STATE OF MAINE
PUBLIC UTILITIES COMMISSION

MAINE PUBLIC UTILITIES COMMISSION	)	
Notice of Inquiry into the Determination	)	Docket No. 2014-00171
of the Value of Distributed Solar Energy	)	
Generation in Maine	)	
	)	

COMMENTS OF ACADIA CENTER

INTRODUCTION

Acadia Center (formerly ENE)[1] respectfully submits its comments in response to the draft *Maine Distributed Solar Valuation Methodology* of October 23, 2014. As a non-profit, research and advocacy organization committed to advancing the clean energy future, Acadia Center supports the Commission's investigation in the value of distributed solar energy generation in Maine, and appreciates the opportunity to engage in this proceeding.

In general, Acadia Center supports the approach outlined by the Commission's consultants, and offers the following comments to help further refine the draft methodology. Acadia Center looks forward to the opportunity to review and comment on the final draft methodology as well as the Commission's recommendations for increasing the deployment of distributed solar generation in Maine.

OVERARCHING ISSUES

Transparency

Acadia Center recommends that the Commission establish, through this process, a means of ensuring that data and information used to generate inputs and the resulting values are available to stakeholders. Transparency in the use of the methodology is as important as in its development. At the very least, proprietary and/or sensitive data and information should be presented to stakeholders, in its entirety, through a non-disclosure agreement so as to establish relative transparency and public confidence in the process and results. This should include, but not be limited to, the utility-specific assumptions and calculations outlined on pages 13 and 14.

Additional Components & Placeholders

Acadia Center commends the Commission and its consultants on the comprehensiveness of the draft methodology in terms of its inclusiveness (i.e. number and diversity of value components) and the thoroughness in which the calculations have been presented.

[1] **Note change of name**: As of October 30, 2014 ENE is now Acadia Center. To more accurately reflect the organization's geographic scope and evolving approach, we are excited to announce the adoption of a new name, logo and website (www.acadiacenter.org) Our team, goals and commitment to results have not changed.

All of the value components outlined in Figure 1 should be included in the final methodology, along with the transmission and distribution system losses that are implicitly captured. In addition, Acadia Center recommends that the following components be added:

- **Location-specific avoided costs** – The mechanism for evaluating and including the locational value of distributed PV should be included in the methodology and applied to the tariff in cases where panels are installed in higher value locations on the grid (e.g. areas of high load and/or congestion) to avoid costly upgrades.

- **Adder for varied panel orientation and tracking systems** – Non-standard orientation of panels (e.g. west facing) and tracking systems may reduce total output but increase the overall capacity or financial benefit if, for example, the PV system production profile is more coincident with the system load curve. If the capacity value is based on the entire Maine fleet, which is composed of various capacity "buckets" instead of specific capacity values by orientation, then non-standard orientation and tracking systems may not be adequately compensated (since total output is reduced and their actual contribution to system reliability has been discounted).

  As an example of the benefits of locational value and non-standard panel orientation, National Grid is currently managing a System Reliability Procurement Pilot Project that is using customer-side energy resources to provide 1 MW of load relief on two distribution feeders in Rhode Island. The Rhode Island Office of Energy Resources commissioned Peregrine Energy Group to determine whether solar can provide reliable relief for the grid during times of peak demand, if approached the right way. Specifically, the study determined that solar could provide 250 kW of relief to the grid at times of peak demand to defer the corresponding amount of infrastructure investments. The study examined different solar panel orientations and calculated the financial incentive that solar PV owners would need to be paid to orient their panels toward the west and compensate for the reduction in overall energy production. One of the study's conclusions is that the benefit of deferring the distribution upgrades is greater than the cost of the lost energy generation.[2]

- **Ancillary services** – Grid support services such as reactive supply and voltage control, frequency regulation, operating reserves, etc. that are associated with distributed PV may generate a benefit for the electric system or impose a cost. Studies vary in their assessments of the impact on ancillary services due to installation of distributed PV.[3] This component may best be incorporated as a placeholder for future evaluation when more system data is available.

- **Avoided RPS compliance costs** – Based on the structure of Maine's RPS policy, it is appropriate to include avoided RPS compliance costs in the value of solar methodology. When a utility's sales are reduced, so too is its RPS obligation (i.e. the number of REC or NEPOOL GIS certificates that are required for compliance). This is therefore an avoided cost to the utility and ratepayers. As discussed during the work session on Oct 30, RECs can still be created and will still have value in the system.

- **Other environmental impacts** – Other non-carbon environmental impacts include avoided air quality health impacts, water consumption and pollution, and land use impacts. Acadia Center

[2] Peregrine Energy Group (2014). *Solar PV for Distribution Grid Support: The Rhode Island System Reliability Procurement Solar Distributed Generation Pilot Project*. A summary of the study is available at: http://www.peregrinegroup.com/utilities-can-rely-on-solar/

[3] eLab, Rocky Mountain Institute (2013). *A Review of Solar PV Benefit and Cost Studies*. Slide 75.

acknowledges that while these avoided impacts are real they may currently be difficult to quantify, and therefore it may not be possible to include them in the initial value of solar calculation. It is recommended that they be listed as a value component that could be quantified in the future. The fact that the benefits accrue outside the electricity system should not be a barrier to inclusion since the statute requires that "the societal value of the reduced environmental impacts of the energy" be included, and to this end the societal cost of carbon must already be incorporated.

- **Economic impacts** – This would include adders for the macroeconomic benefits – jobs and GDP – from the installation and maintenance of PV panels, and the associated benefits of having distributed PV as part of the electric and overall energy system. Adders for local manufacturing/assembly could also be included based on local tax revenue tied to net solar jobs (as suggested in the Minnesota Value of Solar methodology.

It is possible to estimate values or credits for the above components; however, if the Commission and its consultant present arguments for not including the above value components in this first iteration, then it is recommended that they nonetheless be listed in the methodology as a form of placeholder. This will allow them to be revisited and potentially quantified in the future when more detailed information is available.

Sensitivity Analysis & Scenarios

The use of sensitivity analysis was discussed during the work session on October 30 with respect to the economic analysis period (based on asset life) and PV penetration levels. Acadia Center believes that a 25 year analysis period is appropriate since that approximates the lifespan of a PV system/warranty. Further, modeling current PV penetration levels over that period is appropriate given uncertainty around the rate and level of future penetration. These should be maintained as default assumptions for the first iteration of Maine's value of solar; however, the PV penetration levels should be revisited annually. To inform policy discussions and future methodology processes, Acadia Center supports modeling additional cases with respect to both the analysis timeframe and penetration levels.

During the work session the question of sensitivity analysis and multiple scenarios was also raised in the context of panel orientation. While the end results should be presented as a single, aggregate value based on a mix of solar profiles, Acadia Center supports generating a number of values (four or more) based on distinct panel orientations (e.g. west facing) so as to discern the impact on the overall value. That way stakeholders and policymakers have access to additional information, and the final value can (eventually) be an aggregate of the weighted average based on an assumed or actual system profile for the state.

To this end it is important to consider what data sets the utilities and PV system installers should be collecting, and at what granularity, so that more sophisticated values can be arrived at in the future. This should be a general consideration, and not solely for the purpose of valuing panel orientation.

ECONOMIC ANALYSIS

Avoided Generation Capacity

Acadia Center supports the use of ISO-NE's consultant's simulated price forecast for FCA 10 as the value applied to both FCA 9 and 10 with the caveat that this approach for establishing a value for avoided generation capacity should be revisited when future FCM data becomes available.

Acadia Center does not believe that a confidence level adjustment is necessary and appropriate to correctly estimate the value of avoided generation capacity. ISO-NE's approach to conveying Seasonal Claimed Capability may be an adequate measure of the capacity value of solar over the long-run; however, this too should be monitored as more PV systems come on-line and additional performance/production data is available.

Avoided Natural Gas Pipeline Cost

The concept of including avoided natural gas pipeline costs is sound and supported by Acadia Center; however, it is not clear that the calculation included in the methodology document and on Slide 50 of the workshop presentation would in fact accomplish this objective. Or at least the concept is already embedded in electric wholesale market prices and market price effects.

One way to establish avoided natural gas pipeline costs not included in the proposed market price effects methodology would be to calculate the price suppression effects of PV using last winter's historical natural gas and electricity prices across the entire load (not just PV production) for the winter months. This would capture the effect of natural gas prices in the electricity sector that could be alleviated with additional PV installations.

Solar Integration & Regulation Costs

The methodology should at a minimum contain a placeholder for future calculation of costs and benefits of energy storage coupled with PV installations as more data becomes available.

Avoided Transmission Capacity Costs

Acadia Center supports the inclusion of avoided transmission capacity costs in the methodology. Further, we support the use of Text Option 1 as the means of calculating the avoided costs. Even if there are export constraints, it does not necessarily mean that there are no reliability issues within Maine. Reducing load on certain transmission lines could defer or avoid intrastate transmission system upgrades, and may in fact facilitate export opportunities going forward.

It is also important to note that the planned or proposed transmission projects referred to under Text Option 2 are not necessarily for reliability purposes, and therefore may or may not be relevant for calculating an avoided transmission capacity value.

Environmental (Carbon) Costs

Acadia Center strongly supports including both the utility avoided emission cost and the societal cost of carbon to calculate the total environmental cost. This approach is consistent with the statute, which intends for the "societal value of reduced environmental impacts of energy" to have a broader meaning than simply the value of avoided environments compliance costs.

The draft methodology uses ISO-NE's 2012 marginal LMU CO_2 emissions rate for New England of 854 lbs per MWh as the basis for calculating avoided environmental costs. Acadia Center notes that an emissions rate of 1,026 lbs per ton was established for Maine in Synapse's *Avoided Energy Supply Costs in New England: 2013 Report* (see table, below).[4] For each state the emissions rates are based on the

[4] Hornby, R. et al. (2013). Avoided Energy Supply Costs in New England: 2013 Report. Prepared by Synapse Energy Economics, Inc. for the Avoided-Energy-Supply-Component (AESC) Study Group. Available at:

marginal unit in each hour in each transmission area from Synapse's energy model. While this value is used to calculate avoided CO_2 emissions related to energy efficiency savings, it is also applicable to avoided emissions from generation displaced by distributed solar PV. Further, it is a well vetted, up-to-date, and state-specific value.

Exhibit 4-11. 2013 New England Avoided CO_2 Emissions by Modeling Zone and Pricing Period (lbs/MWh)

	Season and Period				
	Winter		Summer		Grand Total
	On Peak	Off Peak	On Peak	Off Peak	
NE - BHE	969	1,033	1,103	1,043	1,026
NE - Boston	960	1,023	1,060	1,023	1,009
NE - CT NE Central	973	1,009	1,077	1,025	1,011
NE - CT Norwalk	974	1,009	1,078	1,030	1,013
NE - ME	968	1,033	1,103	1,043	1,026
NE - NEMA	963	1,019	1,061	1,020	1,009
NE - New Hampshire	968	1,028	1,099	1,046	1,024
NE - Rhode Island	960	1,019	1,058	1,026	1,008
NE - SEMA	958	1,018	1,057	1,017	1,006
NE - SME	968	1,031	1,103	1,047	1,026
NE - SWCT	974	1,009	1,078	1,030	1,013
NE - Vermont	967	1,010	1,081	1,032	1,012
NE - WCMA	965	1,011	1,073	1,028	1,009
Average	**967**	**1,019**	**1,079**	**1,032**	**1,015**

Source: Synapse's 2013 AESC report, pg. 4-28

Acadia Center also notes that Synapse uses a CO_2 marginal abatement cost of $100 (2013 dollars per short ton CO_2) in its 2013 AESC report. Based on its review of current research, Synapse believes that $100/short ton in 2013 dollars is a reasonable marginal abatement cost, and "a practical and reasonable measure of the total societal cost of carbon dioxide emissions."[5] In Maine, using the emissions rate in the AESC report, $100 per short ton CO_2 is approximately $51.30/MWh in 2013. In comparison, the example used in the draft methodology (i.e. the federal government's Societal Cost of Carbon (3% discount rate, average)) is $43 per metric ton ($39 per short ton) of CO_2 in 2007 dollars. While Acadia Center is agnostic with respect to the source for the societal cost of carbon, if the federal societal cost of carbon is used, the value series chosen should be comparable to Synapse's levelized value of $100 per short ton CO_2.

Market Price Response

Market price response is an important component of the value of solar calculation. Acadia Center supports deriving values based on the results from the Demand Reduction Induced Price Effects (DRIPE)

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http://publicservice.vermont.gov/sites/psd/files/Topics/Energy_Efficiency/AESC%20Report%20-%20With%20Appendices%20Attached.pdf

[5] Ibid.

from the 2013 Synapse AESC study for both energy and capacity DRIPE, as outlined in the draft methodology. It is recommended that electricity cross-fuel (natural gas supply prices) DRIPE be considered. If the Commission does not deem it appropriate to establish a value for the cross-fuel DRIPE at this time, then it should consider including a placeholder in the methodology document which would signal that it may be incorporated in the future.

CONCLUSIONS

This process is an important first step in terms of valuing distributed solar PV and increasing the deployment of distributed resources in Maine. Acadia Center is encouraged by the ongoing transparency and opportunity for stakeholder engagement, and looks forward to reviewing and commenting on the updated methodology before it is finalized.

Respectfully submitted,

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