



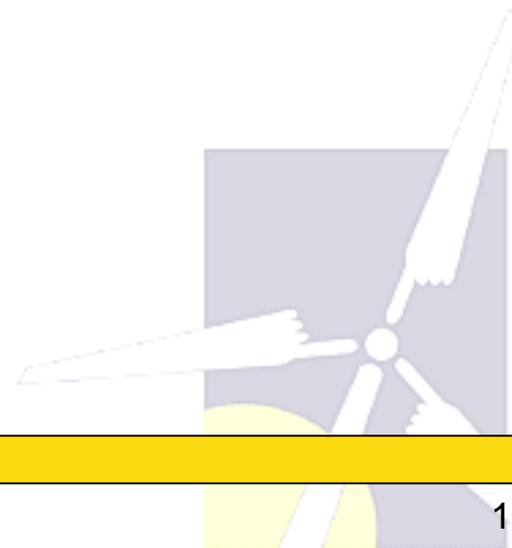
**Rhode Island
Renewable Energy Growth Program:
*Calculation of Revised
2016 Ceiling Price Recommendations***

September 21, 2015
Sustainable Energy Advantage, LLC
Meister Consultants Group, Inc.
Mondre Energy, Inc.





SUMMARY RESULTS



2nd Draft Proposed Ceiling Prices, 2016 REG Program (1)

Technology, Application	CP Size Range (Modeled) kW	Analysis Run	2016 Proposed CP w/ ITC 15 year Tariff Duration	2016 Proposed CP w/ o ITC 15 year Tariff Duration	2016 Proposed CP w/ ITC 20 year Tariff Duration	2016 Proposed CP w/o ITC 20 year Tariff Duration
Small Solar I, Resident Owned	1 to 10 (5)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$41.35 \$34.05 (-18%) \$35.25 (-15%)	\$49.85 \$41.05 (-18%) \$42.65 (-14%)	\$37.75 \$30.75 (-19%) \$31.45 (-17%)	\$45.05 \$36.75 (-18%) \$37.65 (-16%)
Small Solar I, Resident Owned, No Property Tax	1 to 10 (5)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	N/A \$29.75 \$30.75	N/A \$36.75 \$38.25	N/A \$27.05 \$27.75	N/A \$33.05 \$33.95
Small Solar I, Third Party Owned	1 to 10 (5)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$37.60 \$28.15 (-25%) \$28.15 (-25%)	\$43.40 \$33.20 (-24%) \$33.20 (-24%)	\$32.95 \$24.60 (-25%) \$24.60 (-25%)	\$37.65 \$28.75 (-24%) \$28.75 (-24%)
Small Solar I, Third Party Owned, No Property Tax	1 to 10 (5)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	N/A \$23.95 \$23.95	N/A \$29.00 \$29.00	N/A \$22.35* \$20.90*	N/A \$26.85* \$25.05*
Small Solar I, Non-Profit, & Affordable Housing	1 to 10 (5)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	N/A \$40.65 \$40.65		N/A \$37.05* \$36.75*	

* Change between drafts reflects correction for debt term in the 20-year option. No change in 15-year option.

2nd Draft Proposed Ceiling Prices, 2016 REG Program (2)

Technology, Application	CP Size Range (Modeled) kW	Analysis Run	2016 Proposed CP w/ 30% ITC 20 year Tariff Duration	2016 Proposed CP w/ 10% ITC 20 year Tariff Duration
Small Solar II	11 to 25 (25)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$29.80 \$26.15 (-12%) \$26.15 (-12%)	\$34.40 \$30.15 (-12%) \$30.15 (-12%)
Small Solar II, Non-Profit & Affordable Housing	11 to 25 (25)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	N/A \$32.65 \$32.65	N/A \$32.45 \$32.65*
Medium Solar	26 to 25 (140)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$24.40 \$20.85 (-14%) \$23.50 (-4%)	\$29.55 \$25.40 (-14%) \$28.30 (-4%)
Medium Solar, Non-Profit & Affordable Housing	26 to 25 (140)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	N/A \$26.25 \$26.55	N/A \$26.15 \$26.55
Commercial Solar	251 to 999 (500)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$20.95 \$16.10 (-23%) \$16.55 (-21%)	\$24.65 \$19.05 (-23%) \$19.55 (-21%)
Large Solar	1 to 5 (2,000)	2015 Final CP 2016 1 st Draft 2016 2 nd Draft	\$16.70 \$15.20 (-9%) \$15.75 (-6%)	\$19.40 \$17.85 (-8%) \$18.35 (-5%)

* Change reflects adjustment to leverage assumption, which should not have varied between w/ and w/o ITC options in the 1st draft CPs.

2nd Draft Proposed Ceiling Prices, 2016 REG Program (3)

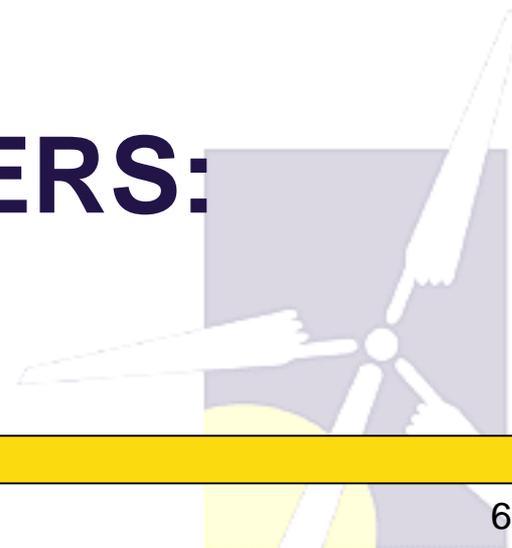
Technology, Application	CP Size Range (Modeled) MW	Analysis Run	2016 Proposed CP w/ ITC ILO PTC 20 year Tariff Duration	2016 Proposed CP w/ PTC 20 year Tariff Duration	2016 Proposed CP w/o PTC or ITC 20 year Tariff Duration
Wind I	1.5 to 2.99 (1.65)	2015 Final CP	\$18.40	\$19.85	\$22.75
		2016 1 st Draft	\$19.95 (+8%)	\$21.45 (+8%)	\$24.45 (+8%)
		2016 2 nd Draft	\$19.95 (+8%)	\$21.45 (+8%)	\$24.45 (+8%)
Wind II	3 to 5 (3.3)	2015 Final CP	\$18.20	\$19.45	\$22.35
		2016 1 st Draft	\$19.10 (+5%)	\$20.45 (+5%)	\$23.45 (+5%)
		2016 2 nd Draft	\$19.10 (+5%)	\$20.45 (+5%)	\$23.45 (+5%)
Wind III	3 to 5 (4.95)	2015 Final CP	N/A	N/A	N/A
		2016 1 st Draft	\$18.50	\$19.70	\$22.65
		2016 2 nd Draft	\$18.50	\$19.70	\$22.65

2nd Draft Proposed Ceiling Prices, 2016 REG Program (4)

Technology, Application	CP Size Range (Modeled) kW	Analysis Run	2016 Proposed CP w/ PTC 20 year Tariff Duration	2016 Proposed CP w/o PTC 20 year Tariff Duration
Anaerobic Digestion I	150 to 500	2015 Final CP	\$20.20	\$20.60
		2016 1 st Draft	\$20.80 (+3%)	\$21.20 (+3%)
		2016 2 nd Draft	\$20.80 (+3%)	\$21.20 (+3%)
Anaerobic Digestion II	501 to 1,000	2015 Final CP	\$20.20	\$20.60
		2016 1 st Draft	\$20.80 (+3%)	\$21.20 (+3%)
		2016 2 nd Draft	\$20.80 (+3%)	\$21.20 (+3%)
Hydro I	10 to 250	2015 Final CP	\$19.80	\$21.35
		2016 1 st Draft	\$19.45 (-2%)	\$21.00 (-2%)
		2016 2 nd Draft	\$19.45 (-2%)	\$21.00 (-2%)
Hydro II	251 to 1,000	2015 Final CP	\$18.55	\$20.10
		2016 1 st Draft	\$18.25 (-2%)	\$19.75 (-2%)
		2016 2 nd Draft	\$18.25 (-2%)	\$19.75 (-2%)



MODELED PARAMETERS: SOLAR





SOLAR: Cost & Production Inputs

Modeled Parameters

		Small Solar I Resi (1-10 kW)	Small Solar I Comm (1-10 kW)	Small Solar II (11-25 kW)	Medium Solar (26-250 kW)	Commercial Solar (251-1,000 kW)	Large Solar (1-5 MW)
Nameplate Capacity	kW	5		25	140	500	2,000
Capacity Factor		13.49%	13.49%	13.49%	13.45%	13.59%	14.18%
Annual Degradation	%	0.5%					
Cost, Less Interconnection	\$/kW	\$3,839		\$3,680	\$2,880	\$1,949	\$1,828
Interconnection	\$/kW	\$0			\$47 \$128	\$103 \$113	\$195 \$237

Blue = change from 2015 value.

Green = change from 1st Draft 2016 value.



Ongoing Cost Assumptions

Modeled Parameters

**No changes
to this set of
inputs.**

		Small Solar I Resi (1-10 kW)	Small Solar I Comm (1-10 kW)	Small Solar II (11-25 kW)	Medium Solar (26-250 kW)	Commercial Solar (251- 1,000 kW)	Large Solar (1-5 MW)
Fixed O&M Expense, Yr 1	\$/kW- yr	\$15.00					
O&M Cost Inflation	%	2%					
Insurance, Yr 1 (% of Total Cost)	%	0.00%				0.25%	
Management Yr 1	\$/yr	\$150			\$500	\$3,300	\$10,000
Land Lease	\$/yr	\$0				\$6,000	\$24,000

Blue = change from 2015 value.



Financing Assumptions

Modeled Parameters

		Small Solar I Resi (1-10 kW)	Small Solar I Comm (1-10 kW)	Small Solar II (11-25 kW)	Medium Solar (26-250 kW)	Commercial Solar (251- 1,000 kW)	Large Solar (1-5 MW)
% Debt	%	0%	50%	60%	40% / 50%	50%	50%
Debt Term	yrs	N/A	13/18	18	18 10	18 15	18 15
Interest Rate on Term Debt	%	N/A	6.5%			6.0%	
Lender's Fee (% of total borrowing)	%	N/A	2.25%	2.25%	2.25%	2.25%	2.25%
Required Minimum Annual DSCR		N/A	1.00				
Required Average DSCR		N/A	1.35				
Target After-Tax Equity IRR	%	6% 5%	8.0%		7.5%	7.5%	7.0%
Reserve Requirement	\$	\$0	\$0	\$0	\$0	\$0	\$0

Blue = change from 2015 value.

Green = change from 1st Draft 2016 value.

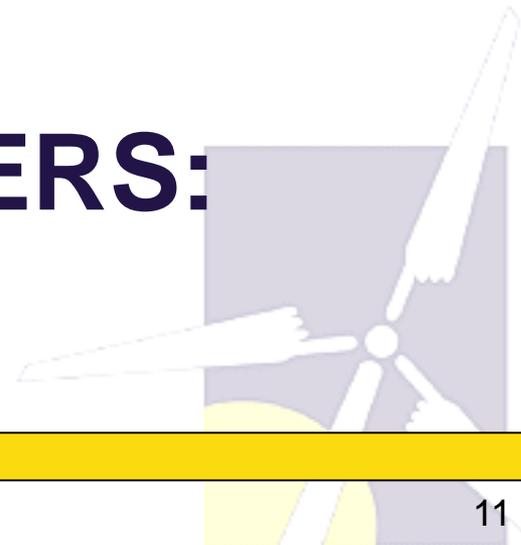


Additional Solar Modeling Adjustments

- For host-owned residential systems, personal income tax applied estimated difference between tariff rate and levelized avoided kWh charges
 - Tax bracket allocation estimated; tax rates blended
 - Estimate that 35% of tariff produces taxable income
 - Residential investment still not depreciable...
- Inverter Replacements
 - Assumed covered by combination of LT warranty and reserve funded by portion of fixed O&M cost estimate



MODELED PARAMETERS: WIND





Production and Capital Cost Assumptions

No changes to this set of inputs.

Modeled Parameters

		Wind I	Wind II	Wind III
Nameplate Capacity	kW	1,650	3,300	4,950
Capacity Factor	%	21%		
Annual Degradation	%	0.0%		
Generation Equipment	\$/kW	\$3,200	\$3,100	\$3,000
Interconnection	\$/kW	\$241	\$181	\$160

Blue = change from 2015 value.



Ongoing Cost Assumptions

Modeled Parameters

*No changes
to this set of
inputs.*

		Wind I	Wind II	Wind III
Fixed O&M Expense, Yr 1	\$/kW-yr	\$25.00		
O&M Cost Inflation	%	2%		
Insurance, Yr 1 (% of Total Cost)	%	0.60%		
Management Yr 1	\$/yr	Included in O&M		
Land Lease	\$/yr	\$52,500	\$105,000	\$157,500

Blue = change from 2015 value.



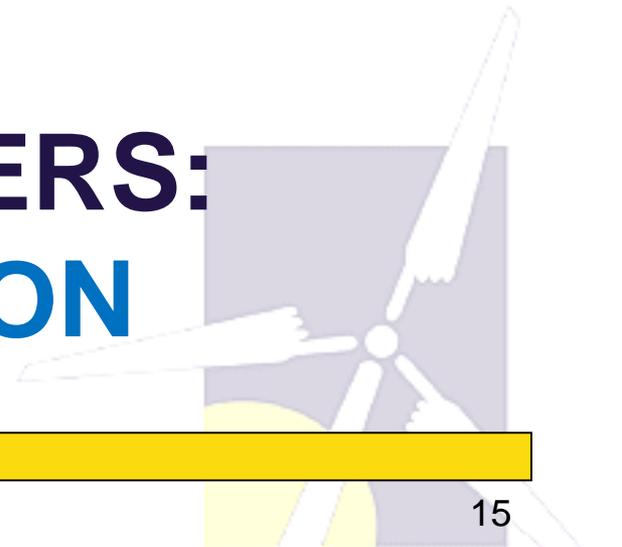
Financing Assumptions Modeled Parameters

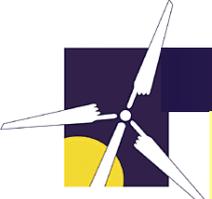
**No changes
to this set of
inputs.**

		Wind I	Wind II	Wind III
% Debt	%	70%		
Debt Term	years	18		
Interest Rate on Term Debt	%	6.5%		
Lender's Fee (% of total borrowing)	%	2.25%		
Required Minimum Annual DSCR		1.00		
Required Average DSCR		1.45		
Target After-Tax Equity IRR	%	10%		
Reserve Requirement	\$	6 months of debt service		



MODELED PARAMETERS: ANAEROBIC DIGESTION





PROJECT PERFORMANCE ASSUMPTIONS

Modeled Parameters

**No changes
to this set of
inputs.**

		Anaerobic Digestion I	Anaerobic Digestion II
Generator Nameplate Capacity	<i>kW</i>	325	725
Biogas Consumption per Day	<i>cubic feet/day</i>	120,066	267,840
Energy Content per Cubic Foot	<i>BTU/cubic foot</i>	600	
Heat Rate	<i>BTU/kWh</i>	8,928	
Availability	%	92%	
Station Service (Parasitic Load)	%	20%	
Annual Production Degradation	%	0%	
Project Useful Life	<i>years</i>	20	

Blue = change from 2015 value.



CAPITAL, INTERCONNECTION AND O&M COSTS

No changes to this set of inputs.

Modeled Parameters

		Anaerobic Digestion I	Anaerobic Digestion II
Generation Equipment	\$/kW	\$10,000	\$10,000
Interconnection Costs	\$/kW		\$150
Fixed O&M Expense	\$/kW-yr		\$600
Variable O&M Expense	¢/kWh		2.00
O&M Cost Inflation	%		2%

Blue = change from 2015 value.



ONGOING EXPENSE ASSUMPTIONS

Modeled Parameters

**No changes
to this set of
inputs.**

		Anaerobic Digestion I	Anaerobic Digestion II
Insurance, Yr 1 (% of Total Cost)	%	1.0%	
Project Management Yr 1	\$/yr	\$33,621	\$75,000
Water & Sewer Expenses	\$/yr	\$0	
Digestate Disposal Cost (if handled as an expense)	\$/ton	\$0.00	
Land Lease	\$/yr	\$15,690	\$35,000



FINANCING ASSUMPTIONS

Modeled Parameters

**No changes
to this set of
inputs.**

		Anaerobic Digestion I	Anaerobic Digestion II
% Debt (% of hard costs) (mortgage-style amort.)	%	60%	
Debt Term	years	18	
Interest Rate on Term Debt	%	7%	
Lender's Fee (% of total borrowing)	%	0%	
Required Minimum Annual DSCR	Ratio	1.00	
Required Average DSCR	Ratio	1.50	
Target After-Tax Equity IRR	%	10%	
Other Closing Costs	\$	\$0	
Reserve Requirement	\$	\$0	



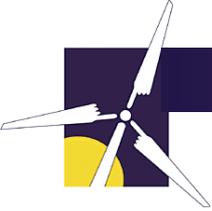
SUPPLEMENTAL REVENUE ASSUMPTIONS

Modeled Parameters

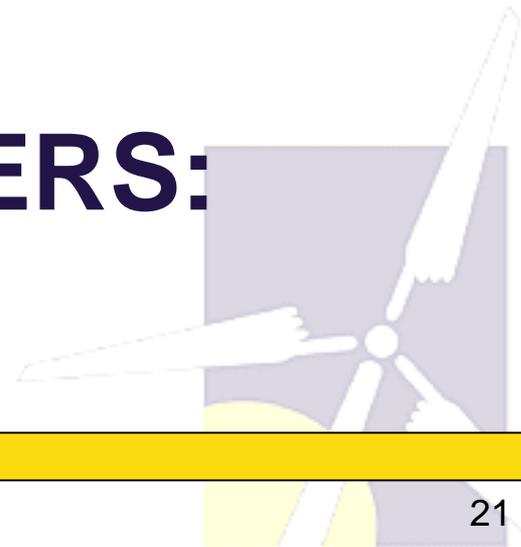
**No changes
to this set of
inputs.**

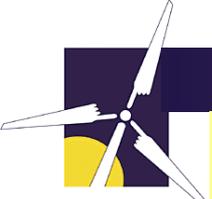
		Anaerobic Digestion I	Anaerobic Digestion II
Tipping Fee	<i>\$/ton</i>	\$22.50	
Quantity Received Each Year	<i>tons per year</i>	10,000	22,308
Digestate (if merchantable for additional revenue)	<i>\$/gallon</i>	\$0	

Blue = change from 2015 value.



MODELED PARAMETERS: HYDRO





Production and Capital Cost Assumptions

*No changes
to this set of
inputs.*

Modeled Parameters

		Hydro I	Hydro II
Nameplate Capacity	kW	150	500
Capacity Factor	%	40%	
Annual Degradation	%	0.0%	
Cost Excluding Interconnection	\$/kW	\$4,000	
Interconnection	\$/kW	\$100	



ONGOING EXPENSES

Modeled Parameters

*No changes
to this set of
inputs.*

		Hydro I	Hydro II
Fixed O&M Expense, Yr 1	\$/kW-yr	\$13.00	
O&M Cost Inflation	%	3%	
Insurance, Yr 1 (% of Total Cost)	%	0.50%	
Management Yr 1	\$/yr	\$5,000	\$15,000
Land Lease	\$/yr	\$2,500	\$10,000



FINANCING ASSUMPTIONS

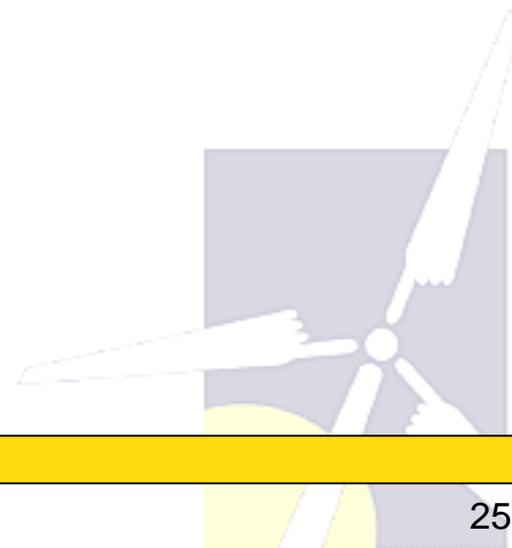
Modeled Parameters

**No changes
to this set of
inputs.**

		Hydro I	Hydro II
% Debt	%	50%	
Debt Term	yrs	18	
Interest Rate on Term Debt	%	6.5%	
Lender's Fee (% of total borrowing)	%	2.25%	
Required Minimum Annual DSCR		1.00	
Required Average DSCR		1.45	
Target After-Tax Equity IRR	%	10%	
Reserve Requirement	\$	\$0	



SUPPLEMENTAL INFORMATION





MassCEC Massachusetts Wind Cost Data

Project	Project Capacity (kW)	In-Service Year	IC \$/kW	Total Cost \$/kW
DOC Gardner	3,300	2013	\$9	\$2,727
Varian Semiconductor	2,500	2012	\$83	\$3,105
Lightolier	2,000	2012	\$76	\$2,239
NOTUS Clean Energy (formerly Webb Research)	1,650	2010		\$1,866
Templeton MLP	1,650	2010		\$1,939
Camelot Wind	1,500	2012	\$66	\$2,901
Jiminy Peak Mountain Resort	1,500	2007		\$2,381
Mass. Military Reservation	1,500	2010		\$3,000
MWRA - DeLauri Pump Sta. (C'town)	1,500	2011		\$3,133
Scituate Wind LLC	1,500	2012		\$3,955
MWRA - Deer Island	1,200	2009		\$2,917
Berkshire East Ski Resort	900	2011		\$2,549
Mass Maritime Academy	660	2006		\$2,121
Holy Name Central Catholic Jr/Sr HS	600	2008		\$3,047
Mark Richey Woodworking	600	2009		\$3,184
Williams Stone	600	2009		\$3,240
Lynn Water & Sewer Comm	600	2014	\$25	

In-Service Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Average IC \$/kW							\$75	\$9	\$25
Average Total Cost \$/kW	\$2,121	\$2,381	\$3,047	\$3,113	\$2,268	\$2,841	\$3,050	\$2,727	



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