

Rhode Island Renewable Energy Growth Program: Research, Analysis, & Discussion in Support of Final Recommended Ceiling Prices for the 2022 Program Year October 25, 2021 Sustainable Energy Advantage, LLC Mondre Energy, Inc.

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Additional Stakeholder Engagement & Results

- Consulting team engaged extensively with the Division of Public Utilities and Carriers (DPUC), throughout the process
- The final Ceiling Prices reflect a substantial degree of their input, as well as input from industry stakeholders on subjects that include (but are not limited to):
 - Accounting for cost increases associated with substantial supply chain distortions related to the shifting nature of the COVID-19 pandemic (particularly in Asia);
 - Further subdivision of the Solar renewable energy classes to simultaneously encourage project diversity while limiting ratepayer cost;
 - Reductions in Small Solar capacity factors and increased Solar degradation rates (to account for emerging evidence of material real world underperformance relative to forecasts and expectations, especially for Small, Medium and Commercial Solar projects);
 - Longer estimate useful lives for Solar projects;
 - More substantial compensation expectations (based on an updated understanding of Rhode Island statute);

Request for Approval of Final Recommended 2022 PY Ceiling Prices

- OER and the consulting team formally request that the Board approve the Ceiling Prices included (and bolded) on the following slides.
- OER and the consulting team also request (as in past years) that the Board grant latitude to revise the Ceiling Prices as needed to account for any late changes to federal policy, including:
 - The Build Back Better Act (which, if enacted, is likely to contain many changes to renewable energy-relevant tax provisions, is enacted into law); and
 - Potential extensions to current tariffs on important solar PV cells and modules, as well as potential anti-dumping and countervailing duties against Chinese solar manufacturers, which may enter effect prior to the beginning of the 2022 PY (April 1, 2022)

Final Recommended Prices for Solar (¢/kWh)

Technology	Tariff Term (Years)	Size Range kW_{DC} (Modeled Size kW _{DC})	2021 Approved CP	2022 1 st Draft Proposed CP (w/ and w/o Year-on- Year (YoY) Solar Capital Cost Adjustment)	2022 2 nd Draft Proposed CP (w/Low/High Project Cost Range)	2022 Final Recommended CP
Small Solar I	15	1-15 (5.8)	28.75	26.85-27.85 (-7%/-3%)	30.45-32.25 (6%/12%)	31.05 (8%)
Small Solar II	20	>15-25 (25)	24.35	24.25-25.05 (-0.4%/3%)	27.05-28.45 (11%/17%)	27.55 (13%)
Medium Solar I	20	>25-150 (150)	N/A	N/A (New RE Class)	26.25-26.95	26.65
Medium Solar II	20	>150-250 (250)	21.65	21.35-22.05 (-1%/2%)	24.15-24.75 (12%/14%)	24.45 (13%)
Commercial Solar I	20	>250-500 (500)	18.55	17.55-18.15 (-5%/-2%)	19.05-19.55 (3%/5%)	19.25 (4%)
Commercial Solar I -CRDG	20	>250-500 (500)	21.33	20.18-20.87 (-5%/-2%)	21.91-22.48* (3%/5%)	22.14* (4%)
Commercial Solar I	20	>500-1,000 (1,000)	15.25	14.55-15.05 (-5%/-1%)	15.55-16.05 (2%/5%)	15.75 (3%)
Commercial Solar II -CRDG	20	>500-1,000 (1,000)	17.54	16.73-17.31 (-5%/-1%)	17.88-18.46* (2%/5%)	18.11* (3%)
Large Solar	20	>1,000-5,000 (5,000)	11.35	9.95-10.35 (-12%/-9%)	10.75-11.25 (-5%/-3%)	10.95 (-4%)
Large Solar-CRDG	20	>1,000-5,000 (5,000)	13.05	11.44-11.90 (-12%/-9%)	12.59-12.94* (-5%/-3%)	12.59* (-4%)

*This is the maximum CRDG Ceiling Price allowed by law. The calculated Final Recommended 2022 values are 22.35 for Commercial CRDG 251-500, 18.85 for Commercial CRDG 501-999 and 14.05 for Large CRDG. Note, however, that this CP would allow cost-competitive projects (bidding below the CP) access to > a 15% premium compared to actual project costs.

Final Recommended Prices for Wind, Hydro & AD (¢/kWh)

Technology	Tariff Term (Years)	Size Range kW _{AC} (Modeled Size kW _{AC})	2021 Approved CP	2022 1 st Draft Proposed CP	2022 2 nd Draft Proposed CP	2022 Final Recommended CP
Wind	20	≤5,000 (3,000)	18.75	20.75 (11%)*	22.05 (18%)	22.40 (19%)
Wind - CRDG	20	≤5,000 (3,000)	21.05	22.85 (9%)*	24.25 (15%)	24.60 (17%)
Hydroelectric	20	≤5,000 (500)	27.35	27.75 (2%)*	36.85 (35%)	37.15 (36%)
Anaerobic Digestion	20	≤5,000 (750)	15.85	22.45 (41%)*	25.15 (59%)	25.55 (61%)

*Increases in Ceiling Prices for non-Solar technologies driven mainly by the expiration of the PTC and resulting changes in financing assumptions

Anticipated Next Steps

- Upon the DG Board's approval, OER anticipates filing the recommended prices, along with supportive testimony, with the Public Utilities Commission (PUC) no later than November 2021
- Based on past practice by the PUC, OER further anticipates a public hearing that typically takes place in either late January or early February 2022
- By statute, the PUC must approve the tariffs **no later than February 15** of each year, ahead of the start of the program year on **April 1**

Appendix A: Changes in Cost/Performance Assumptions to Incorporate Stakeholder Feedback from 2nd Draft



Accounting for Macro-Level Cost Pressures (1)

- Comments received from the Division of Public Utilities and Carriers (DPUC) comments suggested utilizing the lower end of the range proposed in the 1st and 2nd Draft of the 2022 Ceiling Prices, so as to limit cost to ratepayers in an environment of rising development/project costs
- Most recent (September 2021) <u>EIA Short-Term Energy Outlook</u> (<u>STEO</u>) forecasts sharp increase in inflation expectations from 2020 to 2022 (from 10% to 14%), a much larger increase relative to recent months

Accounting for Macro-Level Cost Pressures (2)

- Significant one-month change suggests use of a moving average would enhance robustness of estimate
- Three moving average value (containing July-September 2021 values) suggests a 12% increase (up from 10% assumed in 2nd Draft)
- Multiple Modeling Implications (M.I.s): Utilize 12% increase as an adder to non-interconnection installed costs, which is (for Solar only), but utilize lower end of the range as suggested by DPUC (per NREL ATB 2021 "Moderate" case (see next page for more detail))

Accounting for Macro-Level Cost Pressures (3)

Category	 △ Year-on-Year (YoY) Project Cost Factor Before Impact of PPI (NREL ATB 2021) 	△ YoY Project Cost Factor After Impact of PPI (2 nd Draft)	△ YoY Project Cost Factor After Impact of PPI (Final Recommended)
Small Solar I / II	-4.3% to -9.9%	0% to 6%	2% ⁺
Medium Solar, Commercial Solar, Comm. Solar CRDG	-4.3% to -8.0%	2% to 6%	4% ⁺
Large Solar, Large Solar CRDG	-4.0% to -7.4%	3% to 6%	5% ⁺

⁺ Value represents the "low case" result, but is higher than 2nd Draft low case result due solely to increase in forecasted 2022 average monthly PPI, reduced by the shift to the three-month moving average described on previous page.

Wind and AD

- <u>12%</u> YoY adjustment (per PPI, rather than 10% from 2nd Draft Prices) in non-interconnection installed costs (not offset by cost declines)
- Hydro
 - Given that no new estimates were received by deadline from Hydro stakeholders, set at <u>21%</u> YoY adjustment (representing an average of industry stakeholder estimate and PPI, rather than 20% from 2nd Draft Prices).

Tax Treatment for Small Solar Projects

- The DPUC argues that for Small Solar I projects, Narragansett Electric's tax policy is that REG payments are in the form of bill credits, rather than in the form of a check, which would otherwise be treated as taxable income. As a result (and per longstanding IRS guidance regarding bill credits) the credits to the residential owner should not be assumed to be taxable.
- While the consulting team is open to considering bill credits to be non-taxable (and thus excludable from the tax basis for the Ceiling Prices), there are several hurdles for considering this question during the 2022 PY Ceiling Price process, including:
 - OER suggested to the consulting team that it was their understanding that, rather than receiving either a check or a bill credit, most, if not all, customers received both for different degrees of their usage.
 - Understanding this answer would require Narragansett Electric Co. personnel to undertake an analysis of its payments to determine the proportion paid out by a check vs. conveyed via bill credit.
 - Finally, industry stakeholders have not had a chance to comment on their understanding of this question vis-à-vis their customers.
- M.I.: The consulting team recommends considering this question during the 2023 PY Ceiling Price development process, at which time appropriate adjustments can be made following analysis by Narragansett Electric 12

Property Taxation and Renewable Energy Projects

- Green Development commented that the 2022 Ceiling Prices should account for municipalities that incorporate the change in the underlying value of the land when calculating property tax inputs
- To determine municipal practices, OER and the consulting team surveyed all Rhode Island municipalities about their property valuation practices.
 - 11 responded as of this writing (October 12, 2021)
 - Only four municipalities said they would consider (but not all would commit to) increasing property taxes based on the change in the value of the land based on its use
- M.I.: No change. The consulting team is aware of and understands the issue (that certain municipalities have implemented methodologies that would result in property taxes exceeding the \$5/kW statewide value), but also does not believe a change that can affect the Ceiling Prices statewide should be undertaken unless/until a larger fraction of municipalities undertake such a change.
 - However, consulting team plans to re-survey municipalities during the 2023 PY Ceiling Price development process to determine if practices have sufficiently changed to justify further changes

Post-Tariff Revenue Assumptions

- In its comments, the DPUC recommended a smaller discount to assumed post-tariff net metering revenue
- Ecogy Energy also submitted comments, citing a variety of grounds (ranging from roof warranties to their personal experience with debt financing and customer acquisition) that assuming any post-tariff revenue at all is "overblown", and that assuming a 40% discount is "disingenuous at best" on the part of the consulting team
- Ecogy also asserted that the consulting team does not assume inverter replacement
 - NOTE: the consulting team does assume inverter replacement in Year 12, as shown in the public version of the Cost of Renewable Energy Spreadsheet Tool (CREST) shared with stakeholders this past summer.
- M.I.: No change.
 - The evidence reviewed by the consulting team has consistently indicated that projects can and will operate following the 20-year contract term for non-Small Solar projects, and other developers have indicated to the consulting team that financiers have credited their projects with non-zero post-tariff revenue value.
 - Consulting team continues to believe (as discussed in 2nd Draft Ceiling Price PPT) the 40% discount approach balances the law (which allows for compensation at net metering rates following the tariff term), the practice of other developers, the state's policy (of encouraging a 100% renewable energy grid by 2030), and the policy/financial uncertainty related to net metering eligibility and compensation levels.

Other Issues from Ecogy Energy Comments

- Adoption of Zonal Incentives for REG Program
 - Ecogy suggests projects closer to load "must" be compensated for providing greater system benefit
 - M.I.: No change. As has been communicated to stakeholders several times during this year, the Renewable Energy Growth Act only permits Narragansett Electric (and neither OER, the DG Board, nor the consulting team) to propose either zonal incentives nor public policy adders.
- Lease Value for Medium Solar Projects
 - Ecogy also provided several additional lease agreements for Medium Solar projects in Rhode Island, suggesting that the consulting team's change from \$12,000/yr to \$15,000/yr in response to other lease documents the company provided.
 - M.I.: No change. Though the consulting team appreciates the documents provided by Ecogy, has not received other lease documents for Medium Solar projects sponsored by other developers to substantiate a larger increase, and thus plans to consider the issue further in the 2023 PY Ceiling Price process.

Adoption of 2020 National Electrical Code

- The consulting team sought comment no later than October 11 re: 2020 NEC adoption (effective in early 2022) compliance costs that could result in changes to the Ceiling Prices
- No comments were received from stakeholders by the deadline
- M.I.: No change to inputs related to NEC compliance

Disclaimer RE: Potential for Adoption of Build Better Act/Other Changes to Federal Policy

- The consulting team is closely tracking the Build Back Better Act, the budget reconciliation bill in Congress widely expected to (if enacted) provide long-term extensions (and potential changes in eligibility criteria for) various types of renewable energy tax credits, as well as new provisions providing grants in lieu of tax credits (known as "direct pay") that could have very significant impacts on the assumed Ceiling Prices.
- While the consulting team assesses that passage of such potential tax credit changes is more likely, it is unclear at this point if and/or when such changes might be enacted into law.
- M.I.: No changes at this time.

Appendix B: Revised Modeling Parameters



Summary: Cost & Production Assumptions (Solar)

	Small I	Small II	Medium I	Medium II	Comm'l I	Comm'l I (CRDG)	Comm'l II	Comm'l II (CRDG)	Large	Large CRDG
Nameplate Capacity (kW)	5.8 [5]	25	150	250	500	500	1,000 [900]	1,000 [900]	5,000 [4,500]	5,000 [4,500]
Capacity Factor	13.4% [14.0%]	13.4% [14.0%]	14.5%	14.5%	14.6%	14.6%	14.6%	14.6%	15.10%	15.10%
Annual Degradation	1.0% [0.5%]	1.0% [0.5%]	0.8% [0.5%]	0.8% [0.5%]	0.8% [0.5%]	0.8% [0.5%]	0.8% [0.5%]	0.8% [0.5%]	0.5%	0.5%
Useful Life (Years)	25	25	25 [20]	25 [20]	25 [20]	25 [20]	25 [20]	25 [20]	30 [25] [20]	30 [25] [20]
Total Capital Cost ^ (\$/kW)	\$3,377 [\$3,310] [\$3,195] [\$3,146]	\$3,103 [\$3,042] [\$2,935] [\$2 ,883]	\$2,792 [\$2,739] [N/A] [N/A]	\$2,408 [\$2,361] [\$2,211] [\$2,332]	\$2,108 [\$2,068] [\$1,936] [\$2,097]	\$2,208 [\$2,168] [\$2,036*] [\$2,247*]	\$1,938 [\$1,901] [\$1,780] [\$1,869]	\$2,038 [\$2,001] [\$1,880*] [\$2,019*]	\$1,444 [\$1,411] [\$1,313] [\$1,492]	\$1,544 [\$1,511] [\$1,413*] [\$1,642*]
Fixed O&M (\$/kW-yr)	\$29 [\$35]	\$24 [\$35]	\$14.57	\$14.57	\$12.03	\$34.03 [\$37.03]	\$12.03	\$34.03 [\$37.03]	\$8.00 [\$12.03]	\$30.00 [\$37.03]
O&M Escalation Factor	2.0%	2.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Non-O&M Escalation %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Insurance (% of Cost)	0.0%	0.0%	0.34% [0.27%]	0.34% [0.27%]	0.57% [0.45%]	0.57% [0.45%]	0.57% [0.45%]	0.57% [0.45%]	0.57% [0.45%]	0.57% [0.45%]
Project Management (\$/yr)	\$0	\$0	\$3,000	\$3,000	\$4,000	\$4,000	\$4,000	\$4,000	\$20,000 [\$12,000]	\$20,000 [\$12,000]
Site Lease (\$/yr)	\$0	\$0	\$7,500 [\$12,000]	\$15,000 [\$12,000]	\$20,000	\$20,000	\$20,000	\$20,000	\$67,500 [\$50,000]	\$67,500 [\$50,000]

Values in [Blue Brackets] represent 2021 ceiling price inputs, [Green Brackets] represent Draft 1 inputs that were revised for Draft 2, [Purple Brackets] represents Draft 2 inputs that were revised for the final recommended prices. * Reflects installed cost of non-CRDG project from same category, plus estimated cost of customer acquisition (\$100/kW, previously \$150/kW)

^ Total cost includes interconnection cost

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Summary: Cost & Production Assumptions Wind, Hydro, and AD

	Wind	Large Wind - CRDG	Hydroelectric	Anaerobic Digestion
Nameplate Capacity (kW)	3,000	3,000	500	725
Capacity Factor	21.00%	21.00%	55.00%	92% ¹
Annual Degradation	0.5%	0.5%	0.0%	0.0%
Total Cost (\$/kW)	\$3,158 [\$3,102] [\$2,820]	\$3,258 [\$3,202] [\$2,970]	\$11,918 [\$11,824] [\$ 9,931]	\$11,200 [\$11,150] [\$10,150]
Fixed O&M (\$/kW-yr)	\$26.50	\$48.50 [\$51.50]	\$2.00	\$600
O&M Inflation	2.0%	2.0%	2.0%	2.0%
Insurance (% of Cost)	0.29% [0.20%]	0.29% [0.20%]	4.0% [2.7%]	1.5% [1.0%]
Project Management (\$/yr)	\$18,000	\$18,000	\$3,000	\$75,000
Site Lease (\$/yr)	\$162,000	\$162,000	\$8,750	\$35,000

1. Note: For Anaerobic Digestion we use an Availability Factor

Values in [Blue Brackets] represent 2021 ceiling price inputs, [Green Brackets] represent Draft 1 inputs that were revised for Draft 2, [Purple Brackets] represents Draft 2 inputs that were revised for Draft 3.

Summary: Financing Assumptions (Small Solar)

	Sm	nall I	Small II		
	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	
Federal Investment Tax Credit (%)	26%	26%	26%	26%	
% Debt	71%	60%	60%	50%	
Debt Term (years)	13	13	10	10	
Interest Rate on Term Debt	6.3%	6.3%	7.0%	7.0%	
Lender's Fee (% of total borrowing)	4.25%	4.25%	2.3%	2.3%	
Target After-Tax Equity IRR	5.2%	7%	13.0%	12.5%	

Summary: Financing Assumptions (Solar >25 kW)

	Medium		Comm'l &	Comm'l CRDG	Large & Large CRDG	
Assumption Set	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	2021 Final	2022 1 st Draft, 2 nd Draft and Final Recommended
Federal Investment Tax Credit (%)	26%	26%	26%	26%	26%	26%
% Debt	55%	55%	55%	55%	55%	53%
Debt Term (years)	15	15	15	15	15	15
Interest Rate on Term Debt	6.0%	6.6%	5.25%	5.85%	5.25%	5.85%
Lender's Fee (% of total borrowing)	1.0%	1.0%	1.0%	1.0%	2.0%	2.0%
% Equity Share of Sponsor Equity	25%	25%	25%	25%	25%	25%
Target After-Tax Equity IRR (Sponsor Equity, Levered Return)	13.5%	13.0%	12.5%	12.0%	11.5%	11.0%
% Equity Share of Tax Equity	75%	75%	75%	75%	75%	75%
Target After-Tax Equity IRR (Tax Equity, Levered Return)	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Depreciation Approach	5-Year MACRS	5-Year MACRS	5-Year MACRS	5-Year MACRS	5-Year MACRS	5-Year MACRS

Summary: Financing Assumptions (Non-Solar)

	Wind & Wind CRDG		Hydroe	electric	Anaerobic Digestion	
Assumption Set	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended	2021 Final	2022 1 st Draft, 2 nd Draft & Final Recommended
Federal Investment Tax Credit	18%	0% (Expiring 1/1/2022)	0% (Available but not Monetizable)	0% (Expiring 1/1/2022)	30%	None (Expiring 1/1/2021)
% Debt	60%	60%	70%	70%	45%	45%
Debt Term (years)	15	15	20	20	15	15
Interest Rate on Term Debt	6.0%	6.6%	6.25%	7.15%	6.25%	6.85%
Lender's Fee (% of total borrowing)	1.0%	1.0%	1.88%	1.88%	1.5%	1.5%
% Equity Share of Sponsor Equity	25%	60%	100%	80%	20%	60%
Target After-Tax Equity IRR (Sponsor Equity, Levered Return)	12.5%	12.0%	12.5%	12.0%	12.5%	12.0%
% Equity Share of Tax Equity	75%	40%	0%	20%	0%	40%
Target After-Tax Equity IRR (Tax Equity, Levered Return)	9.0%	9.5%	9.0%	9.5%	9.0%	9.5%
Depreciation	5-Year MACRS	Average of 100% bonus and 5- Year MACRS	7-year MACRS	7-year MACRS	5-year MACRS	5-year MACRS

Appendix C: Stakeholder Engagement Details



2022 PY Ceiling Price Stakeholder Engagement to Date (1)

- The PUC approved the consulting team's budget for 2022 Program Year (PY) support in late April 2021 in Docket 4604
- The consulting team emailed stakeholders on June 2, 2021 with Data Request and Survey, requested responses by June 28
 - Received responses from 14 Solar, 1 Non-Solar and 2 combination Solar/Non-Solar stakeholders.
- Circulated 1st Draft Proposed 2022 Ceiling Prices and Overview of Potential Options Related to Solar Performance Assumptions and Solar Renewable Energy Class Subdivisions on July 13, 2021, ahead of meeting on July 27. Requested comments no later than August 20
 - Included options for technology categories, system size bins, and modeled system size, as well as the proposed Ceiling Prices and responses to stakeholder input.
 - Meeting attended by over a dozen stakeholders, including a broad array of Solar and Non-Solar developers, as well as the Division of Public Utilities and Carriers (DPUC) and National Grid.
 - Received responsive comments from 8 stakeholders 5 Solar stakeholders, 1 Non-Solar stakeholder and 2 Solar/Non-Solar stakeholders, as well as the DPUC

2022 PY Ceiling Price Stakeholder Engagement to Date (2)

- Requested comments on issued public versions of the Cost of Renewable Energy Spreadsheet Tool (CREST) utilized to calculate the Ceiling Prices on August 9, 2021
- Circulated 2nd Draft Proposed 2022 Ceiling Prices on September 2, 2021 ahead of meeting on September 8, 2021. Requested comments on the prices no later than September 30
 - Meeting attended by 35 stakeholders, including a broad array of Solar and Non-Solar developers, as well as the DPUC
 - Received responsive comments from 2 stakeholders the DPUC and 1 Solar and Non-Solar stakeholder
- Requested supplemental comment on impacts of adoption of electrical code changes by October 11, 2021
 - No responsive comments received



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