurement

Rhode Island's 2006 Comprehensive Energy Conservation, Efficiency, and Affordability Act established the state's landmark "Least-Cost Procurement" policy, which requires electric and natural gas distribution companies to invest in "all cost-effective" energy efficiency before the acquisition of additional supply. The law contains an important and innovative provision requiring electric distribution companies to develop an annual "System Reliability Procurement" (SRP) Plan, which must strategically consider an array of customer and utility-sited energy





resources to maximize their benefit to Rhode Island’s energy system. These “non-wires alternatives” (NWAs) include but are not limited to cost-effective energy efficiency measures, distributed generation (DG), and demand response measures that are targeted toward reducing the peak loads on the electricity grid. National Grid is assessing whether an array of such resources could be deployed to avoid dirtier “peaking” generators and defer distribution (and potentially transmission) system investments. Deferring distribution system investments could provide savings over time for customers and could lower the volatility and cost uncertainty of the larger energy and capacity markets in New England by securing sources of energy supply and capacity from in-state resources.

The National Grid System Reliability Procurement Plan

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Since its first System Reliability Procurement Report (SRP Report), which was approved in Docket 4296, National Grid has been conducting a pilot called “DemandLink” in Tiverton and Little Compton. This pilot is designed to defer the need for a new substation feeder in the Tiverton/Little Compton region through at least 2017 by targeting energy efficiency measures and conducting a demand response program in the area that will reduce the load on specific feeders attributable to customer air conditioning, lighting, and other summer-peaking loads. If the pilot is successful in enrolling and providing 1 megawatt (MW) of sustained load relief over its planned lifecycle, it will result in deferred construction of a new substation feeder estimated to cost \$2.9 million for four years. On November 1, 2014, National Grid filed its plans to continue the DemandLink pilot in 2015. More information on the National Grid System Reliability Procurement Plan may be found here:

[http://www.ripuc.org/eventsactions/docket/4367-NGrid-SRP-2013Plan\(11-2-12\).pdf](http://www.ripuc.org/eventsactions/docket/4367-NGrid-SRP-2013Plan(11-2-12).pdf).

System Reliability Procurement Solar DG Pilot Project

To date, National Grid’s pilot has relied solely on efficiency and demand response measures to achieve the required load relief and has not proposed including or assessing the potential of distributed renewable energy systems as part of the system reliability portfolio. To examine how DG could be included as part of the SRP plan, OER allocated funding to initiate the SRP Solar DG Pilot. The goal of this pilot is to assess the viability, costs, and benefits of distributed generation as a system reliability resource (non-wires alternative).

To develop a framework for the SRP Solar DG Pilot, the OER and National Grid commissioned a study by Peregrine Energy Group, Inc. (attached as Appendix A). The goal of the study was to: 1) assess solar deployment options and develop a proposed configuration for a portfolio of DG resources to meet **250 kW of summer peak load reduction** in the SRP DemandLink pilot footprint in Tiverton and Little Compton, and 2) recommend an implementation strategy to solicit participation in the pilot and procure the DG resources.





The results of the Peregrine study found that a mix of small and large solar systems could in fact contribute to meeting summer peak load reduction needs in Tiverton and Little Compton. Peregrine also determined that southwest- and west-facing solar arrays in particular will provide a distribution grid benefit in the two towns because the time period of highest load constraint on the local distribution system in this area occurs approximately between 3:30pm and 7:30pm on summer days.

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	1	2	3	4
	Grid Support Solar Field(s)	Solarize Residential	Other Small Projects	Total
1 Gross Capacity (kW)	280	160	80	520
2 Average Distribution Contribution Percentage (DCP)	50%	45%	45%	
3 Distribution Contribution (kW)	142	72	36	250
4 Portfolio Allocation	57%	29%	14%	100%

Figure 1

Figure 1 displays Peregrine’s final recommended portfolio of solar resources to achieve 250 kW of summer peak load reduction. This solicitation solely addresses the “Solarize Residential” and “Other Small Projects” components (residential and small commercial). A separate “Solar PV for Distribution Grid Support” initiative, conducted by RIOER will be used to deploy the “Grid Support Solar Field(s)”. More information and questions on the “Solar PV for Distribution Grid Support”, please contact Danny Musher at the RI Office of Energy Resources at danny.musher@energy.ri.gov.

As shown in Figure 1, the goal of the OER SRP Solar DG Pilot Project is to deploy a total of 240kW nameplate capacity of residential and small commercial solar systems in **both** Tiverton and Little Compton through Solarize campaigns. However, there is no explicit kW target goal specifically for the Solarize Tiverton project. Any additional installed capacity may result in infrastructure upgrades differed further into the future. Due to this additional goal, projects installed as part of Solarize Tiverton pilot will require the installation of a data acquisition system (DAS) (See Section 7 for more information regarding the DAS requirement).





Round 2 of the Solarize pilot will target installations on homes and small businesses that face southwest or west in order to maximize production of these projects in the afternoon and evening hours between 3:30-7:30pm. To achieve this goal, an additional incremental incentive, called the “SRP Incentive” will be provided (See Section 6 for more information on the SRP Incentive).

3. Program Description

Solarize is a solar photovoltaic (PV) group purchasing system that aims to lower acquisition costs for rooftop solar installations. At its core, Solarize combines four main components:

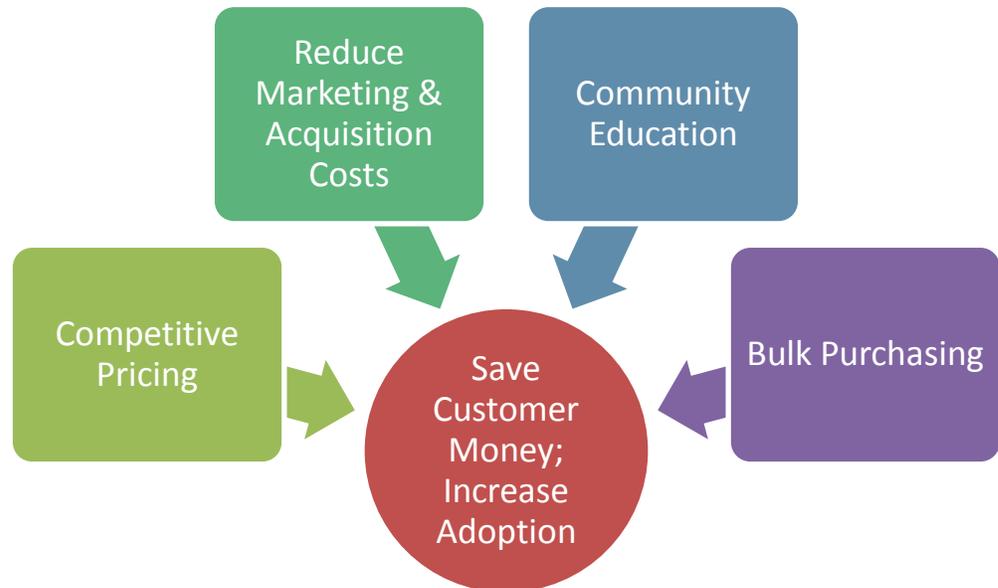
- A. Tiered Pricing: Pre-negotiated group buying discounts which increase as more people sign up within a target community (i.e., bulk purchasing—the more people that go solar under a Solarize campaign, the lower the price for everyone in the community that participates).
- B. Community-Driven Outreach: These methods may include but are not limited to social media campaigns, a booth at the local farmers’ market, or town meetings.
- C. Competitively-Selected Installers: Through a competitive bidding process, the targeted community selects an installer or installers to service the area throughout the duration of the Solarize Program. This saves installers marketing costs related to customer acquisition and screening and saves the consumer the effort of finding a reputable, price-competitive installer.
- D. Limited Time Offer: Solarize campaigns are limited time offers. This puts pressure on customers to act promptly, or risk missing the window of opportunity to install solar PV at a reduced rate.

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The basic cost savings from the Solarize Program result from a coordinated education, promotion, and outreach effort and from the tiered pricing arrangement which takes advantage of economies of scale. These savings ultimately are passed along to the homeowners that choose to enroll through participation in the Solarize Program.

The aggregation of multiple small-scale solar PV installations within a community provides opportunities to realize economies of scale for the Installer, reduced customer acquisition costs, and ultimately cost savings for the customer. Installation prices for small-scale solar PV installations are generally higher than for large-scale installations, in part due to the extra cost of customer acquisition – including marketing, advertising, and providing education to multiple customers. By educating the local community, streamlining marketing efforts, and aggregating sales, the Program will help make solar PV a more accessible and affordable energy option.





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4. Community Selection

Commerce RI and RIOER selected North Smithfield, Tiverton and Little Compton to participate in the Solarize RI pilot program. There are two rounds of the Pilot Program. The North Smithfield program is currently underway in Round 1 and both Tiverton and Little Compton are in Round 2. Each round of the Pilot has its own timeline. *This RFP refers specifically to the Round 2 Community, Tiverton.* Commerce RI, RIOER, and SmartPower will provide each community in the Program with education and marketing support, including free educational meetings and marketing plan development support to help implement a community-wide solar PV program for residential and small scale commercial projects.

5. Program Administrators – Program Marketing Support

Commerce RI, RIOER, and SmartPower (collectively referred herein as “Program Administrators”) will assist Tiverton and the selected Installer(s) to deploy a marketing strategy to enhance local interest in solar PV technology, as well as alleviate some of the marketing and acquisition costs for the Installer associated with small scale PV installations.

Specifically, the Program Administrators will:





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- a. Work with Tiverton to develop and implement a marketing plan specific to Tiverton’s Solarize campaign. This will include event organization, creation of websites and social media campaigns, as well as designing, printing, and distribution of standardized marketing materials.
- b. Assist with developing a training guide and facilitate trainings for the Tiverton Solar Ambassadors and other members of the volunteer team. The Solar Ambassadors will be the “lead volunteers” and will support SmartPower for event coordination and be the contact for local residents who express interest in the Program. The selected installer will be expected to assist the Program Administrators in helping train the volunteer team on the basics of Solar PV, answer questions posed by the team, and work with them to generate leads during the course of the Program.
- c. Participate in certain outreach measures and events, including but not limited to, strategic community meetings such as a Program Kickoff Event and educational meetings where all stakeholders, including the selected Installer(s), will meet with residents to increase awareness of solar energy and its benefits.
- d. Convene bi-weekly meetings or conference calls to coordinate between the Community and Installer outreach activities.
- e. In addition, the Program Administrators will provide installers additional funding for:
 - ❖ SRP Incentive
 - ❖ Procuring and installing a DAS on all Solarize Tiverton projects
 - ❖ Possible DemandLink Promotional Incentive

6. SRP Incentive

Round 2 of the Solarize pilot targets installations on homes and small businesses that face west or southwest in order to maximize production of these projects in the afternoon and evening hours between 3:30-7:30pm. To achieve this goal, an additional incremental incentive, called the “SRP Incentive” will be made available to participants of the program. The SRP Incentive intended to incentivize those with southwest and west facing roofs to participate in the program in recognition that energy savings from PV systems oriented in these directions will produce less than those oriented toward the south. The incentive will be prorated on the ratio of the estimated annual generation of the proposed system to the generation from a system that would produce the maximum amount of energy during the hours of 3:30 – 7:30pm during the months of July and August. The calculation is described below.





Definitions:

kWh_{proposed}: the modeled annual energy generation for the proposed system for all hours, and all months during the year

kWh_{evening}: the energy generation from a PV system oriented to maximize energy generation between 3:30 – 7:30 pm in July and August (number to be provided by the Administrator)

kWh_{max}: the energy generation from a PV oriented for maximum annual energy generation for all hours during the year (e.g. oriented due south, at optimal tilt)

SRP Incentive_{max}: the maximum SRP incentive available

SRP Incentive: the SRP incentive available

Calculation:

$$\text{SRP Incentive} = \text{SRP Incentive}_{\text{max}} * (\text{kWh}_{\text{max}} - \text{kWh}_{\text{proposed}}) / (\text{kWh}_{\text{max}} - \text{kWh}_{\text{evening}})$$

Notes:

* Energy generation lost to shading during the hours of 3:30 – 7:30 in July and August shall not exceed 10%.

* The SRP Incentive shall not exceed the SRP Incentive_{max}.

* The kWh_{proposed} must equal or exceed kWh_{evening}.

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The SRP Incentive will be calculated to compensate participants for the reduction to net present value lost due to orienting this system west of due south. The REF is working with the Cadmus Group to help design a SRP Incentive calculator that Installer(s) will use to calculate the incentive on a per project basis. Data points including tilt and azimuth will be input into the calculator and the SRP incentive will be displayed. The calculator is designed to be replicable by Installer(s) in the field as well as by Program Administrators when reviewing Solarize applications. The incentive must be clearly shown in all Solarize customer contracts as a pass through cost. The calculator will be made available to the selected installer before Program kickoff.

All solar PV projects that come through Solarize pilot will be eligible for the REF Small Scale Solar grant program.¹ The SRP Incentive calculation must be included in all REF applications for those projects that are eligible. Figure 2 below illustrates what the SRP incentive could look like. A project with a 180 azimuth will not be eligible for the SRP Incentive. However, as the

¹ Any commercial projects sold during the program, may apply to the REF Commercial Scale program. The current list of the solicitation dates for both REF programs can be found here:

<http://www.commerceri.com/finance/REF.php>

azimuth increases west of south, the incentive per watt will increase. A project that has a 270 azimuth would have an approximate \$790 per watt SRP incentive.

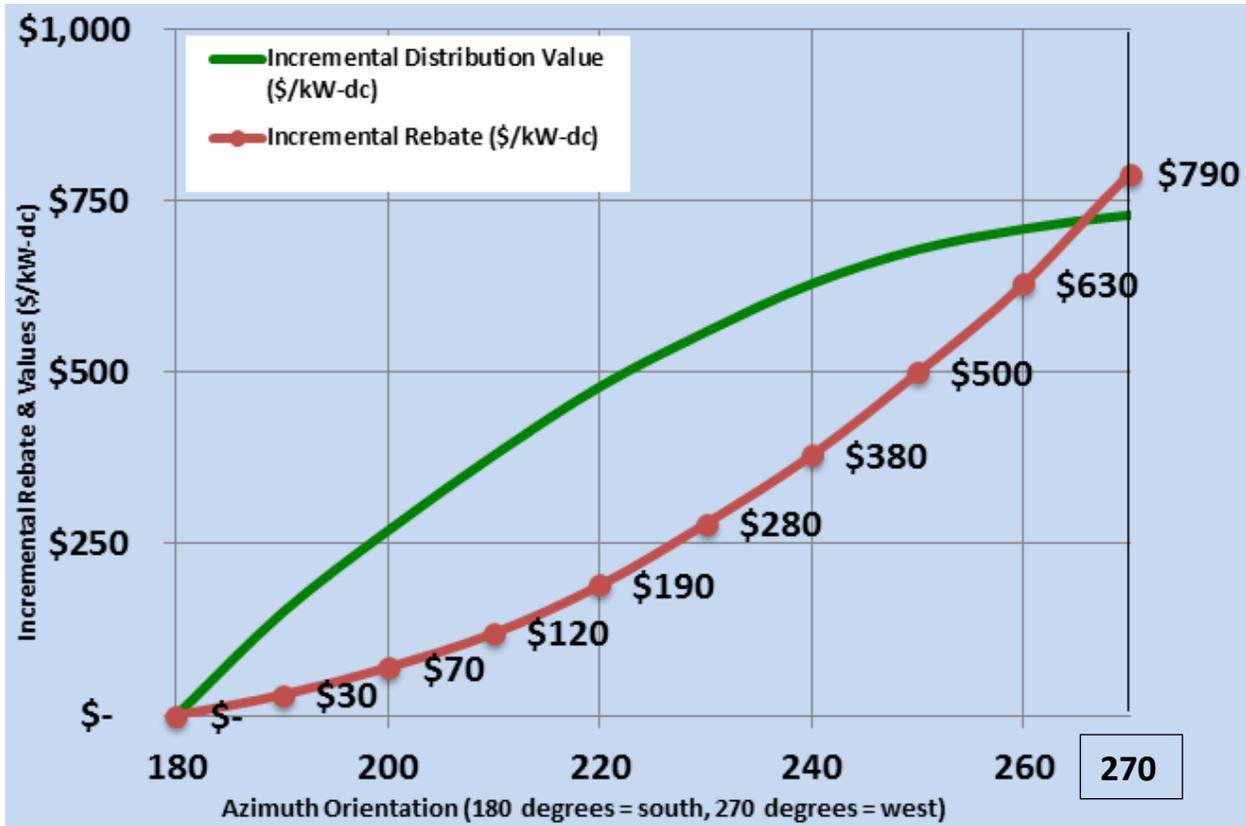


Figure 2

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Projects that utilize the SRP Incentive will not need to comply with the REF's 80% of optimal requirement. However, all projects will need to provide a Solmetric Suneye or PV Watts Pathfinder analysis at application. No other PV solar access software will be allowed. Excessive shading in addition to the SRP incentive will not be awarded grant funding or SRP Incentive funding.²

7. Data Acquisition System Requirements

In order to evaluate program success and determine whether solar systems are contributing to the expected summer peak load reductions in the afternoon hours between 3:30 and 7:30pm, Program Administrators will monitor production from the PV systems installed as part of the

² The shading definition has not yet been determined for projects utilizing the SRP incentive. This will be developed further and made available to the selected installer(s) before program launch.



Solarize pilot. All projects that are installed as part of the Solarize Tiverton project will have a Data Acquisition System (DAS) installed. The DASs will conform to data collection requirements and report to the Open Solar Performance and Reliability Clearinghouse (oSPARC)³. oSPARC is a user driven database designed to compare and assess long-term relative performance of solar PV systems. In addition, Program Administrators will increase the interval of some categories of data reported to oSPARC, specifically increasing the reports of the following three data sets to fifteen (15) minute intervals. They include:

- ❖ Production data from the PV arrays
- ❖ In home electricity usage
- ❖ National Grid substation data

The selected installer(s) will be required to procure, install, and ensure that the DASs are functioning through a three year workmanship warranty. The specifications must include the following⁴:

A. *Metering solar PV system at inverter output (AC)*

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- ❖ The DAS must collect and report data from a revenue grade meter
 - ❖ Capable of collecting, reporting, and storing 15 minute interval data (reported as Watt-hours over 15 minutes, or Watts). The types of data required and optional:
 - i. Required: Energy (AC) out from inverter
 - ii. Optional: OSPARC 'Environmental Measurements'
 - iii. Optional: OSPARC 'Array Measurements'
 - iv. Optional: OSPARC 'Plant Electrical Readings'
 - v. Optional: OSPARC 'Availability States'

B. *Metering at electric service*

- ❖ Required: Bi-directional metering for energy, power, voltage and amps of the electrical services to the home. The purposes is to meter the net energy (including solar PV) in or out of the home
- ❖ Required: Accuracy shall be +/- 2% or better in either direction
- ❖ Required: 15 minute interval data to be collected with the same time stamp as the solar PV data

C. *Data Acquisition System (DAS) and data storage / access*

³ For more information see <http://www.sunspec.org/osparc/>. Program Administrators are still in the process of procuring this software and use of it may be subject to change.

⁴ See <http://www.sunspec.org/wp-content/uploads/2014/04/oSPARC-Plant-Info-Template-v5.1.xlsx> for the full list of required and optional data.



- ❖ Required: DAS shall collect all measurements for (A) and (B) above
- ❖ Preferred: Communication between the DAS and offsite storage shall have a near 100% uptime, resulting no loss of data, or resolution in the data
- ❖ Preferred: The DAS shall be capable of continuing to collect measurements in the event of a grid outage such that data continuity or integrity is not compromised (bidders shall indicate how long the DAS can be expected to operate during a grid outage)
- ❖ Required: Access to data shall be made available via the web or other easily accessible option
- ❖ Required: Data shall be downloadable in a standard format such as MS Excel
- ❖ Preferred: The complete data history shall be backed-up to separate offsite storage
- ❖ Preferred: External data (e.g. utility interval data sets) can be uploaded to the data storage system

As part of the proposal, Installer(s) must include the specifications of two or three DASs that meet the above criteria and should be listed as part of Attachment B. Many of the most well-known DAS providers and manufacturers are familiar or partners with oSPARC. A full list of affiliated manufacturers and providers can be found here: <http://www.sunspec.org/directory/>.

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The selected installer(s) will be reimbursed for the DAS through the REF grant application process. As part of grant completion paperwork, an invoice for the DAS will be submitted using a predetermined invoice template. Under no circumstances will reimbursement for an individual DAS be more than one thousand (\$1,000) dollars. Reimbursement for the DAS will only be for the device itself; labor will not be allowed. Labor costs for DAS installation should be factored into the tiered pricing as part of Attachment B. In addition, should a customer choose to not have a dedicated internet connection that meets the criteria above, the Program Administrators should be contacted before REF grant application.

If the selected installer(s) require or request training on the installation of a DAS, the Program Administrators will work to provide resources and trainings on the installation of the DAS based on the specifications included as part of Attachment B.

8. Additional DemandLink Promotional Incentive

An additional incentive may be able to provide an additional incentive to customers who sign a contract for PV through the Solarize program AND sign up for the DemandLink pilot. At the time of this RFP, confirmation of this incentive and its amount is not available, however, this information will be communicated prior to program launch in January 2015.⁵ The selected

⁵DemandLink Promotional Incentive design is subject to National Grid SRP budget and administrative considerations.





Installer(s) will work with National Grid and Program Administrators on the marketing of the DemandLink pilot and any associated incentive.

9. Installer Selection

Through this Request for Proposals, the Program Administrators and Tiverton will select and partner with a solar PV installer (or a consortium of installers) that offers sales models in which installation costs are based on a tiered pricing structure that provides a lower installed cost per watt as the amount of contracted solar PV within the community increased. The chosen Installer(s) will also provide free solar site assessments (with site visits or desktop analysis, as appropriate), an optional PPA or lease price, and installation services. In addition, the selected Installer(s) will be responsible for managing leads, providing general customer service, and serving as the “technical expert” regarding solar PV to Tiverton.

Installer(s) that can provide demonstration of innovative concepts will have additional scoring weight (See Section 17 for Evaluation Criteria). These concepts include, but are not limited to, innovative business models or provide options for other technologies such as Solar Hot Water or access to additional financing options. Note that solar hot water projects do not count toward the tiered price.

Commerce RI and RIOER will perform a threshold review to verify that all proposals are complete, as well as a substantive review to ensure that each proposal demonstrates the installer’s (or consortium’s) capacity to deliver on the Program’s objectives. Commerce RI will then provide the proposals to the External Review Team for evaluation. The External Review Team will consist of three members of the Tiverton volunteer team and one member of each of the three of the Program Administrator agencies⁶.

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External Review Team	
Tiverton	3
Commerce RI	1
RIOER	1
SmartPower	1

The Program Administrators will work with the Tiverton review team to identify a short list of installers with which they prefer to work. Those installers on the short list will be invited to the Interview Day. Tiverton will host the Interview Day on December 17, 2014 or, in the case of inclement weather, December 19, 2014, during which the Program Administrators will have the

⁶ No member of the External Review team can be affiliated (either directly employed or contracted for employment) with a solar PV installation company.





opportunity to interview the short list of installers (See Section 18 for more information about timeline). Conference lines will be available so that all members of the External Review Team have the option to participate. However, at a minimum, at least two members of the three Tiverton External Review Team members will be present during the Interview Day. Installer(s) must be available to meet with the Review Team on December 17, 2014. If a consortium is applying, at least one representative from each Installer company must attend in person⁷. At the completion of the event, the External Review Team will have a chance to reevaluate their ranking of the installers interviewed. The revised ranking sheets will be discussed among the External Review Team. The team will then select the Installer(s) that will work with Tiverton during the course of the Pilot.

10. Program Roles and Responsibilities

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Once the Solarize Tiverton campaign has launched, interested customers in Tiverton will be able to contact the Installer(s) and sign up for a free site assessment. If the customer's site is deemed feasible for solar, they will have the option to contract with the Installer(s) before the Program deadline, which is defined in Section 14 below. The Installer(s) will be responsible for assessing individual sites, responding to all customer inquiries about their site suitability for solar, providing a plan for customers who do not have good site for solar, working with interested customers to design appropriate systems, presenting financing options as needed, and contracting with the customer for installation of the solar PV system. The selected Installer(s) is also responsible for submitting all paperwork needed for the necessary permits and interconnections. Customers who choose to participate in the Program will be eligible for the REF Small Scale Solar grant program, as long as the project meets the REF requirements. Installations must be completed within one year of award from the REF Small Scale Solar grant program.

⁷ If five (5) companies or more are partnering in a consortium, please choose a maximum of five (5) representatives to attend the Interview Day.



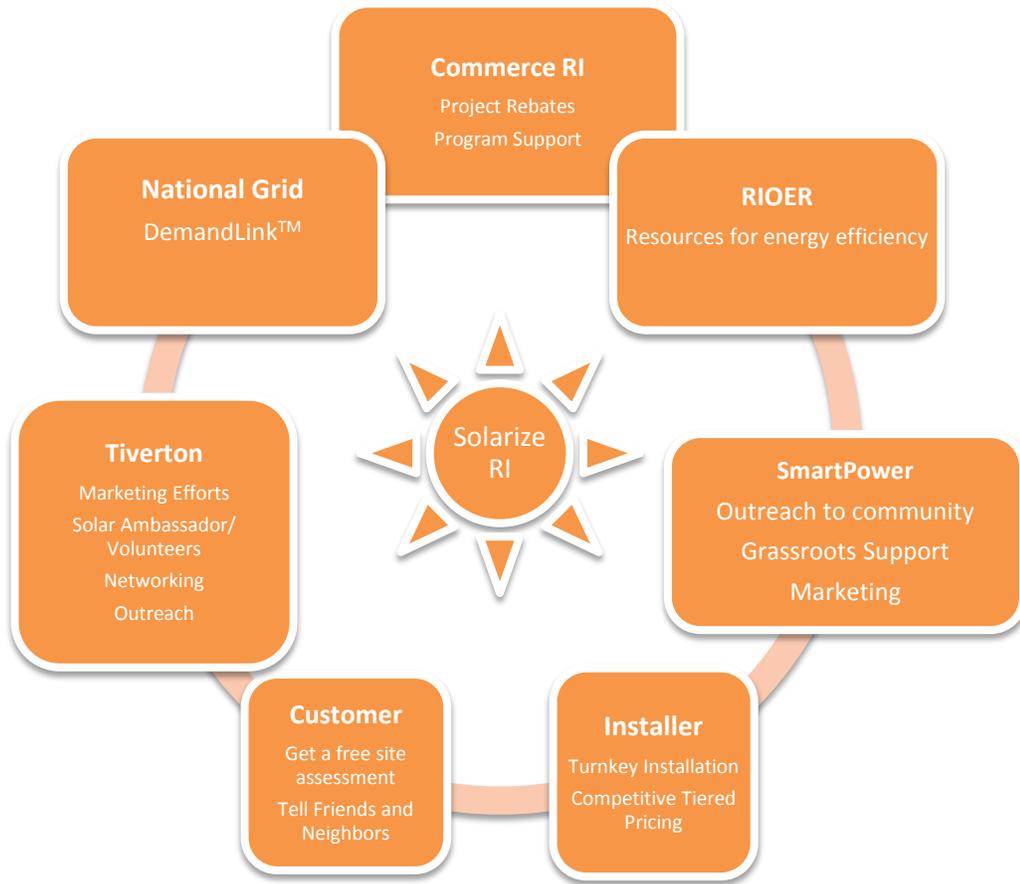


Figure 3: Chart of Program Roles

The chart below outlines the roles of the different parties under the Solarize RI Program.

	Commerce RI/ RIOER/SmartPower	Tiverton Outreach Team	Installer(s)	National Grid
Procurement	Release RFP to select Installer(s) and determine if proposals meet threshold requirements; Work with communities to select Installer(s)	Work with Program Administrators to evaluate proposals and lead in the selection process	Submit competitive proposals	n/a

<p>Reduce Cost to Customer</p>	<p>Make available solar incentives⁸; Assist residents in evaluating finance mechanisms for solar PV installations; Provide financing products and tools</p>	<p>Increase awareness of solar PV to drive down marketing and customer acquisition costs; Assist Program Administrators in stream-lining the permitting process (if possible)</p>	<p>Provide competitive tiered pricing</p>	<p>Help reduce electric costs through energy efficiency and DemandLink Programs</p>
<p>Marketing</p>	<p>Provide Marketing and Education Toolkit to Tiverton; Facilitate Tiverton group outreach planning; attend and support key community events</p>	<p>Reach out to local community organizations, potential partners, and volunteers; Organize and mobilize community networks over the course of the Program; Demonstrate municipal support for Program</p>	<p>Partner with community groups, Solar Ambassador and other volunteers to disseminate information on Program (as appropriate)</p>	<p>Work with Program Administrators on the Tiverton marketing plan to help promote both the Solarize and DemandLink Programs. Will attend program events such as Solar Workshops and other community events</p>
<p>Education</p>	<p>Educate community groups, Solar Ambassador, and volunteers on solar PV basics; Facilitate local Solar presentations</p>	<p>Serve as point for questions of program mechanics and basic solar information; Utilize municipal communications vehicles or outreach and education</p>	<p>Serve as the technical expert on solar; Present at Solar Workshops</p>	<p>Work with SmartPower to help educate the residents of Tiverton about the DemandLink Program. Will serve as the technical expert on the DemandLink Program.</p>
<p>Communication</p>	<p>Provide a Solarize RI website with town specific pages; Identify communications opportunities and story angles; Media/Social Media strategy and promotion</p>	<p>Assist in providing content for Solarize North Smithfield website, social media, and other additional content (i.e. blogs, letters to editor); Assist in pitching stories for local media coverage; May utilize town-wide resources (i.e. email listings, tax bill inserts), if appropriate</p>	<p>Work with SmartPower, Solar Ambassador, and volunteers to support outreach; Will develop a portal to facilitate customer sign up</p>	<p>Provide Program Administrators and Tiverton residents resources to learn more about the DemandLink Program. Will provide links to the Solarize website highlighting the program.</p>

⁸ Commerce RI makes no guarantee that all applications to the REF Small Scale Solar Program will receive a grant.



Solar Installations	Leverage communications opportunities from early solar installations (if possible)	Leverage outreach opportunities from early solar installations (if possible); Outline permitting process for solar PV projects in community	Provide site assessments, customer services, system design, and a turnkey installation to customers;	n/a
Program Administration	Facilitate bi-weekly check-in calls	Participate in bi-weekly check-in calls	Participate in bi-weekly check-in calls; Will provide weekly metrics to Program Administrators	Participate in bi-weekly check-in calls

Chart 1: Outline of anticipated roles of the different Program participants.

11. Program Marketing Support – SmartPower

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SmartPower is the nation’s leading non-profit marketing firm dedicated to promoting clean, renewable energy and energy efficiency. SmartPower will assist Tiverton, grassroots civic organizations, and the selected installer to deploy a marketing strategy to enhance local interest in solar PV technology, as well as alleviate some of the marketing and acquisition costs for an Installer associated with residential PV installations.

Specifically SmartPower will:

- a. Coordinate with the Program Administrators, the selected Installer(s), and Tiverton on education, marketing and outreach including developing a local campaign strategy; participate in certain meetings and events; provide standardized marketing materials, as well as drafting and coordinating media opportunities;
- b. Provide content management for the Solarize RI webpage and forward website generated leads to the selected Installer(s). Manage web presence and social media for the Program;
- c. Work with National Grid to encourage residents to take advantage of energy efficiency measures and coordinate a uniform message on DemandLink program (See Sections 2 and 6 in more information on DemandLink);
- d. Coordinate and share with the Program Administrators on managing the weekly metrics from the selected Installer(s) and aggregation of data;





- e. Convene bi-weekly meetings or conference calls to coordinate between the Program Administrators, Tiverton, and the selected Installer(s).

12. Commerce RI Commitment:

Commerce RI agrees to provide the Installer(s) with the following:

- a. Responsible for overall Solarize RI and REF Small Scale Solar program administration and addressing issues relating to contracts.
- b. Will provide assistance, along with other Program Administrators to address issues related to contracts and community relations.
- c. Make available the REF Small Scale Solar Program to all customers that apply through the Installer(s), at the incentive rate outlined in the Small Scale Solar Program at the time of grant application. This information will be available to the selected Installer(s) on the Commerce RI website. Each application submitted by the Installer(s) to Commerce RI must meet the REF Small Scale Solar program rules and regulations in order to qualify for the grant.
- d. Make available the SRP Incentive to all customers that apply to the REF through the Installer(s) at the amount generated by the SRP incentive calculator.
- e. Provide reimbursement for the cost of the data acquisition systems at project completion.
- f. Work with other Program Administrators on the Solarize RI brand and ensure that all logos from the selected Installer(s) are on all appropriate marketing material published under this Program.
- g. Assist the selected Installer(s) on the solar education in Tiverton; and through SmartPower, facilitate a bi-weekly phone call between the Program Administrators, Tiverton and the selected Installer(s).

13. Installer(s) Commitment: The following Terms and Conditions are agreed to by the Installer(s) upon acceptance by Commerce RI of this Proposal. For purposes of this section 13, Contractor and Installer shall have the same meaning and Contract and Proposal shall



have the same meaning. Installer(s) agree to execute a Letter Agreement with Commerce RI agreeing to the Terms and Conditions listed below (Attachment C).

- a. The Installer(s) will provide the Program Administrators the community contacts with weekly data as requested, including but not limited to, the number of community initial interest contacts, number of site visits completed, number of feasible sites, number of signed contracts, and contracted capacity. Customer names, email addresses, and phone numbers will also be included as part of the metric data. Prior to Program Launch, the selected Installer(s) and the Program Administrators will agree to specific Program metrics. The agreed upon metrics will be due to Commerce RI by Monday at 5:00pm for the prior week (Monday through Sunday at midnight);
- b. The Installer(s) will be able to contract with customers through May 8, 2015 and will have six months to submit all applications to the REF Small Scale Solar program⁹. Commerce RI will keep the selected installer(s) and the RI solar installer community updated if there are any changes to the REF funding levels for the Small Scale program. Dates of solicitations in 2015 are currently posted on the Commerce RI website. There will be a review process for all grant applications processed and all applications will need to be approved before the Commerce RI monthly board meetings;
- c. The Installer commits to providing customers with the tiered pricing outlined in Attachment B. All adders will be clearly defined in all turkey contracts to customers. The Installer will offer the equipment as outlined in Attachment B and will notify Project Administrators if the proposed equipment is unavailable before project installation. Workmanship warranty language will be included in the Proposal narrative.
- d. The Installer commits to installing a DAS on every participant receiving the additional SRP Incentive. The price of the DAS will be reimbursed from the Project Administrators (up to \$1,000 per system). No portion of the price of the DAS will be passed along to the participant. The cost of installation of the DAS will be included as part of the tiered pricing structure bid by the Installer;
- e. The Installer commits to passing along the full value of the SRP Incentive as calculated by the provided calculator to qualifying participants. This incentive is designed to compensate and provide a subsidy to qualifying participants. Contracts

⁹ REF will post additional 2015 solicitation dates to the REF website when they are known.





and proposals written for Solarize Tiverton customers must include a specific line item detailing the value of this incentive;

- f. The installer(s) will be required to provide the Program Administrators with a final report outlining the total number of contracted customers within the community and the resulting prices that will be associated with each installation. If at any time during the Program, a customer cancels a contract, the Installer(s) will need to notify the Program Administrators within two (2) weeks of the cancellation and the reason why the project is not moving forward;
- g. The Installer(s) agree to work with Program Administrators on referring to the brand as “Solarize RI” and “Solarize Tiverton” on all Program documentation. The Installer(s) will provide the Program Administrators the Installer(s) company logos to use on Program documentation. All relevant logos, including the Solarize RI logo, will be used in all community outreach materials, websites, and other marketing materials. Any material produced for distribution for the Program will need to be approved by the Program Administrators in advance;
- h. Collaborate with Program Administrators on all press releases, events, or news conferences concerning the Program. In any media produced by the Installer(s), the Installer(s) will not represent that positions taken or advanced by it represent the opinion or position of Commerce RI, the State of Rhode Island, the RI Office of Energy Resources, the town of Tiverton, or SmartPower, Inc.;
- i. Work with Program Administrators in developing additional marketing materials, including but not limited to, providing photographs or other information for use in marketing the Program, and collaborate in obtaining photographs (using the Commerce RI Media Consent Form) and statements of support from Solarize Tiverton customers for use of the Solarize RI website;
- j. Include a disclaimer on all Installer(s) customer intake forms and media (such as website and sign-sheets) that outlines how customer contact information may be used under the Program and provide the customer will be ability to opt out of any communication unrelated to solar PV installations under the Program;
- k. Provide complete and accurate customer and lead contact information to the Program Administrators within five (5) business days on the conclusion of the campaign, including full name, email address, phone number, and addresses. In addition, the Installer(s) will provide complete and accurate information for all non-feasible leads



(as determined by actual site visits or satellite image screening) to the Program Administrators on a monthly basis;

- l. Installer(s) agree to participate in any appropriate marketing and outreach events within Tiverton as well as any community meetings organized by the Program Administrators;
- m. Agree to provide feedback at the end of the campaign on the effectiveness of various marketing materials, outreach strategies, and general Program matters, including completion of an evaluation survey;
- n. Participate in bi-weekly phone calls with the Program Administrators and Tiverton;
- o. Installer(s) agree not to market under the Solarize tagline in other future Solarize communities other than Tiverton;
- p. During the performance of this Agreement, Contractor and its subcontractors shall comply with all applicable federal, state, and local laws, rules and regulations in regard to nondiscrimination in employment because of sex, sexual orientation, race, color, ancestry, religious creed, national origin, disability, medical condition, age, marital status, and denial of family care leave. The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Agreement;
- q. That no gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by Contractor, or any agent or representative of Contractor, to any officer or employee of Corporation with a view toward securing this Agreement, or securing favorable treatment with respect to any determinations concerning the performance of this Agreement. For breach or violation of this warranty, the Corporation shall have the right to terminate this Agreement, either in whole or in part, and any loss or damage sustained by Corporation in procuring on the open market any services which Contractor agreed to supply shall be borne and paid for by Contractor. The rights and remedies provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or in equity;
- r. Installer acknowledges that all submissions (including those of parties not selected for engagement) may be made available to the public on request (pursuant to the Rhode Island Access to Public Records Act, R.I.G.L. § 38-1-1 et seq.) upon the completion of the process and award of a contract or contracts. Accordingly, any information



included in the proposal that the Installer believes to be proprietary or confidential should be clearly identified as such.

- s. Contractor certifies that that it is insured against liability for Workers' Compensation and affirms that it will maintain Workers' Compensation Insurance during the term of the Program and indemnify the Corporation from any liability for violating this provision. Contractor shall require any and all subcontractor(s) to include such a provision in all subcontracts to perform work under this Agreement;
- t. Installer agrees to indemnify Commerce RI, and its officers, directors, employees, agents, and affiliates against, and defend and hold each of them harmless, from any and all claims or liabilities related to or arising in any manner from this Program other than claims or liabilities resulting from the gross negligence or willful misconduct of Commerce RI;
- u. Commerce RI shall not be liable to the Installer for any special, indirect, incidental, consequential, punitive, or exemplary damages of any kind whatsoever, whether based on contract, warranty, tort (including negligence or statutory liability), or otherwise, in connection with the performance of this Agreement;
- v. This Agreement shall remain in effect for one (1) year after Commerce RI approves the Small Scale Solar Program incentive award to the Installer under the Program;
- w. The Contractor has obtained, will obtain, and shall maintain and comply during the term of this Agreement, with any and all applicable federal, state and local reviews, consents, authorizations, approvals and licenses required by law for the Program and shall indemnify, defend and hold the Corporation, and each of its officers, agents, employees and consultants harmless from and against any and all suits, damages, claims, causes of actions, demands, judgments, penalties, costs, expenses, attorneys' fees and any and all injuries to persons or property and all other matters arising out of or incurred in as a result of the Contractor's violation of this provision.

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14. Scope of Work

Once selected, the Installer(s) will work with Tiverton and the Program Administrators on a marketing strategy specific to the community. Shortly after selected, the Installer will be





introduced by the town as the selected Installer for the Program during a Kickoff event tentatively scheduled for January 27, 2015¹⁰.

As leads are identified, the Installer(s) will provide site assessments (as appropriate) and system designs for individual solar PV projects. The site assessment will evaluate a site's suitability for solar PV, including shading, onsite load, and any electrical, structural, or mechanical issues that may increase the cost of the solar PV project relative to the proposed price. The system design should maximize system production while minimizing project cost.

In order to be eligible for the Program, residential and small scale commercial projects must meet all of the requirements currently outlined in the Renewable Energy Fund Small Scale solar program.¹¹ For more information on the REF Small Scale Solar program visit <http://www.commerceri.com/finance/REF-Small%20Scale.php>. In addition, the selected installer(s) must have a Renewable Energy Professional (REP) by the date the program launches in January 2015. If applying as part of a consortium, all installers in the partnership must demonstrate they have their own REP by the date the program launches in January 2015.

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Upon contracting, the Installer(s) will be responsible for providing each contracted customer with a turnkey service, which includes securing all local permits, applying for a grant to the REF Small Scale Solar program, and completing the installation within one year of grant award. In addition, the Installer(s) will be expected to provide information regarding net metering, energy efficiency, and any other federal or state incentives available for the customer.

The installer(s) must follow up with all customers who request a site visit or survey with more information about the Program and provide options for non-feasible sites. The Installer(s) and the Project Administrators must identify in advance of Program Launch a process for handling leads that have non-feasible sites for solar PV. Examples may include offering individuals with non-feasible sites more information on other technology options, such as energy efficiency or Solar Hot Water, or requesting potential assistance from the Solarize Tiverton volunteer team.

15. Proposal Requirements:

During the August 25, 2014 Tiverton Town Council Meeting, the community passed a Resolution to participate in the Solarize Tiverton Program. This RFP for installer(s) is specific to the town of Tiverton and not for future Solarize rounds under the Pilot. All proposals will receive a threshold review by Commerce RI and RIOER to determine eligibility.

¹⁰ The snow date for the kickoff event will be February 3, 2015. Please ensure availability for both dates. Both dates are tentative and if they should change, Commerce RI will notify the selected Installer(s) as soon as possible.

¹¹ Projects applying for the SPR incentive do not need to meet the 80% of optimal REF program requirement. All other application requirements apply.





Proposals must contain the following:

- a. **Executive Summary:** The Executive Summary should state that the Installer(s) are applying for the Solarize RI Tiverton Round 2 Pilot and that it is understood that the Proposal is for Tiverton only. Should the Installer(s) want to apply for both Round 2 Communities; two (2) separate proposals will be required. If Installer(s) apply for both towns, make sure that is indicated in each proposal. If an Installer or consortium applies for both communities and does not want to receive both contracts (should both towns make the same decision), indicate the preferred community. The Executive Summary should summarize the highlights of the proposal, key features and distinguishing points of the proposal, as well as any unique problems perceived by the Installer(s) and proposed solutions.
- b. **Proposal Team Experience:** Identify all members of the project team, including but not limited to, partners assisting in project financing, customer service, outreach, project installations, and other relevant services. Include an organizational chart outlining the various key individuals and partners, a description of each and attach resumes and copies of licenses (including REP certificate(s) if available at application), of all key individuals on the project. Consortiums of Installers are welcome; however one Installer of the Consortium must be the lead company on the proposal. Proposals must include the following:
 - i. Description of the applying Installer, including company size, financial stability, location, capacity for work, and access to various supply chains. Highlight relevant experience, skills, and capabilities necessary to undertake this Program, including but not limited to demonstrated experience through a minimum of ten (10) installed solar PV projects.
 - ii. Identify how many residential and small scale solar installations have been completed to date and how many have been completed (interconnected) in Rhode Island.
 - iii. Identify the team member(s) who will be participating on the bi-weekly calls.
 - iv. Provide a list of any partners on the project team that are located in or near Tiverton.
 - v. Identify any partners that are local to Tiverton and/or are focused on sustainable business practices.



vi. Optional: Propose a partner or contact who can install solar hot water systems, other renewable technology, or other energy efficiency measures.

c. **Proposal Narrative**: This section in the proposal should outline a detailed and solid strategy that should at a minimum address the following items:

- i. **Program Plan**: Provide a plan for implementation, describing the proposing Installer's ability to provide solar PV installation services to the Community during the Program period. Specifically, the proposal should describe the Installer(s) ability to provide timely customer service, site assessments, grant applications submissions, installation services, and workmanship warranty. Identify all components, including the DAS, covered in the workmanship warranty. Elaborate on the specific intake process for customer leads, method for screening sites, and an installation schedule for tiered levels of the solar PV capacity. Include an estimate of the number of small scale solar PV projects the installation team can complete on a monthly basis. Describe a quality assurance process for the solar PV installations and outline the process for managing any permits, inspections, and the interconnection process with National Grid. Finally, outline the quality of the proposed equipment and how the installation process will be explained to the customer.
- ii. **Timeline**: Provide an expected timeline for the average customer under the Program to guide Tiverton and the customer expectations.
- iii. **Marketing Strategy**: Outline a marketing plan that describes methods to motivate community-driven solar PV installations. This should include ways a joint marketing strategy between Tiverton and the Installer(s) can expand the number of PV projects within the community. Include ideas by which Tiverton outreach can be leveraged to generate leads more likely to move forward. Identify any potential community partners that may be able to assist in deploying or enhancing the marketing strategy. Cite specific examples of marketing services that will provided, items, or marketing materials that will be produced (lawn signs, banners, etc.) or (if available) dollars that will be allocated to support Tiverton's efforts.
- iv. **Geographic Proximity**: Provide a plan to address the Installer's geographic proximity to Tiverton and how this will shape the services provided.



- v. **Plan for large volume:** The Project Administrators anticipate that large volumes of installations could occur through the Solarize RI program. Installers should identify both the number of installations that could be reasonably handled as well as details for a contingency plan if outreach results in contracting a large number of PV projects. Strategies may include identification of a subcontracted installer, formation of an installer consortium, access to out-of-state crews, hiring of additional sales or administrative staff, or another strategy. Installer(s) should also identify the “ramp up” plan that outlines a plan to accommodate the anticipated increase in volume in response to leads, site visits, and follow up visits as well as community events and meetings.
- vi. **Tiered Pricing Structure:** Outline the Purchase Price and the optional lease/PPA price, and the optional lease/PPA financial incentive on the *Pricing Proposal* (Attachment B), based on a total capacity (DC @STC) of solar PV contracted using the following three tiers:

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Tier 1	Tier 2	Tier 3
1kW – 50kW	51kW-150kW	151kW+

As total contracted capacity increases by tier, the Installer’s proposed cost per watt (\$/W) must decrease for customers that purchase a system under the Program.

Optional: Installer(s) may propose a \$/kWh lease/PPA price for customers that sign a third party ownership contract and will note an additional financial incentive as higher tiers of aggregate contracted capacity within Tiverton are reached. Examples of the financial incentive can include a rebate, gift card, or other financial incentive. However, the agreed upon financial incentive should be consistent across all customers and needs to be disclosed on the Small Scale Solar grant application.

Pricing proposals to Tiverton customers should include total installation costs, which includes system design, permitting, applicable materials and equipment, transportation, labor, and all equipment and workmanship warranties. The price should be independent of any tax credits or incentives available to the customer.

Installer(s) should refer to and complete the *Pricing Proposal* (Attachment B). Information on Attachment B must be electronic, hand written documents will not be accepted. Project specific pricing will not be considered for this Program. In addition,





Commerce RI will not recognize any project-related cost adders if they are not outlined in Attachment B at the time of proposal.

A copy of the standard agreement for purchased systems should be included in the proposal. Optional: If bidding with a lease/PPA price, provide a copy of the standard lease or PPA agreement. Also, the Installer(s) should clearly identify any criteria in which a price escalator may be present for customers, and include a maximum range for the price escalator.

Note: As of November 10, 2014 the average cost for installed direct purchased residential PV systems under the Small Scale Solar program was \$4.49/watt.¹²

vii. **Price Contingencies (Adders)**: It is understood that features of certain installations will result in higher costs. Installers must outline specific electrical, mechanical, structural, equipment, site, or labor features that will result in higher costs. Adders should be listed as a \$/watt cost for Purchased projects. Optional: if bidding a lease/PPA price adders should be lists as a \$/kWh cost. Also, the Installer(s) may list an adder as a flat cost for Purchased projects. Installers will be responsible for identifying individual projects that trigger additional pricing and will submit appropriate documentation to the Project Administrators for tracking purposes.

viii. **System Specifications**: Identify system specifications for equipment that will be used for projects going through the Program, including equipment manufacturers, models, and warranties for modules, inverters, racking, meters, and data acquisition systems. The project administrators and Tiverton are interested in high quality as well as cost competitive equipment.

ix. **Proposal for sites that are not feasible for solar PV**: Outline the process by which the Installer(s) will handle the leads that do not have feasible sites for solar PV.

d. **References**: Provide references for three (3) residential projects and one (1) commercial solar project that may be contacted to discuss customer experience (including a name, location, date of installation, phone number and email address). All projects listed in the reference section must be interconnected and operational.

16. Application Format:

This section outlines the content and format requirements for all Applications.

¹²Four installed battery backup systems were removed from the Small Scale Solar program \$/watt average.





- a. Executive Summary
- b. Proposal Team Experience
- c. Proposal Narrative
- d. References
- e. Signed and Completed Attachment A
- f. Completed Attachment B in Excel format
- g. Copy of Direct Purchase contract(s) and optional Lease/PPA contract

One copy of the proposal must be delivered via electronic format, including a scanned signature page (Attachment A) and a finalized Pricing proposal (Attachment B) in Excel format either by email to ref@commerceri.com or included on a CD or flash drive with one hard copy submission of all proposal materials. All applications are due to Commerce RI by 4:00pm on December 9, 2014. No late submissions will be accepted. All email submissions should include "Solarize Tiverton RFP" in the subject line.

17. Evaluation Criteria

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All proposals must meet the Solarize RI Program objectives and must be responsive to the relevant scope of work and proposal requirements outlined above. Proposals will be evaluated on the general criteria below:

- a. **Threshold Requirements:** Applications must meet a threshold review before they will be provided to the Tiverton External Review Team. To meet the threshold review, proposals must include the following:
 - i. Installer(s) must have a Renewable Energy Professional Certificate with the RIOER at application submittal. A statement in the Executive Summary stating this will be acceptable. A copy of the REP application submitted to RIOER will also be acceptable.
 - ii. A minimum of ten (10) installed and interconnected PV projects.
 - iii. Completed and signed Attachments A and B
 - iv. Specifications of two or three Data Acquisition Systems as part of Attachment B
 - v. Proposed program plan
 - vi. A direct purchase tier price (presented as a \$/watt) and an Optional lease/PPA price (presented as a \$/kWh) with corresponding PPA/lease financial inventive on Attachment B.





- vii. The proposed Purchase Price to the customer **must** decrease by each of the three tiers. Note: the price drop can be different between tiers.
- viii. Identify any project price adders on Attachment B.
- ix. A template copy of a direct purchase contract
- x. Optional: a template copy of the proposed lease/PPA agreement, specifying terms and conditions and an explanation of any escalators

b. **Additional Requirements:** Once the Installer proposal passes threshold review, the proposals will be evaluated by the Program Administrators and the Tiverton External Review Team based on the following criteria:

- i. **Overall quality and value:** overall quality of proposal and specified equipment;
- ii. **Experience:** degree of Installer’s experience and proficiency in the scope of work, including demonstrated experience in developing, designing, and installing small-scale solar PV systems. In addition, experience of Installer team. If applying as a consortium, provide the experience of the Installer companies in the consortium and (if any) past experience working together.
- iii. **Implementation:** ability to provide timely, quality customer service and installations as well as ability to work well with Tiverton, and ability to submit timely metrics as well as grant applications to the REF’s Small Scale Solar Program.
- iv. **Price structure:** quality and simplicity of pricing proposal for Purchase Price (\$/kW) and optional lease/PPA price (\$/kWh) and corresponding financial incentive. In addition, the value offered by proposed equipment, price adders, price escalators (if any) and contract term and conditions.
- v. **Demonstration of innovative concepts:** additional consideration will be given to Installer(s) that can provide innovative business models, or have options for other technologies such as solar hot water or energy efficiency.
- vi. **Marketing Plan:** ability of proposal to drive community adoption of solar PV projects and drive down the cost of residential and small scale solar PV installations.

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18. Timeline

A proposed timeline for the RFP process and program is outlined below. Please note that this is an estimated timeline and dates may be subject to change.





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Solarize Rhode Island Schedule	Round 2 - Tiverton
RFP for Solar Installers: Released	November 12, 2014
Solar Installer Stakeholder Meeting & Public Questions and Answer Session	December 3, 2014
RFP for Solar Installers: Due	December 9, 2014
Threshold review of Installer Proposals	December 10, 2014
Community selection of top three proposals	December 15, 2014
Community-Installer Interview Day	December 17, 2014 between 9am-12pm
Community-Installer Interview Day (Snow Date)¹³	December 19, 2014 between 1-4
Announce Selected Solar PV Installer(s)	December 22, 2014
Begin Community Solar Ambassador Education & Volunteer Training	December 2014 - January 2015
Outreach Strategy Development with Installer	Early January, 2015
Community Kickoff Event	January 27, 2015
Community Kickoff Event (Snow Date)	February 3, 2015
Customer Sign-Up Period Begins	January 27, 2015
Customer Sign-Up Period Ends	May 8, 2015

- a. Responses to this RFP must be received by Commerce RI no later than 4:00pm on December 9, 2014. Only complete, timely proposals will be considered. Commerce RI, at its sole discretion, may determine whether an application is timely and complete.

¹³ If weather causes a problem for the originally scheduled Community-Installer Interview Day, the event will be rescheduled to this alternative date. Program Administrators will contact the selected Installer(s) in advance if the alternative date is needed.





- b. Installer(s) must be available to meet with the Review Team on December 17, 2014 or, in the case of inclement weather, December 19, 2014. At least one representative from the Installer team must attend in person. If five (5) companies or more are partnering in a consortium, please choose a maximum of five (5) representatives to attend the Interview Day.
- c. One copy of the proposal must be delivered via electronic format, including a scanned signature page (Attachment A) and a finalized Pricing proposal (Attachment B) in Excel format either by email to ref@commerceri.com or included on a CD or flash drive with one hard copy submission of all proposal materials. One hard copy of the proposal must be delivered to Commerce RI. All email submissions should include “Solarize Tiverton RFP” in the subject line.

19. Questions and Contact Information

- a. A public solar PV stakeholder meeting will take place on Wednesday, December 3, 2014 from 9:00 am to 12:00 pm. During this meeting, questions regarding the RFP may be asked. Representatives from the respective Program Administrators offices will be in attendance. If, during the meeting a question is unable to be answered, the Program Administrators will post an addendum to this RFP with answers that may not be available during the meeting.
- b. Questions may also be asked in writing. These should be sent to ref@commerceri.com with the subject line “Solarize Tiverton RFP”. All questions posed in writing will be answered during the PV stakeholder meeting and posted on the Commerce RI website after the meeting no later than Friday, December 5, 2014.
- c. Installer(s) must be available to meet with the Review Team on December 17, 2014 or, in the case of inclement weather, December 19, 2014.. At least one representative from the Installer team must attend in person. If five (5) companies or more are partnering in a consortium, please choose a maximum of five (5) representatives to attend the Interview Day.

20. Negotiations

Commerce RI selection of an Installer through this RFP is not an offer and Commerce RI reserves the right to continue negotiations with the selected Installer(s) and the each Community until the parties reach a mutual agreement. Commerce RI reserves the right to reject any or all responses; waive defects or irregularities in any response; enter into



discussions with selected bidders; discontinue discussions with any bidder at any time and for any reason; correct inaccurate submissions; change the timing or sequence of activities related to this program; modify, suspend or cancel this program.

21. Changes to the RFP

Comments and suggestions for programmatic changes, especially regarding the DAS requirement, are welcome in the Installer(s) proposals.



Attachment A

Authorized Installer's Signature and Acceptance Form

The undersigned is a duly authorized representative of the Installer listed below with the authority to bind the company for the proposed Solarize Rhode Island Program. The Installer has read and understands the RFP requirements. The undersigned acknowledges that all of the terms and conditions of the RFP are mandatory. I certify:

- The information contained in this Proposal or any part thereof, including its exhibits, schedules and other documents or instruments delivered or to be delivered to Commerce RI, are true, accurate and complete. This Proposal includes all information necessary to ensure the statements therein do not in whole or in part mislead Commerce RI as to any material fact.
- The Installer understands that all materials, are subject to disclosure under the Rhode Island Public Record Laws (R.I. Gen. Laws § 38-2).
- Installer understands that Commerce RI has no obligation, and retains sole discretion to fund applications received under the Renewable Energy Fund's Small Scale Solar Program.
- Commerce RI's receipt of the proposals received through this RFP does not imply any promise of future funding.
- The Proposal is not made in connection with any competing Installer submitting a separate response to this RFP and is in all respects fair and without collusion or fraud; provided, that this requirement shall not be construed to prohibit any person or entity from being involved in more than one Application.
- The Installer has not been convicted of bribery or attempting to bribe a public official or employee of the state, has not been disqualified for contract awards by any agency of the state, and is not in default under any contract with an agency of the state.
- No Commerce RI Board member, consultant to Commerce RI, or employee of Commerce RI participated directly or indirectly in the Installer's response preparation.
- The Installer has not provided any gift or benefit to any state official or employee having direct influence over the evaluation of this proposal.

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I have read, and agree with the terms of this application, including the Terms and Conditions listed in Section 9 of the Request for Proposals (RFP) dated November 12, 2014, that are incorporated herein:

Installer: _____
(Printed name of Installer Organization)

By: _____
(Signature of Authorize Representative)

Date: _____

Name: _____

Title: _____



Attachment B

Solarize RI Program Pricing Proposal

Selected Community

Please complete this document electronically – do NOT handwrite.

Proposal for Community
Tiverton

Primary Point of Contact

Installer Company Name	Contact Name
Contact Email	Contact Phone Number

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Proposed Equipment

List all proposed equipment to be used during the course of the program for the typical solar PV installation. If more than one variety of equipment will be used, please include it below. **The selected Installer(s) may only alter the list of approved equipment during the course of the Solarize RI program upon pre-approval by Program Administrators. If the equipment proposed below does not match equipment listed in customer proposals and contracts, there may be a delay in Commerce RI grant approval. Under no circumstances will Commerce RI reimburse the selected Installer(s) for a Data Acquisition System not listed below.**

Major Component	Manufacturer	Model Number
<i>Inverter(s)</i>		
<i>PV Modules</i>		
<i>Mounting System</i>		
<i>Production Meter</i>		
<i>Data Acquisition System A</i>		





<i>Data Acquisition System B</i>		
<i>Data Acquisition System C</i>		

Tiered Pricing Proposals¹⁴

The bid should include a dollar per watt (\$/W) Purchase Price that will reduce as higher tiers are reached. Optional: a Lease/PPA Price in the form of a dollar per kilowatt hour (\$/kWh) price. While the Lease/PPA Price is expected to remain the same throughout the program, the bid should include a financial incentive (such as a rebate, check card, other incentive, etc.) that is received by Lease/PPA customers as higher tiers are reached.

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Tiers	1kW-50kW	51kW-150kW	50kW-100kW
Purchased Price (\$/W)			
Lease/PPA Price¹⁵ (\$/kWh)¹⁶	Lease/PPA Price (at 90% optimal): _____ Escalator (%) ¹⁷ : _____		
Lease/PPA Incentive¹⁸	N/A		
Details on Lease/PPA Pricing Model	Explain any variations on the Lease/PPA model that will be provided. Outline the maximum range for pricing escalators that will be present in contracts.		

¹⁴Installer should include a template Purchase contract and, if applicable, a template Lease/PPA contract in the proposal for review.

¹⁵ Provide a lease/PPA price for a system that produces 90% of optimal production. All lease/PPA prices should assume \$0 down upfront. In addition, provide the contract escalator that applies to projects.

¹⁶ If a lease is offered, convert the payment to a \$/kWh price.

¹⁷ The lease/PPA escalator is the rate by which the price will increase over the term on the contract.

¹⁸ Provide the incremental value that a lease/PPA customer would receive as a new tier is reached (Not the total value received, including prior tier incentives).





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If proposing a lease/PPA price, Commerce RI also requests a summary of Lease/PPA Pricing based on alternate system production. Please complete the following, indicating what the price would be for a typical contract with the different production percentages, including the escalator.

% of Optimal System Production	100%	95%	90%	85%	80%
Lease/PPA Price (\$/kWh)					
Escalator (%)					

37

Increased Pricing Factors

Outline below any additional costs that may increase the tiered pricing proposal (both Purchase and PPA/Lease Prices, if offering) above. Identify a maximum price increase for projects under the Program.

Factors	Increased Cost (\$/W)	Increased Cost (\$/kWh)	Flat Fee (if applicable)	Description of Work
<p>Site Specific</p> <p>May include, but is not limited to:</p> <ul style="list-style-type: none"> • Multiple roof arrays • Tilt racking • Standing seam metal roof • Flat roof • Pole or ground mounted system • Tree removal 				



<p>Structural May include, but is not limited to:</p> <ul style="list-style-type: none"> Reinforcing rafters 				
<p>Electrical May include, but is not limited to:</p> <ul style="list-style-type: none"> Electrical panel upgrade Electrical sub-panel Meter Upgrade/change Interior conduit run 				
<p>Internal Monitoring (Micro-inverters)</p>				
<p>Extended Warranty (if applicable)</p>				
<p>Maintenance (if applicable)</p>				
<p>Other May include, but is not limited to:</p> <ul style="list-style-type: none"> Additional cost micro-inverters Steep roof / tall roof (define) Small system adder Large system cost subtraction 				



Total Additional Cost				



Attachment C

(Date)

(Installer Address)

Attention: (Installer Contact)

Dear (Solar Installer),

40 Congratulations upon (Solar Installer) being selected as an Installer in connection with the Solarize Rhode Island Program (the "Program"). The Rhode Island Commerce Corporation ("Commerce RI"), Rhode Island Office of Energy Resources and SmartPower, Inc. ("Program Administrators") are looking forward to working with you during the Program. Consistent with the Request for Proposals to which you responded, (Solar Installer) agrees to the following terms and conditions. For purposes hereof, Contractor and Installer shall have the same meaning and Contract and Proposal shall have the same meaning.

In consideration for having been chosen as an Installer for the Program, (Solar Installer) hereby agrees as follows:

- a. The Installer will provide the Program Administrators the community contacts with weekly data as requested, including but not limited to, the number of community initial interest contacts, number of site visits completed, number of feasible sites, number of signed contracts, and contracted capacity. Prior to Program Launch, the selected Installer and the Program Administrators will agree to specific Program metrics. The agreed upon metrics will be due to Commerce RI by Monday at 5:00pm for the prior week (Monday through Sunday at midnight);
- b. The Installer will be able to contract with customers through May 8, 2015, and will have six months to submit all applications to the REF Small Scale Solar program. Commerce RI will keep the selected Installer and the RI solar installer community updated if there are any changes to the REF funding levels for the Small Scale program. Dates of solicitations in 2015 are currently posted on the Commerce RI website. There will be a review process for all grant applications processed and all applications will need to be approved before the Commerce RI monthly board meetings;





- c. The Installer commits to providing customers with the tiered pricing outlined in Attachment B of the Request for Proposal. All adders will be clearly defined in all turnkey contracts to customers. The Installer will offer the equipment as outlined in Attachment B and will notify Project Administrators if the proposed equipment is unavailable before project installation. Workmanship warranty language will be included in the Proposal narrative;
- d. The Installer commits to installing a DAS on every participant receiving the additional SRP Incentive. The price of the DAS will be reimbursed from the Project Administrators (up to \$1,000 per system). No portion of the price of the DAS will be passed along to the participant. The cost of installation of the DAS will be included as part of the tiered pricing structure bid by the Installer;
- e. The Installer commits to passing along the full value of the SRP Incentive as calculated by the provided calculator to qualifying participants. This incentive is designed to compensate and provide a subsidy to qualifying participants. Contracts and proposals written for Solarize Tiverton customers must include a specific line item detailing the value of this incentive;
- f. The Installer will be required to provide the Program Administrators with a final report outlining the total number of contracted customers within the community and the resulting prices that will be associated with each installation. If at any time during the Program, a customer cancels a contract, the Installer will need to notify the Program Administrators within two (2) weeks of the cancellation and the reason why the project is not moving forward;
- g. The Installer agrees to work with Program Administrators on referring to the brand as “Solarize RI” and “Solarize North Smithfield” on all Program documentation. The Installer will provide the Program Administrators the Installer company logos to use on Program documentation. All relevant logos, including the Solarize RI logo, will be used in all community outreach materials, websites, and other marketing materials;
- h. Collaborate with Program Administrators on all press releases, events, or news conferences concerning the Program. In any media produced by the Installer, the Installer will not represent that positions taken or advanced by it represent the opinion or position of Commerce RI, the State of Rhode Island, the RI Office of Energy Resources, the town of North Smithfield, or SmartPower, Inc.;



- i. Work with Program Administrators in developing additional marketing materials, including but not limited to, providing photographs or other information for use in marketing the Program, and collaborate in obtaining photographs (using the Commerce RI Media Consent Form) and statements of support from Solarize North Smithfield customers for use of the Solarize RI website;
- j. Include a disclaimer on all Installer customer intake forms and media (such as website and sign-sheets) that outlines how customer contact information may be used under the Program and provide the customer will be ability to opt out of any communication unrelated to solar PV installations under the Program;
- k. Provide complete and accurate customer and lead contact information to the Program Administrators within five (5) days on the conclusion of the campaign, including full name, email address, phone number, and addresses. In addition, the Installer will provide complete and accurate information for all non-feasible leads (as determined by actual site visits or satellite image screening) to the Program Administrators on a monthly basis;
- l. Installer agree to participate in any appropriate marketing and outreach events within North Smithfield as well as any community meetings organized by the Program Administrators;
- m. Agree to provide feedback at the end of the campaign on the effectiveness of various marketing materials, outreach strategies, and general Program matters, including completion of an evaluation survey;
- n. Participate in bi-weekly phone calls with the Program Administrators and North Smithfield;
- o. Installer agree to not market under the Solarize tagline in other future Solarize communities other than North Smithfield;
- p. During the performance of this Agreement, Contractor and its subcontractors shall comply with all applicable federal, state, and local laws, rules and regulations in regard to nondiscrimination in employment because of sex, sexual orientation, race, color, ancestry, religious creed, national origin, disability, medical condition, age, marital status, and denial of family care leave. The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Agreement;



- q. That no gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by Contractor, or any agent or representative of Contractor, to any officer or employee of Corporation with a view toward securing this Agreement, or securing favorable treatment with respect to any determinations concerning the performance of this Agreement. For breach or violation of this warranty, the Corporation shall have the right to terminate this Agreement, either in whole or in part, and any loss or damage sustained by Corporation in procuring on the open market any services which Contractor agreed to supply shall be borne and paid for by Contractor. The rights and remedies provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or in equity;
- r. Installer acknowledges that all submissions (including those of parties not selected for engagement) may be made available to the public on request (pursuant to the Rhode Island Access to Public Records Act, R.I.G.L. § 38-1-1 et seq.) upon the completion of the process and award of a contract or contracts. Accordingly, any information included in the proposal that the Installer believes to be proprietary or confidential should be clearly identified as such;
- s. Contractor certifies that that it is insured against liability for Workers' Compensation and affirms that it will maintain Workers' Compensation Insurance during the term of the Program and indemnify the Corporation from any liability for violating this provision. Contractor shall require any and all subcontractor(s) to include such a provision in all subcontracts to perform work under this Agreement;
- t. Installer agrees to indemnify Commerce RI, and its officers, directors, employees, agents, and affiliates against, and defend and hold each of them harmless, from any and all claims or liabilities related to or arising in any manner from this Program other than claims or liabilities resulting from the gross negligence or willful misconduct of Commerce RI;
- u. Commerce RI shall not be liable to the Installer for any special, indirect, incidental, consequential, punitive, or exemplary damages of any kind whatsoever, whether based on contract, warranty, tort (including negligence or statutory liability), or otherwise, in connection with the performance of this Agreement;
- v. This Agreement shall remain in effect for one (1) year after Commerce RI approves the last Small Scale Solar Program incentive award to the



Installer under the Program;

- w. The Contractor has obtained, will obtain, and shall maintain and comply during the term of this Agreement, with any and all applicable federal, state and local reviews, consents, authorizations, approvals and licenses required by law for the Program and shall indemnify, defend and hold the Corporation, and each of its officers, agents, employees and consultants harmless from and against any and all suits, damages, claims, causes of actions, demands, judgments, penalties, costs, expenses, attorneys' fees and any and all injuries to persons or property and all other matters arising out of or incurred in as a result of the Contractor's violation of this provision;

By signing below, you acknowledge that you have carefully reviewed the foregoing, that you understand its contents and you agree to be bound by all the terms and conditions stated therein.

Sincerely,

44

Marcel A. Valois
Executive Director
CommerceRI

APPROVED AND ACCEPTED

(Solar Installer)

Dated

By:

Its: _____

Duly Authorized



Appendix A



Solar PV for Distribution Grid Support:

*The Rhode Island System Reliability Procurement
Solar Distributed Generation Pilot Project*

June 30, 2014

Prepared by

Peregrine Energy Group, Inc.

2 Oliver Street, Boston MA 02109

Francis Cummings, Project Manager

with

Charles P. Salamone, PE, Cape Power Systems

Mark Farber

Richard C. Gross, PE

Solar PV for Distribution Grid Support:

*The Rhode Island System Reliability Procurement
Solar Distributed Generation Pilot Project*

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3. Solarize Campaign For Rooftop Installations	17
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INTRODUCTION AND EXECUTIVE SUMMARY

National Grid and the Rhode Island Office of Energy Resources (OER) have initiated this study to:

- 1) understand the extent to which solar distributed generation (DG) resources can provide 250 kW of reliable load relief at times of peak demand that could lead to a distribution investment deferral; and
- 2) gain insight into the associated costs and benefits of using DG resources as part of a distribution system reliability portfolio.

The context for this project is the System Reliability Procurement (SRP) Pilot that National Grid is conducting to assess load relief from energy efficiency and demand reduction in the communities of Tiverton and Little Compton, Rhode Island. ^[ES-1] This study outlines the potential for a pilot program of installing solar PV for load relief that is additive to and integrated with National Grid's existing SRP Program, but is funded by the OER and not through the existing SRP budget. Loads are more residential in composition here than the statewide or regional averages and therefore peak later on a summer day.

The capability of PV to generate power in the Pilot area is essentially known for each hour of the day during the summer under optimal conditions. The main factors subject to uncertainty for distribution planning are:

- the time of day at which the relevant load will reach its highest peak of the summer, ^[ES-2] and
- the extent of reduction in PV output that can be expected at that time, primarily due to cloud cover.

Solar Distribution Contribution. This study therefore analyzes the hourly load on the relevant portion of the distribution system ("feeder 4") for each hour of the 3-year period 2011 through 2013. For each of these hours we compared the load with the solar output that would have been achieved given actual historical conditions. ^[ES-3] Based on this historical data, we developed a method to calculate the Distribution Contribution Percentage or "DCP" of solar PV, to determine the level of solar capacity that would assure that the 250 kW deferral need could be met for the few highest-load summer hours when it is actually required.

The resulting DCP metrics are presented in Figures 7 and 8 on page 8. We used these DCP values to evaluate multiple solar DG configurations for each of the three years for which load data was available.

- *Example:* a solar configuration with a fixed solar array facing 200 degrees (almost southwest) would provide a DCP of 46% of the kW capacity of the array. This means that to provide 250 kW of sustained, reliable load relief, a total of 540 kW of solar would have to be installed (540 kW capacity x 46% DCP = 250 kW deferral).

The 46% Distribution Contribution Percentage in this example for a southwest orientation is substantially better than the 26% DCP of a typical south-facing PV array. The highest Distribution Contribution was 61% for a system with dual-axis tracking.

Cost of Optimizing PV for Distribution Support. To assess the net value of different PV configurations for load relief, one question is whether the value of the distribution deferral benefit from solar PV is greater than the cost of achieving it. The costs and benefits of using these solar DG resources as part of a distribution system reliability portfolio can be analyzed on the basis that the costs would include only the incremental costs of, or lost revenues from, optimizing the solar systems for distribution deferral, and not the base level of cost for a solar array built to maximize energy production. The solar system(s) would likely be owned by private companies or residents, and those private owners would realize the benefits of the energy generation and so would pay the conventional costs of the solar systems.

The cost to achieve the distribution deferral (from fixed-array configurations) is only the incremental cost of lower annual energy generation that results from facing the PV to the southwest (in the example above) instead of the south.^[ES-4] This is discussed in Section 2.4, Incremental Incentives to Optimize Distribution Contribution.^[ES-5]

- *Example:* in the Tiverton and Little Compton area, each kW of solar capacity will generate approximately 1,463 kWh if it is facing south (180 degrees), but only 1,309 kWh if it is facing 220 degrees – a modest 5% reduction of 74 kWh/year. This cost amounts to \$145/kW in present value terms (from Figure 13, page 13, columns E and F).^[ES-5]

Distribution Benefits of Solar PV. The analysis of the distribution contributions of solar PV in this geographic area shows the potential for significant economic benefits from deferring the distribution investment that is the target of the SRP pilot.

- *Example:* The incremental benefit of changing the orientation from 180 to 220 degrees, to continue the example above, is estimated to be \$652 for each solar kW installed (from Figure 13, column D) -- significantly greater than the \$145/kW cost. This benefit is based on the difference between the Distribution Contribution Percentage of 46% for a 220 degree orientation and the 26% DCP for south (an increment of 20%) times the present value of the deferral savings and avoided distribution cost.

Economic Comparison of Solar PV Configurations. The different solar configurations have different levels of benefits for distribution deferral, as well as different levels of incentives to optimize these distribution contributions.

- Tracking configurations have relatively high DCPs in the range of 60%, though their viability for this Pilot in the short term will depend on incremental capital and operating costs that are difficult to predict meaningfully.
- For fixed solar arrays, there are diminishing returns as the azimuth orientation moves toward the west, with smaller and smaller increases in the DCP. At the same time, increasing incentives would be required to offset greater reductions in annual output as orientation nears the west. The highest level of net distribution benefits are obtained from orientations of approximately 220 degrees for residential projects (with DCP of approximately 46%) to 230 degrees for fixed-array commercial projects (with DCP of approximately 49%). These analyses are described in Sections 2.4 (for ground-mounted solar projects and 3.3 (for rooftop PV projects).

Solar Pilot Resource Portfolio. A portfolio was developed as a target for this SRP Solar Pilot or an example of what could be expected. These resources are sized to meet the 250 kW deferral goal based on the ranges of DCP values summarized above, as shown in the table below (Figure 1):

- *Grid Support Solar Field:* one commercial-scale ground-mounted solar project of approximately 280 kW, or greater, addressed in Section 2, providing over half of the deferral goal (approximately 140 kW based on a Distribution Contribution Percentage of 50%), or a small number of projects with the same total size;^[ES-5]
- *Solarize Campaign:* a mix of residential PV systems (totaling 160 kW) and small nonresidential rooftop systems (averaging 25 kW), with a total of at least 200 kW and providing approximately 110 kW or more of distribution contribution based on an average DCP of 45%.^[ES-6] These 30 to 35 smaller installations, discussed in Section 3, will diversify the portfolio to offset risks such as the possibility that one or more larger solar fields could be delayed in development.

PV Procurement for Distribution Contribution. This portfolio can be used as a general guide to procure the most attractive distribution support options for this Pilot by offering incremental rebates designed to incent interested solar developers and owners to design PV systems with high distribution contributions.

- For the Solar Field, a competitive process would provide PV developers the opportunity to submit a bid for a grant to offset the incremental costs of optimizing the distribution contribution. Each bidder would propose a particular PV orientation or tracker configuration for a specific site in the Pilot areas, and would propose a grant amount. A grant would be awarded to the bidder whose bid is scored as providing the greatest net distribution benefit, and that bidder could then develop the PV project for submission in the next round of the DG Standard Contract process.
- For the Solarize Campaign, a rebate would be calculated for each 10 degrees of orientation to the west of south, and offered as an “instant rebate” directly to each of the 30 to 35 participating customers in the Pilot area. For purposes of this pilot, it is understood that the grant funding for any rebates and adders would be provided by the RI OER from funding available for this purpose.

Figure 1: Solar / Storage Resource Portfolio

	1	2	3	4
	Grid Support Solar Field(s)	Solarize Residential	Other Small Projects	Total
1 Gross Capacity (kW)	280	160	80	520
2 Average Distribution Contribution Percentage (DCP)	50%	45%	45%	
3 Distribution Contribution (kW)	142	72	36	250
4 Portfolio Allocation	57%	29%	14%	100%

These resources are described further in sections 2 and 3.

Implementation Schedule. A schedule for the SRP Solar Pilot is provided at the conclusion of this report, in which 80% of the resource portfolio becomes operational for distribution support in approximately 12 months, before the summer of 2015. Success in meeting this schedule will depend on the response of the markets to the SRP procurements, and also the avoidance of delays in the development process.

Footnotes: Executive Summary

- ES-1: 2014 System Reliability Procurement Report, The Narragansett Electric Company d/b/a National Grid, R.I.P.U.C. Docket No. 4453
- ES-2: Solar PV generation corresponds well with the peak periods for the wholesale power markets and the transmission system. In fact, all the PV configurations studied for Tiverton generate at least 66% of their annual output during peak periods. However, to provide distribution system capacity, PV output is needed during just one or a few peak summer hours.
- ES-3: The analysis of hourly PV production for the SRP Pilot area was conducted by Clean Power Research with the SolarAnywhere® Data system. <http://www.cleanpower.com/products/solaranywhere/sa-data/>
- ES-4: For tracking configurations, output and DCP are high but there may be increases in capital and operating costs in order to achieve the incremental Distribution Contribution. These incremental costs are not reflected in the analysis of fixed arrays.
- ES-5: The 50% DCP used for the solar fields in the portfolio summary is approximately the DCP of the PV orientation (230 degrees) with the greatest Net Distribution Benefit in Figure 13 on page 13. 50% is also the expected value DCP based on an equal probability of development for each fixed orientation from 200 degrees through 260 degrees and for single-axis and dual-axis tracking.
- ES-6: “Solarize” is a term for local campaigns that increase penetration and drive down installation prices. For a description of the approach in Massachusetts, see <http://www.masscec.com/solarizemass>. The 45% DCP used for the solarize PV in the portfolio summary is approximately the DCP of the PV orientation (220 degrees) with the greatest Net Distribution Benefit illustrated in Figure 16 on page 18, and 45% is also the expected value DCP based on an equal probability of development for each fixed orientation from 200 degrees through 240 degrees.

SECTION 1: SOLAR DISTRIBUTION CONTRIBUTION

1.1 Load Data for SRP Pilot Area

The starting point for this study is the need for sustained, reliable load relief that will allow for a distribution investment deferral. National Grid provided data on the hourly load on the relevant portion of the distribution system (“feeder 4”) for each hour of the 3-year period 2011 through 2013.^[1-1]

Without significant solar distributed generation (DG), the peak load in the Pilot area reached 9,800 kVa in 2011, as shown in Figure 2. While the peak load was lower in 2012, it reached nearly the same peak again in 2013.

The summer months were the focus of this analysis: June, July, August and September. For each of the three years, we selected the highest 10 percent, or 288, of the hours out of the summer peak period to analyze the potential contribution of solar PV. This use of 10% is analogous to its use in “90/10” load forecasts. Figure 2 shows how these hours constitute the top of each year’s load duration curve.

The location of feeder 4 is shown on the map on the next page, extending from Tiverton into Little Compton. This defines the Pilot area for this study.

Figure 2: Feeder 4 Load for Top 10% of Summer Hours

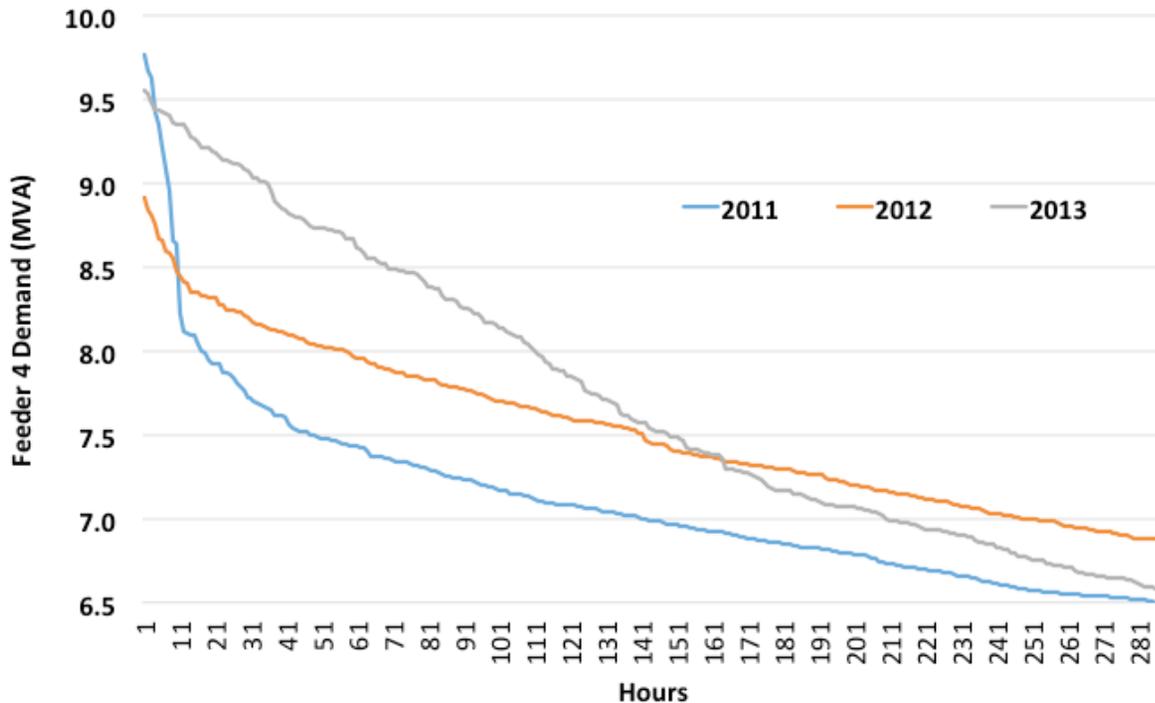
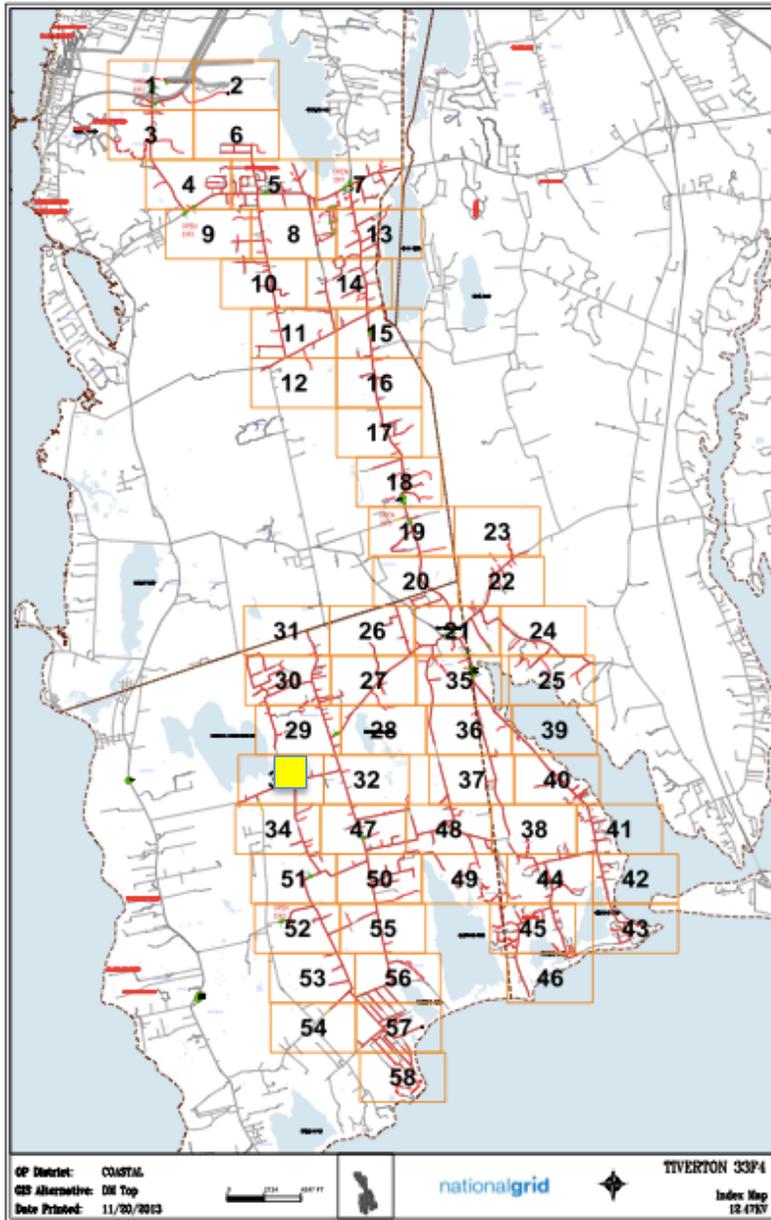


Figure 3: Feeder 4

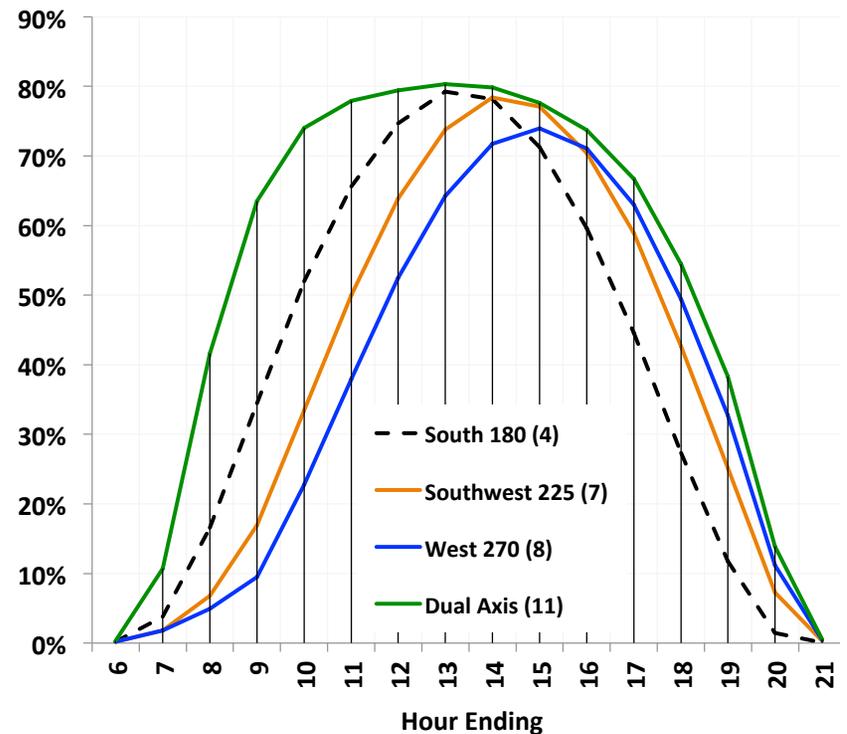


1.2 Historical Hourly Solar Generation in the Pilot Area

This study is based on the output that solar PV would have provided in the particular location of feeder 4 under the historical conditions in each hour of 2011 through 2013. The hourly PV production data was prepared by Clean Power Research for the SRP Pilot area with the SolarAnywhere® system.^[1-2]

These PV data make it possible to compare the load relief that would have been provided to feeder 4 by different PV configurations. Figure 4 shows the increase in output in the critical late hours of the day from southwest and west-facing fixed arrays and from dual-axis trackers, compared with traditional south-facing fixed arrays.

Figure 4: Output of Solar Configurations on July 22, 2011



1.3 Distribution Contribution Methodology

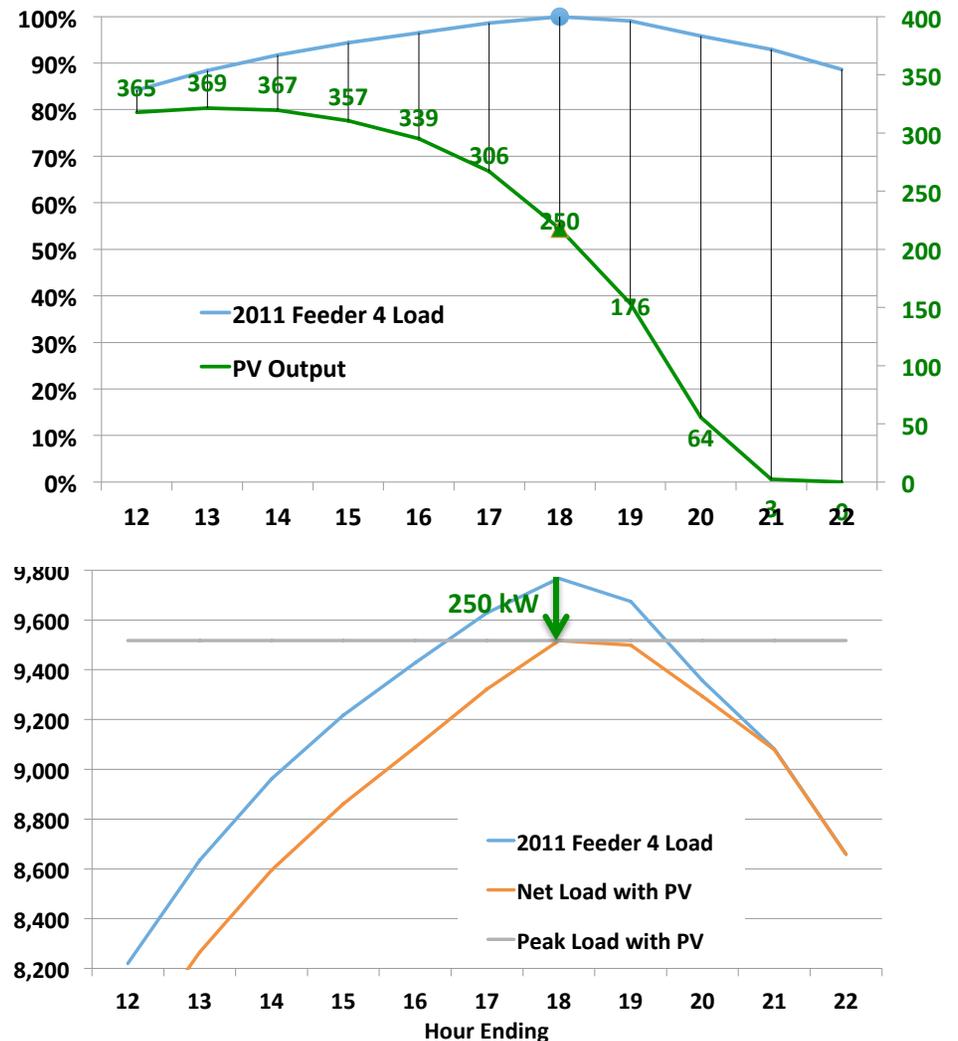
The Distribution Contribution of solar DG is its ability to provide reliable load relief, which depends on its output in the hours with the highest loads. The highest peak load on feeder 4 in the three year study period occurred on July 22, 2011 in the hour ending 18 (from 5:00 pm to 6:00 pm). The hourly generation levels of five different PV configurations are shown for that day in Figure 5 on the previous page.

Figure 6 to the right zooms into 11 hours during that day.^[1-3] The comparison of the two lines in the top chart highlights the rapidly falling PV output at the time the load is reaching its peak, but also shows that just over half of the PV capacity remains available to provide load relief in that hour. Specifically, the blue lines in Figure 6 show the actual load without any new PV, in percentage terms in the top chart and in absolute terms in the lower chart.

The green line represents the output from one of the PV configurations: a dual-axis tracking system. Its output is plotted on the left axis as a percentage of the annual PV maximum output.

The basic approach of the Distribution Contribution Methodology is to identify the percentage of the PV's maximum output that would have been generated under historical peak conditions, and to size the PV resource to meet the need, which is to ensure that net loads will not be greater than the original maximum demand less the desired load relief (250 kW). In other words, the load must be kept at or below the horizontal line in Figure 6.^[1-4] The orange line in Figure 6 is the result of this distribution contribution.

Figure 6: PV required on July 22, 2011 peak day to provide 250 kW load relief



Section 1: Solar Distribution Contribution (continued)

The distribution contribution methodology summarized above is based on meeting a specified need, and the resulting DCP values are referred to as DCP-N (for Need). DCP-N values were calculated for each year and configuration [1-5] and are presented in the solid lines in Figure 7, and on the left side of Figure 8 below.[1-6] These DCP values are used in this report to develop a resource portfolio for the Pilot (Figure 1, page 3), and to estimate the economic value of the distribution contribution from PV resources (Section 2.4). For these purposes, an average DCP-N is computed for the two years with the lowest values, as shown in Figure 8; this metric is used in the rest of this report unless noted otherwise.

Since the DCP-N calculation hinges on relatively few hourly data points – albeit the ones that matter most – we have calculated an alternative version of the DCP which gives some consideration to the solar output in all of the top 288 hours for each summer. These values, called DCP-L (for Load-weighted), are shown on the right side of Figure 8 below. While they vary less between the PV configurations, they generally fall into the middle of the range of DCL-N values, as illustrated in Figure 7 to the right.

Figure 7: Distribution Contribution Percentages (DCP)

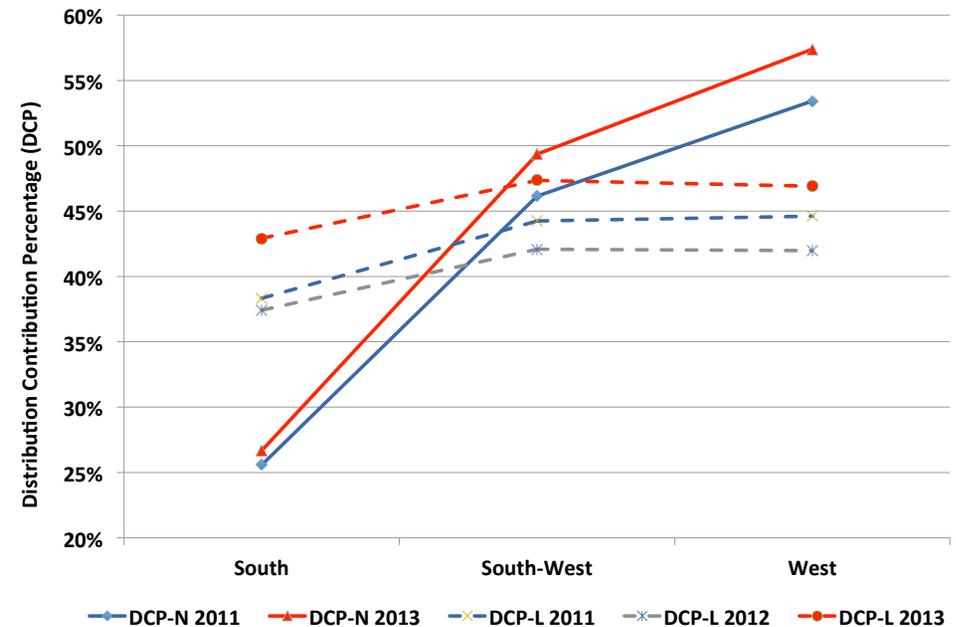


Figure 8: Distribution Contribution Percentages (DCP) for Selected PV Configurations

	DCP-N (Need)				DCP-L (Load-weighted)			
	2011	2012	2013	Average of 2 Lowest Years	2011	2012	2013	Average of 2 Lowest Years
4 South 180	25.6%	67.3%	26.7%	26.1%	38.3%	37.4%	42.9%	37.9%
7 SW 225	46.1%	79.5%	49.3%	47.7%	44.2%	42.1%	47.3%	43.2%
8 West 270	53.4%	69.9%	57.4%	55.4%	44.6%	42.0%	46.9%	43.3%
9 1-Axis	55.7%	72.0%	60.0%	57.9%	49.0%	46.1%	53.5%	47.6%
11 2-Axis	58.9%	83.4%	63.5%	61.2%	50.3%	47.4%	55.1%	48.9%

1.4 PV Energy and Capacity Values

The fixed PV array configurations that are oriented to the west of south generate less electricity, as shown in the bar chart in Figure 9. However, they provide a greater distribution contribution and more generation capacity, as shown in the table in Figure 10 below. Tracking configurations provide high values for both generation and T&D.

Figure 10 shows the energy and capacity characteristics that depend on PV output as it varies in each hour; these values are based on all three years 2011 through 2013.^[1-7] These are in the same format as the corresponding inputs to the screening model for the Rhode Island Cost Test used to evaluate energy efficiency measures.

Peak energy is based on an average of PV output values for weekday hour ending 8 through hour ending 23. Coincidence for capacity is calculated as the median of PV output for weekday hour ending 14 through hour ending 18 for the summer months or, for winter, hour ending 18 through hour ending 19.^[1-8]

Figure 9: Annual Output of Key PV configurations

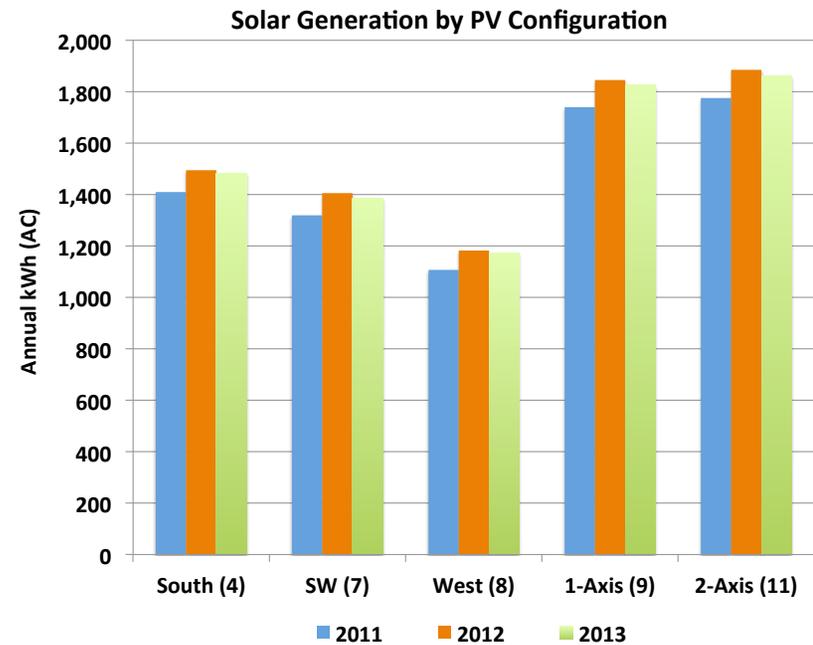


Figure 10: Energy and Capacity Parameters for PV in Pilot Area

	Energy Savings					Capacity Savings				
	Gross Annual kWh	Winter Peak Energy %	Winter Off-Peak Energy %	Summer Peak Energy %	Summer Off-Peak Energy %	Summer Coincident (%)	Winter Coincident (%)	Annual Median (%)	Trans. Coincident (%)	Distribution Coincident DCP-N (%)
1 Flat	1,240	36.5%	18.9%	30.7%	13.9%	40.2%	2.3%	24.3%	37.3%	34.4%
4 South 180	1,463	40.2%	20.8%	27.0%	12.1%	42.6%	3.0%	24.4%	34.4%	26.1%
7 SW 225	1,371	39.4%	20.1%	27.9%	12.5%	51.4%	4.4%	33.7%	49.6%	47.7%
8 West 270	1,154	37.0%	18.8%	30.4%	13.8%	54.3%	4.7%	34.7%	54.8%	55.4%
9 1-Axis	1,805	39.6%	21.0%	27.0%	12.5%	57.6%	4.9%	36.6%	57.7%	57.9%
11 2-Axis	1,841	39.5%	20.9%	27.0%	12.6%	59.0%	5.0%	38.4%	60.1%	61.2%

Footnotes: Section 1

- 1-1: Feeder 4 was directly metered for most of the hours in these three years. For some hours, to adjust for anomalies, metered loads for two transformers were combined and allocated to feeder 4. The revised data is in an excel file named “2014-1-23_cps_Revised_Calcs_Tiverton 33F3 33F4_MW-MVAr_rc”.
- 1-2: The SolarAnywhere® Data system utilized by Clean Power Research is described at: <http://www.cleanpower.com/products/solaranywhere/sa-data/>. The PV configurations were defined by Mark Farber for this SRP Solar Pilot project. These data are in the file “master-file_PV-output.xlsx”
- 1-3: The 11 hours in Figure 6, all on July 22, constitute the top 11 hours of the load duration curve for the summer of 2011.
- 1-4: The new maximum hourly demand with the PV contribution must be 250 kW (in this case) lower than the original maximum demand. The original maximum demand and the reduced maximum demand may or may not occur in the same hour, especially when the original loads in hours adjacent to the peak are not much different from the peak load itself. For this reason, the calculation of DCP-N values is set up with iterative adjustments of the needed PV, with a “solver” in the spreadsheet.
- 1-5: The calculations are performed for the top 288 hours of each summer in the excel file named “Sum_Load_PV_Size_DCP”, which looks up load data and PV output values from two other files.
- 1-6: These DCP figures in Figures 7 and 8 take into account the reduction in local line losses that is estimated to result from each PV configuration in each summer hour. This methodology is presented in the “losses” sheet of the file “Sum_Load_PV_Size_DCP.” The fixed-array configurations compared in these Figures were all assumed to be at a tilt of 30 degrees. Data on other tilt angles and configurations are included in the file “master-file_PV-output.xlsx”
- 1-7: In Figure 10, transmission coincidence is assumed to be an average of the coincidence figures for summer generation and distribution.
- 1-8: Various market rules and regulations govern eligibility for a solar generator or other participant to actually receive value for these energy or capacity attributes; see Section 2, footnote 2-2.

SECTION 2: DEVELOPING GRID SUPPORT SOLAR FIELD(S)

2.1 Characteristics of Solar Fields for SRP Pilot

The largest component of the portfolio of solar resources described in the Introduction (Figure 1) is the Grid Support Solar Field (or fields), with a target of 280 kW. This resource is targeted to meet a majority (approximately 57% or 140 kW) of the distribution need, as shown in the resource portfolio in Figure 1 (page 3).

The actual kW size of the project(s) will depend on which solar configurations are bid or installed by potential developer(s), and their Distribution Contribution Percentages (DCP). The most attractive configurations are discussed in Section 2.4 below.

This portion of the solar resource portfolio is anticipated to be ground-mounted because the installation(s) can be designed and monitored to focus on the distribution support objective.^[2-1] This PV generation field could be interconnected behind a customer meter or directly to feeder 4.^[2-2]

A single facility or a small number of relatively larger facilities will be more cost-efficient than multiple smaller solar projects, as well as being more convenient to monitor.

One or more solar PV vendors could develop and finance these ground-mounted projects, or National Grid could seek approval to construct and own such PV facilitie(s). The following sections review potential ownership and procurement options.

How much land may be required?

250 kW to 300 kW of solar fields would likely require approximately 2 to 3 acres for the solar arrays and all other land enclosed by the site boundary, based on an NREL study of the size of actual projects.* Single-axis tracking requires slightly less land since it requires less capacity to provide the same distribution contribution, even though it uses more land for the same kW capacity compared to fixed ground-mounted arrays. A 2-axis tracking system would require more land, which could vary significantly according to the design and manufacturer of the equipment. The accompanying table compares the acres needed for key configurations to provide a distribution contribution of 140 kW, based on the DCP metric and the NREL data on actual project sizes.^[2-3]

Figure 11: Land Requirements for Solar Field(s)

	Total Acres/MWac	DCP	Capacity to contribute 140 kW to need	Total Acres Needed
Fixed SW	7.6	48%	292	2.2
1-axis	8.7	58%	242	2.1
2-axis	13.0	61%	229	3.0

* Land-Use Requirements for Solar Power Plants in the United States, Ong et. al., June 2013, NREL/TP-6A20-56290

2.2 Ownership Options for Grid Support Solar Field

National Grid Ownership Option. If National Grid is to construct and own or lease a 250 kW to 300 kW PV facility, it could follow procedures that it has used in other states to procure and install PV systems. The company owns property adjacent to its substation which could potentially be used for this grid support solar field, although various development and interconnection issues would need to be addressed. Subject to resolution of these issues, this property could possibly be made available for lease to a PV developer, which would help accelerate development.

National Grid could pay a turnkey price for the total installed cost of the PV facility, or could enter into a commercial lease for the equipment, and would follow appropriate regulatory procedures for recovery and accounting for capital and operating costs and the value of the facility's capacity and energy generation. The RI OER would determine the extent to which its budget for the SRP Solar Pilot would be used to cover any of the PV net costs under this approach.

Non-Utility Ownership Option. An alternative would be for one or more PV vendors to develop one or more Grid Support Solar Field(s), in which case each owner would presumably seek a DG Standard Contract, or its successor program, in the first Open Enrollment opportunity, and would seek any other financial assistance or incentives that would apply to any similar solar project at the time.

A PV developer or owner would incur incremental costs to configure the PV arrays to optimize Distribution Contribution, potentially including increased capital or other costs (e.g., for tracking systems) or a reduction in revenues (e.g., for orientation to the southwest or west). The SRP Solar Pilot budget would be used by RI OER to compensate the PV owner for these costs, and potentially to provide an additional positive incentive to encourage participation in this Pilot.

2.3 Procurement Options for Solar Field Developer

There are two options for a competitive procurement process:

- 1.) Selection of a PV developer through the procurement process for the solarize solar vendor. The solarize campaign is addressed below.
- 2.) RFP to select a PV developer with the best qualifications to optimize Distribution Contribution and/or the best bid for the incremental incentive required to optimize Distribution Contribution.

1.) Selection of a PV developer through the procurement process for the solarize solar vendor. A primary selection criterion in this approach would be the vendor's ability not only to sell and install the rooftop systems but also to develop and construct the Grid Support Project. It is not clear whether a single contractor that is currently active in the Rhode Island market has experience in all of these areas, but a team might be assembled to do both. This might also complicate the solarize development process.

2.) RFP to seek bids for the incremental costs required to optimize Distribution Contribution. In this option, an RFP would be issued by the state and/or by National Grid to select a PV developer to receive a grant for incentives specific to the SRP Solar Pilot. The evaluation of bids would be based in part on a metric of the pre-calculated \$/kW distribution deferral benefit for each solar configuration minus the \$/kW incremental cost bid by the PV developer. Each proposal would consist of the \$/kW cost bid, the solar configuration selected, the kW capacity and the total grant requested. Each bid would also document the qualifications of the PV developer, and selection could be based in part on experience installing trackers and/or working with distribution-related applications.

2.4 Incremental Incentives to Optimize Distribution Contribution

The distribution contribution increases as azimuth orientation moves toward the west, although with diminishing returns after a certain point. The avoided distribution cost is shown in Column C in the table below (Figure 13). The incremental distribution value, compared with a south orientation, is shown in column D and in the green line in Figure 12. [2-4], [2-5]

As the orientation of a fixed array moves toward the west, electricity generation falls off, as shown in Figures 9 and 10 on page 9, so a PV developer loses revenue, if it is based on the quantity of kWh sold. A grant could be provided that would represent the present value of this loss, so the PV owner would be indifferent to PV orientation and willing to improve the contribution to distribution.

Figure 12: Incremental Costs and Benefits – Fixed Arrays

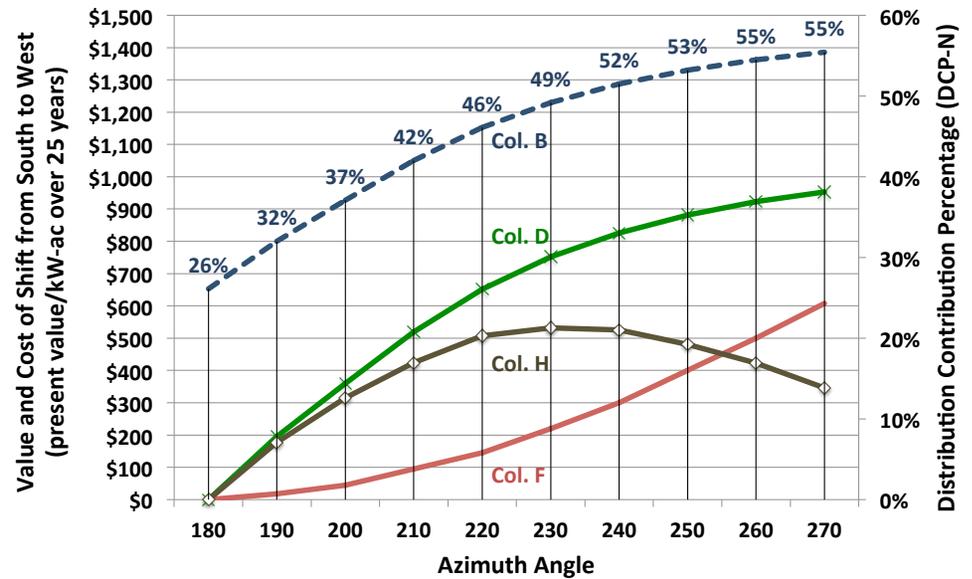


Figure 13: Incremental Costs and Benefits per kW-ac

A	B	C	D	E	F	G	H	I	J
Azimuth Orientation	Distribution Contribution (DCP-N)	Avoided Distribution \$/kW	Incremental Distribution Value	Reduced Generation (kWh/year)	Incremental Cost/Bid to Optimize DC	Cost as % of Value (Col. F/D)	Net Distribution Benefit/kW	Capacity to contribute 140 kW to need	Total Incremental Cost/Bid
180	26%	\$ 840	\$ -	0	\$0	0%	\$ -	544	\$0
190	32%	\$ 1,035	\$ 195	9	\$18	9%	\$ 177	444	\$7,988
200	37%	\$ 1,200	\$ 360	23	\$45	13%	\$ 315	383	\$17,224
210	42%	\$ 1,359	\$ 519	48	\$95	18%	\$ 424	338	\$32,119
220	46%	\$ 1,492	\$ 652	74	\$145	22%	\$ 507	308	\$44,664
230	49%	\$ 1,592	\$ 752	112	\$220	29%	\$ 532	289	\$63,496
240	52%	\$ 1,666	\$ 826	153	\$300	36%	\$ 526	276	\$82,718
250	53%	\$ 1,721	\$ 881	204	\$400	45%	\$ 481	267	\$106,767
260	55%	\$ 1,763	\$ 923	254	\$500	54%	\$ 423	261	\$130,275
270	55%	\$ 1,793	\$ 953	309	\$607	64%	\$ 346	256	\$155,608
1-axis	58%	\$ 1,870	\$ 1,030					245	
2-axis	61%	\$ 1,980	\$ 1,140					232	

- Distribution Contribution % (DCP-N)
- x— Incremental Distribution Value
- Incremental Cost/Bid to Optimize DC
- ◇— Net Distribution Benefit/kW

The amount of such a grant could be based on developer bids. The red line, based on column F of Figure 13, represents an estimate of this incentive or cost on a per-kW basis that the pilot would incur to encourage an increase in distribution contribution, based on lost revenue.^[2-6] The final column (J) in Figure 13 indicates the possible dollar amount of this cost for each PV orientation, based on the size of solar installation that would be required to meet the need.

The space between these red and green lines represents the net distribution benefit, which is also graphed in the brown line and shown in Column H of the table. This net benefit is greatest (\$532/kW) at an orientation of 230 degrees (approximately southwest), where the DCP is 49%. This maximum net benefit could be obtained at an incremental cost or incentive of approximately \$220/kW-ac. (The net benefit does not differ significantly between the orientations of 230 and 240 degrees.)

The net benefit is still substantial (approximately \$423/kW) at 260 degrees, but diminishing returns have set in; this orientation provides a higher distribution benefit, with a DCP of 55%, but at a higher cost.

2.5 Competitive Bidding for Incremental Grant(s)

If a competitive bidding process is used to award a grant for the incremental incentive for the Grid Support Solar Field(s), the goal would not be to select the lowest grant bid, but could be to find the highest net benefit, as indicated above.

The table on this page (Figure 14) illustrates one way in which such a selection criteria could be established and applied in the bidding process. As stated above, under procurement option 2, the evaluation of bids to the Solar Field Developer would be based in part on a metric of:

- the pre-calculated incremental \$/kW distribution deferral benefit for each solar configuration, illustrated in:
 - the green line in the chart and Column D in the table in Figures 12 and 13 above, and
 - Column C in the table on this page (Figure 14);

minus:

- the \$/kW incremental cost which might be bid by PV developers, which is illustrated by:
 - the lower/red line in the Figure 12 chart and Column F in Figure 13, which are based on estimates of what a PV developer would need to stay whole financially as a result of reduced generation, and
 - Column D in the table on this page, which is a set of hypothetical bids to illustrate a potential scoring mechanism; bids may differ from the costs estimated in the previous table for various reasons, which could include the proposer’s internal assessment of additional incentive needed to assign resources to developing a project of this relatively small size in this location.

Figure 14: Potential Bids to Optimize Distribution Contribution

A Configuration / Azimuth	B DCP	C Distribution Value	D Bid Example (\$/kW)	E Unit Score (C - D)	F kW (140 / B)	G Award (D x F)
2-axis	61.2%	\$ 1,140	\$ 360	\$ 780	232	\$ 83,551
1-axis	57.9%	\$ 1,030	\$ 330	\$ 700	245	\$ 80,997
2-axis	61.2%	\$ 1,140	\$ 450	\$ 690	232	\$ 104,439
240	51.5%	\$ 826	\$ 325	\$ 501	276	\$ 89,612
1-axis	57.9%	\$ 1,030	\$ 550	\$ 480	245	\$ 134,996
220	46.1%	\$ 652	\$ 200	\$ 452	308	\$ 61,605
240	51.5%	\$ 826	\$ 400	\$ 426	276	\$ 110,291
260	54.5%	\$ 923	\$ 500	\$ 423	261	\$ 130,275
200	37.1%	\$ 360	\$ 100	\$ 260	383	\$ 38,275

Section 2: Developing a Grid Support Solar Field (continued)

In other words, each bid would be given a score calculated as column C minus column D of Figure 14, indicative of a net distribution benefit. In this example, a hypothetical bid of \$360/kW is submitted by a developer proposing a dual-axis tracking configuration, which has a winning score of \$780/kW.

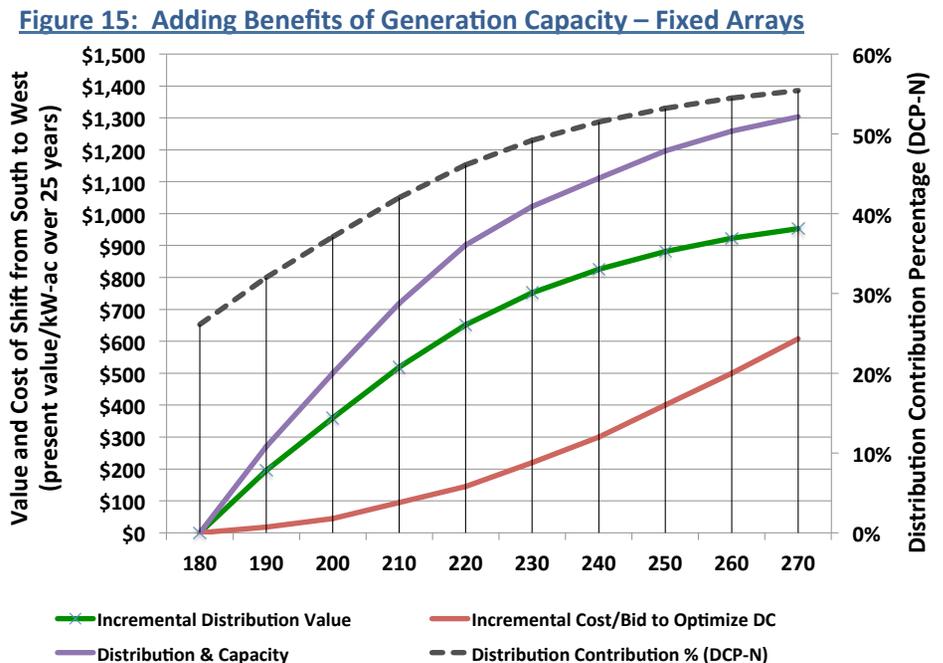
Column G (on the right of Figure 14) illustrates an award that could be made (approximately \$83,000), based on 232 kW of PV -- the quantity of PV that is necessary with its DCP of 61% to achieve the 140 kW of deferral designated in the potential resource portfolio (in Figure 1 on page 2). The calculation is the 142 kW need divided by the 61.2% DCP = 232 kW PV size needed.

The procurement could also allow larger PV sizes to be bid. Alternatively, the above score could be adjusted by weighing the distribution value more heavily than the bid amount, within an appropriate range.

Bids could be submitted at levels higher (or lower) than estimated here as a result of differing developer assessments of risk and cost tradeoffs. For example, the incremental cost represented by the red line in Figure 12 (and replicated in Figure 15 here) is based on 25 years of reduced PV generation at a discount rate of 11.5%, which might be an appropriate discount rate for a solar developer or owner of commercial scale PV projects. However, lower discount rates for the lost revenue could lead to a higher incremental cost to improve the distribution contribution. One procurement option to address the potential of high bids would be to set a cap on awards, most likely on a per-kW basis. A cap could be set at the level of the incremental distribution benefit shown in the green line in Figure 12 (replicated in Figure 15 here). However, there are also other benefits that might warrant paying higher incentives, either to deal with high bids or in order to obtain higher distribution contributions.^[2-7]

For example, if the value of the incremental generation capacity (based on capacity values from Figure 10) is added to the distribution value, as diagrammed with the purple line in Figure 15, that combined value would warrant procuring the output of system(s) with higher DCPs to increase the contribution of solar PV to distribution, since the total benefit could be measured at a higher level. In order to realize this capacity benefit with current ISO-NE Forward Capacity Market rules, however, it might be necessary for the PV to be connected behind the meter of a retail customer where the generation is coincident with on-site load.

For a fixed array with an orientation of 230 degrees, the combined distribution and capacity value is approximately \$1,000/kW. For a due west orientation, this value would be about \$1,300. These values (plus any other incremental benefits that may be included) provide an upper level of incentives that would be paid in a procurement.



Footnotes: Section 2

- 2-1: Ground-mounted systems could be fixed arrays or trackers. One benefit of a solar field is the potential for the use of solar tracking systems. The solar tracking configurations have high DCP distribution contribution percentages, but they do not incur the reductions in annual generation that come with orienting fixed PV systems to the southwest or the west. In fact, tracking systems generate approximately 25% more electricity over the year than fixed systems. While there is not enough regional experience to make reliable estimates of capital or operating costs, trackers may have somewhat better economics than fixed systems. In view of the cost uncertainties, it is not clear what bids developers will submit for trackers in a competitive procurement; this is one reason to hold a competitive procurement for incremental grant(s).
- 2-2: Under current market rules, subject to interpretation and changes, a solar generator, or an electric distribution company which has purchased solar generation, may not be eligible to participate in the ISO-NE capacity market. However, capacity costs may be reduced if the solar is connected behind a customer meter and reduces the measured peak demand.
- 2-3: The NREL data in Figure 11 is only used for comparative purposes; the kind of PV projects planned for the Pilot area may have different requirements. Based on visual inspection of portions of the Pilot area, including along Route 81, and on review of on-line real estate offerings, it appears that (a) some parcels may currently be for sale with sufficient acreage, and (b) significant land resources may be available for solar generation uses.
- 2-4: The analyses in Section 2.4 are performed in the sheet "Incremental" in the file "SRP-PV-Screening-Model-Structure". The values in Figures 12 and 13 for each 10 degrees of azimuth orientation for fixed arrays are estimated on curves based on the values for orientations of 180, 225 and 270 degrees. For trackers, see footnote 2-1.
- 2-5: The Avoided Distribution Cost and the Incremental Distribution Value in Figure 12, Columns C and D are based on the incremental Distribution Contribution Percentages times the present value of the deferral savings and avoided distribution cost. The deferral savings are computed by National Grid in the 2014 System Reliability Procurement Report (page 20), as the present value achieved in each year through 2017 by avoiding the wires solution for another year. For the remaining years of the life of the solar installation, the benefit is based on the annual avoided distribution cost of \$152 per kW that is used for statewide analysis of energy efficiency measures. The \$152/kW figure was developed by National Grid, before the inflation and discounting that is done for the energy efficiency cost analysis. After the 2017 end of the SRP deferral period, the local SRP distribution investment is assumed to be made. Other distribution costs may still be avoided between 2018 and 2038 by reducing load growth; these are assumed to be 25% of the statewide avoided cost for the next 5 years, and then 50% for 5 years, and then 100% through 2038.
- 2-6: The Incremental Cost/Bid to Optimize DC in Figure 13, Column F is based on lost potential revenue from reduced PV generation. This simple methodology is presented in the sheet "lost revenue" in the file "SRP-PV-Screening-Model-Structure". An example is discussed in the Executive Summary (see page 2) of the \$145/kW present value cost for an orientation of 220 degrees due to a reduction of 74 kWh/year. This reduction is valued at 25 cents/kWh every year for 25 years (with a degradation of PV output of 0.5%/year), assuming these annual values would then be discounted at 11.5% (such as by a solar developer or owner of commercial scale PV projects). Lower discount rates for 25 years of lost generation would indicate a higher incremental cost to improve the distribution contribution. This assumption of 25 cents/kWh is a straight-line extrapolation to the 280 kW size of a Grid Support Solar Field in the portfolio summarized in Figure 1, based on the prices bid into the third 2013 RI DG Enrollment for the nearest PV project sizes, specifically (a) a price of approximately 19 cents/kWh for a PV project sized at 500 kW and (b) a price of 28 cents/kWh for a 150 kW PV project. Source: http://www.nationalgridus.com/non_html/4277-4288-3rd%202013%20DG%20Enroll%20%28PUC%201-6-14%29.pdf
- 2-7: Some of these benefits have not been quantified for this report. Examples include transmission benefits, the option value of demand reductions, or the potential to reduce the length of time that demand response is asked of participating customers on the feeder.

SECTION 3: SOLARIZE CAMPAIGN FOR ROOFTOP INSTALLATIONS

3.1 Solarize Campaign

An important component of the solar resource portfolio for this pilot is a set of rooftop installations on homes, small businesses and public buildings that take load from feeder 4. Rhode Island OER and National Grid could work with government officials and community groups in Tiverton and Little Compton to initiate a “solarize” campaign based in part of the solarize model in Massachusetts and elsewhere.

A unique element in this case will be the targeting of rooftops facing to the west of south, in order to improve the distribution contribution. To achieve this goal, incremental incentives can be offered that increase with the azimuth orientation, as described below.

Residential and other small rooftop solar installations are not as cost-effective as most configurations for a larger solar field. Also, a solarize program and marketing campaign takes months to organize and implement.

Nevertheless, the solarize portion of the solar portfolio has several important advantages. Each small PV project can be installed much faster than larger and more complex projects, and project costs are better known. These multiple locations may diversify the potential impact of passing clouds on partly-sunny days.

These rooftop systems will provide valuable data for future initiatives to use new or existing solar PV for distribution planning. In particular, this SRP pilot is a good opportunity to test the effectiveness of outreach targeted to roofs oriented to the west of south.

The solarize-style campaign could be implemented over a two year period to take into account the limited residential PV market to date in the area. The campaign would launch in 2014 to test the interest and ability of the local community to mobilize a campaign and to achieve some early residential installations. During 2015, changes could be made to increase installations before summer of 2016.

3.2 Penetration Rates

According to National Grid, there are 2,450 residential customers on feeder 4. Of these, 51% are located in Tiverton, and the other half in Little Compton. There are also 188 nonresidential customers.

One source of relevant experience to inform predictions of penetration in the SRP Pilot area is that of the early solarize communities in Massachusetts. The number of contracts signed in 2012 was approximately 0.74% of the households in a set of ten communities analyzed for this study.^[3-1] For the four smallest communities, which had an average of 3,010 households (Mendon, Shirley, Lincoln, and Montague), the penetration rate of PV contracts was higher, at 0.91%, for an average of 27 contracts per community.

For a longer period of two to three years through May of 2014, the total number of contracts signed reached approximately 1.14% of the households in the same 10 communities.^[3-2] For the four smallest communities, the penetration rate reached 1.38%, for an average of 41 contracts per community.

Based on this experience, it is reasonable to expect that a successful outreach campaign could attract 1.25% residential penetration, for approximately 31 PV participants in the pilot area over two years. If the average system is 5 kW in size, that would represent 155 kW of residential PV capacity. If penetration of 1.5% could be achieved for nonresidential customers, that would be 3 PV installations, which should average at least 25 kW, for another 75 kW of capacity. This would be a total of 230 kW of PV capacity.

3.3 Incentives for Degrees of Orientation to West

The solarize component of the SRP Solar Pilot should be designed to achieve a significant distribution contribution by encouraging the enrollment of homes and small businesses with roofs that face to the west of south.

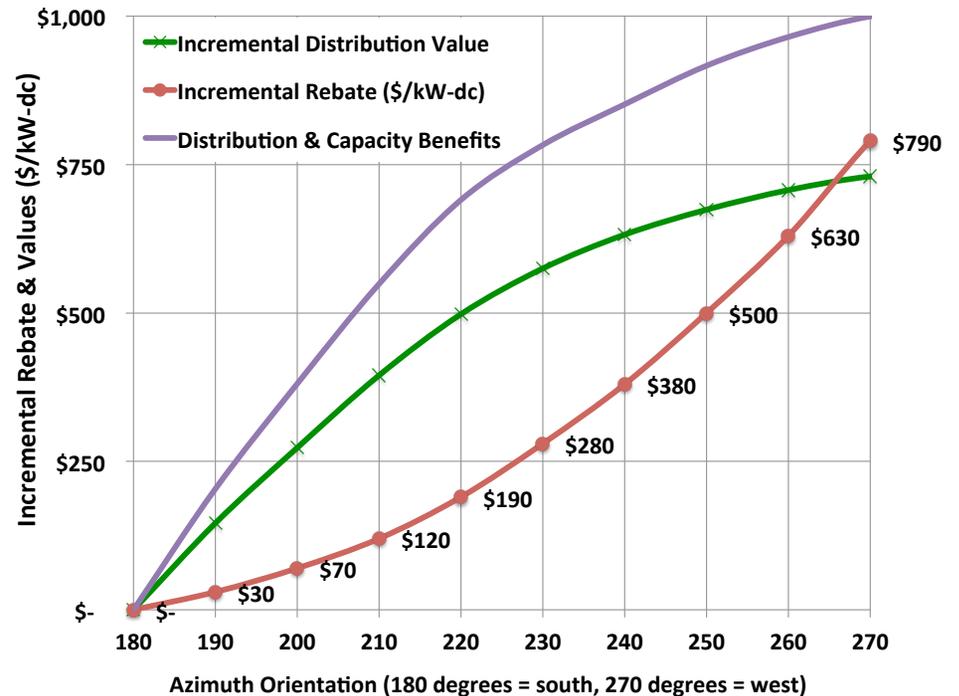
To do this, incremental rebates could be offered that would approximate the present value to homeowners of the reduction in the future savings in their electric bills (including though net metering). The levels of these incremental rebates are estimated in the red, bottom line in Figure 16 for residential customers. This chart is in units of \$/kW-dc (unlike Figures 12 and 13) to be comparable with existing incentives that are based on kw-dc. These rebates are based on the assumptions that electricity savings are valued at 17 cents/kWh in 2014, escalating at 2.5% and discounted at 4.6%/year.^[3-3] These rebates should be fixed and offered in advance as a function of azimuth orientation.

These incremental rebates could be paid directly to each participating homeowner in the pilot area who installs PV that is oriented significantly to the west of south, perhaps as an “instant rebate”. As part of the solarize campaign planning, it would be important to simplify the messaging and participation requirements so that added complexity does not reduce participation.

Once the orientation reaches 260 degrees azimuth, we estimate that homeowners would require \$630/kW-dc to compensate them for these lost savings – a level which has nearly reached the value of the distribution deferral for that azimuth, which is shown in the green line.

If the value of the incremental generation capacity (described in Section 2.5 above) is added to the distribution value, as diagrammed with the purple line, that combined value would provide a rationale for offering rebates that are at the high end of

Figure 16: Incremental Costs and Benefits for Residential Fixed Arrays (\$/kW-dc)



the range of distribution benefits, in order to increase the solar distribution contribution.^[3-4]

The total payments of incremental incentives for the rooftop solarize projects can be estimated by assuming that there is an equal probability of installations from 200 degrees to 240 degrees.^[3-5] This leads to an expected value of \$208/kW-dc for the incremental rebate. Applied to 240 kW of rooftop projects, this is a total expenditure of only \$50,000.

In addition to the above rebates to offset reduced PV output and increase DCP, it may also be desirable for this solar pilot to offer an additional bonus to motivate customers to “act now”. Incentives are addressed further in Section 3.5 below.

3.4 Initial Community Planning for Solar Outreach

Massachusetts experience suggests that local support and a time- and-geography-bounded marketing program is key to residential market penetration. The backing of state and/or local parties substantially boosted market interest beyond the marketing pitch of the private installer. RI OER, or a non-developer independent consultant, could introduce the solar grid-support concept to the target communities, to prepare for subsequent outreach and procurement steps for both residential and other solar projects. The following issues need to be addressed at the local level:

- *Community awareness.* Hold one or more public meetings to alert the residential and business community of the coming program. Informally solicit any interest in potential sites for the ground-mounted facility(ies).
- *Solar champion(s).* Explore, and preferably identify, individual(s) or small groups that can become solar champions during a limited-term solarize-style program. These champions have been one of the keys to market participation in MA programs.
- *Property tax.* Meet with town officials to urge them to clarify solar property tax policies for user-owned and for third-party-financed systems, residential and commercial. Towns are allowed by RI statute to extend a property tax exemption for solar, at the discretion of the town.^[3-6] Property tax can be a determining factor in PPA rates, as much as \$.10/kWh for high tax rates and full-commercial-value assessments.
- *Permitting, safety and zoning.* Assess the interest and capabilities of town electrical inspectors and fire departments. Provide networking, training, or backup engineering support, if needed. The goal is to get local officials up the learning curve, and to clarify procedures and rules, to speed up and lower the cost of installations without compromising quality or safety.

3.5 Outreach and Contracting

The goal of the community campaign will not be so much to boost competition as to buy down or drive down soft costs and to fast-track a local market. Steps will include:

- Undertake a competitive procurement to offer a temporary monopoly in the target area to a single solarize contractor. Pick a winner based on bid pricing (e.g., in volume tiers) as well as business experience and solarize marketing plan, so it's not just based on the lowest bidder.
- Engage a local solar champion(s) to facilitate community involvement. Solarize developers in MA have identified this as the most important ingredient of success.
- Offer a small grant to the local champion(s) to facilitate local support, accelerate the startup of the local campaign, and increase the overall penetration over one or two years.
- Coordinate solarize outreach with the marketing of SRP efficiency and demand response options in the pilot area. This integrated approach was tested and found to be successful in NSTAR's Marshfield Energy Challenge.
- Design and run the solarize campaign like the pilot that it will be. Cap the program term and volume at the outset so it doesn't become a runaway.

During the second year (after the beginning of the summer of 2015), changes could be considered in incentive levels, outreach strategies or PV contractor(s). PV installation prices may fall, and penetration patterns will begin to emerge. Customer incentives could be revised downward or upward based on experience to date.

3.6 Solarize Implementation Costs

Rebates to solarize customers were discussed in Section 3.3 to offset reduced PV output and increase DCP, and it was estimated that rebates for 240 kW of rooftop projects could total only \$50,000 based on an equal probability of installations from 200 degrees to 240 degrees, which results in an expected value of \$208/kW-dc for the average incremental rebate. An “act-now” bonus of 50% of the base rebate would increase the outlay to \$75,000.

That calculation was based on an estimate of a residential discount rate; assuming a higher discount rate for the other portion (33%) of the solarize rooftop PV would reduce the rebate amount by almost 20% to about \$60,000. This would be a suitable low estimate for the funding required for incremental rebates and bonuses.

As noted above, customer incentives could be revised downward or upward based on initial penetration levels. A higher estimate for rebate and bonus funding could be \$125,000, based on the following alternative assumptions:

- a rebate that is 20% higher if needed to achieve penetration, or a penetration rate that is 20% higher than assumed here, and
- a change in the probabilities of adoption to 20% for orientations of 220 and 230 degrees and 30% for 240 and 250 degrees.

Funding will be required to engage the local solar champion(s) and/or to cover their out of pocket expenses, to develop and refine marketing messages and design and print collateral materials for the solar campaign, to plan and coordinate interactions between the selected solarize contractor and all the other entities involved in outreach and implementation, etc. These planning and marketing costs may reach \$100,000 to \$200,000. Together with the rebate and bonus outlays discussed above, this would bring the budget for solarize portion of the solar portfolio to a range of \$175,000 to \$325,000.

Footnotes: Section 3

- 3-1: 2012 Solarize Massachusetts Program Update:
<http://images.masscec.com.s3.amazonaws.com/uploads/attachments/Create%20Basic%20page/2012%20Solarize%20Massachusetts%20Program%20Update%20FINAL.pdf>
- 3-2: RPS Solar Carve-Out Qualified Renewable Generation Units, Updated June 6, 2014, excel spreadsheet:
<http://www.mass.gov/eea/docs/doer/rps-aps/solar-carve-out-units.xlsx>
- 3-3: The calculations of present value of lost revenue are done in the sheet “lost revenue” in the file “SRP-PV-Screening-Model-Structure”.
- 3-4: There are also other benefits, as noted in Section 2.5 above, that might warrant further increasing the contribution of solar PV to distribution, which have not been quantified in this analysis, such as the potential to reduce the amount of time that demand response is asked of participating customers.
- 3-5: For additional information on the total rooftop capacity and DCP calculations, see footnote ES-7 on page 4.
- 3-6: For Rhode Island tax information, see:
<http://webserver.rilin.state.ri.us/Statutes/TITLE44/44-3/44-3-21.HTM>

SECTION 4: SCHEDULE FOR SOLAR PILOT

4.1 Schedule

Before the peak loads of the summer of 2015, National Grid would welcome as much as possible of the load relief from solar that is contemplated in the resource portfolio in Figure 1. However, the resources in the portfolio will require significant time for marketing, development, design, contracting and installation. Therefore, the summer of 2016 is a more realistic time to expect full implementation. The schedule in Figure 17 is designed to achieve solar installations as soon as possible by issuing the procurements described in this report by August and September of 2014.

- With this schedule, some of the solarize rooftop installations could be online before next summer, but another year will likely be required to achieve the resource portfolio targets – i.e., before the 2016 peak load.
- For the Solar Fields, it would be challenging for developers to be ready for the October 2014 DG contract enrollment unless systems were already in development. Even if that schedule is met, it is not certain that one or a few projects totaling 280 kW could be approved and constructed before the summer of 2015, so the spring of 2016 is a more likely time to complete these installation(s) as well.

Figure 17: Potential Schedule for SRP Solar Pilot

				Month												
		Responsibility	Start	End	1 July	2 Aug	3 Sep	4 Oct	5 Nov	6 Dec	7 Jan	8 Feb	9 Mar	10 Apr	11 May	12 Jun
Solarize Campaign:																
A	Community Solar Planning	State & Towns	July	December	█	█	█	█	█	█						
B	Solar Coach Outreach	State & Towns	August	Ongoing		Δ	█	█	█	█	█	█	█	█	█	█
D	Solarize RFP Release, Selection	RI OER	September	November			Δ	█	Δ							
E	Contracting & Installation	Solarize Contractor	January	Ongoing							█	█	█	█	█	█
Grid Support Solar Field(s):																
F	SRP PV RFP Release, Selection	RI OER/NG	August	September		Δ	Δ									
G	Preparation for DG Enrollment	PV Developers	October	October				█								
H	DG Contract Open Enrollment	National Grid	October	November				Δ	Δ							
I	PV Financing & Construction	PV Developers	December	June						█	█	█	█	█	█	Δ