



Rhode Island Distributed Generation  
Standard Contracts Program:

*Proposed Final Analysis &  
Data Submittal to DG Board and OER*

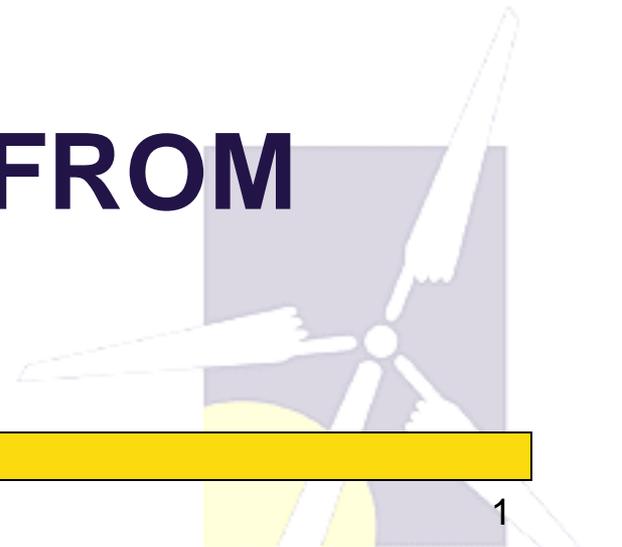
November 25, 2013

Sustainable Energy Advantage, LLC  
(with support from Meister Consultants Group)





# **SUMMARY RESULTS FROM CREST ANALYSIS**





# Summary Comparison of 2012, 2013 & 2013 CPs

Categories, 2012, in kW	2012 CP	Categories, 2013, in kW	2013 CP+	Categories, 2014, in kW	2014 Proposed CP+	Net Change 2013→2014
Solar, 501 – 5,000	<b>28.95</b>	Solar*, 500 +	<b>24.95</b>	Solar*, 500-3,000	<b>23.50</b>	<b>-6%</b>
Solar, 151 – 500	<b>31.60</b>	Solar*, 251 – 499	<b>28.40</b>	Solar*, 201-499	<b>27.30</b>	<b>-4%***</b>
Solar		Solar*, 101 – 250	<b>28.80</b>	Solar*, 50-200	<b>27.10</b>	<b>-6%***</b>
Solar, 10 – 150	<b>33.35</b>	Solar*, 50 – 100	<b>29.95</b>			
Wind	<b>13.35</b>	Wind*, 1,000-1,500	<b>14.80</b>	Wind*, 1,000-3,000	<b>17.50</b>	<b>18%</b>
Wind		Wind*, 400 – 999	<b>16.20</b>	Wind*, 50-999	<b>16.20</b>	<b>0%</b>
Wind		Wind*, 90 – 100	<b>24.65</b>			
AD		AD**, 400 – 500	<b>18.55</b>	AD**, 50-3,000	<b>18.55</b>	<b>0%</b>
Hydro		Hydro** 500-1,000	<b>17.90</b>	Hydro**, 50-1,000	<b>17.90</b>	<b>0%</b>

+ With ITC/PTC, No Bonus Depreciation

\* ITC                      \*\* PTC

\*\*\* Note, changes in selected sub-class definitions prevents a direct comparison in these circumstances.





# Summary Results: Sensitivity to Federal Incentives

<u>Tech., class (kW)</u>	<u>2014 Proposed CP w/ITC/PTC + Bonus</u>	<u>2014 Proposed CP w/ITC/PTC, No Bonus</u>	<u>2014 Proposed CP No ITC/PTC, No Bonus</u>
Solar*, 500-3,000	22.25	23.50	N/A
Solar*, 201-499	25.90	27.30	N/A
Solar*, 50-200	25.75	27.10	N/A
Wind*, 1,000-3,000	16.35	17.50	20.55
Wind*, 50-999	15.55	16.20	19.95
AD**, 50-3,000	17.70	18.55	19.55
Hydro**, 50-1,000	17.25	17.90	18.85

\* ITC

\*\* PTC



## Benchmarking to Other States

<i>Nominal Levelized ¢/kWh (unless noted otherwise)</i>	<b>RI</b> (2013 CPs)	<b>VT</b> (‘13 Bids/’12 SO)	<b>CT</b> (Sec. 127) (ZREC data next slide)
<b>Tech. ↓ Terms →</b>	<b>15 years</b>	<b>25 years (solar) 20 years (others)</b>	<b>20 years</b>
	<b>Bundled</b>	<b>Bundled</b>	<b>Bundled</b>
Solar <sub>small</sub>	29.95 (50-100kW) 28.80 (101-250kW)	20.50 (Bid)	
Solar <sub>Medium</sub>	28.40		
Solar <sub>Large</sub>	24.95	13.40 – 14.41 (Bid) (CP = 25.70)	East Lyme: 15.7 w/ 2% esc Somers: 19.0 w/ 3% esc Bridgeport: 33.36 flat
Wind <sub>Small</sub>	24.65	25.30 (2012 Std Offer*)	
Wind <sub>Large</sub>	14.80	11.82 (2012 Std Offer**)	BNE Wind Colebrook: 20.0 (avg. per 6/5/13 Order)
AD	18.55	14.11*** (2012 Std Offer)	
Hydro	17.90	12.26 (2012 Std Offer)	

\* For 100 kW wind turbine; no small wind projects yet accepted into the program

\*\* No large wind projects yet accepted into the program

\*\*\* Designed for Farm Digesters



# Benchmarking to CT ZREC Program

## October 2012 Results

<b>Large ZREC: 250kW – 1 MW</b> <b>Medium ZREC: &gt;100 kW &lt;250 kW</b> <b>Small ZREC: ≤ 100 kW</b> <b><i>(All Behind the Meter)</i></b>	<u>UI Large</u> <b>ZREC</b> <b>(\$/REC)*</b>	<b>CL&amp;P</b> <u>Large</u> <b>ZREC</b> <b>(\$/REC)**</b>	<u>UI Medium</u> <b>ZREC</b> <b>(\$/REC)*</b>	<b>CL&amp;P</b> <u>Medium</u> <b>ZREC</b> <b>(\$/REC)**</b>
<b>Weighted <u>Average</u> Bid Price of Accepted Bids</b>	\$90.43	\$101.36	\$102.31	\$149.29
	4 accepted bids: 2 winners <500 kW	Winners span whole size range.	Winners range from 110 – 250 kW	Winners range from 101 – 250 kW
<b>Approx. Value of Retail Electricity Purchases Avoided, Levelized***</b>	\$186		\$186	
<b>Est. Value Under 3<sup>rd</sup>-Party Net Metering (Assumed 10-15% discount, common in MA)</b>	\$158-167		\$158-167	
<b>Est. Equivalent to Calculated LCOE</b>	\$248-257		\$260-269	

\* UI Prices are for 2013 Solicitation

\*\* CL&P Prices are from 2012 Solicitation

\*\*\* Levelization assumes 4% annual rate escalation and 10% discount rate. Based on UI GST Rate.



## Vermont Standard Offer

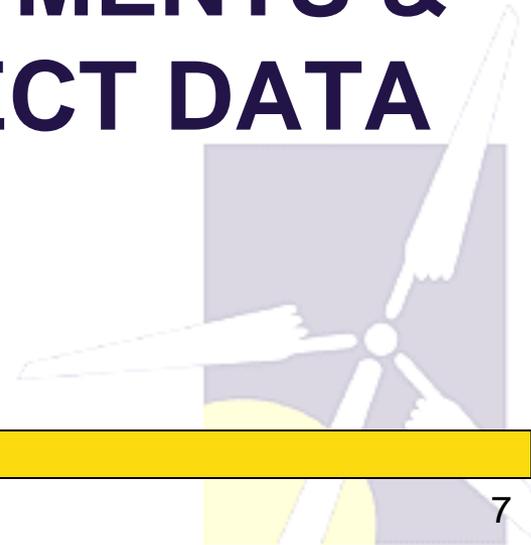
- Operating VT Standard Offer Projects (data through 9/24/2013)
  - Max eligible project size = 2.2 MW

Technology	# of Projects	Size Range (kW)
Solar	15	37 – 2,200
Wind	0	
Farm Methane	15	150 – 600
Hydro	3	138 – 675



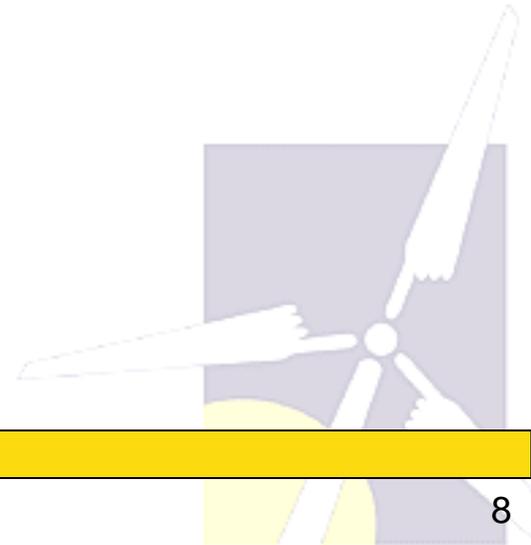
# **APPENDIX A:**

# **WIND MODELING ADJUSTMENTS & OPERATING WIND PROJECT DATA**





# WIND MODELING ADJUSTMENTS





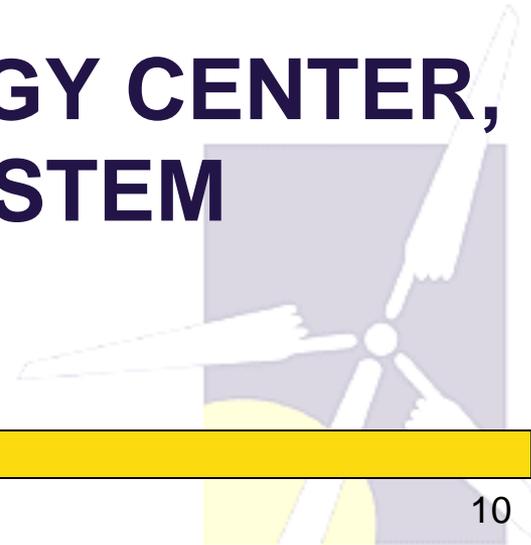
## Wind Modeling Adjustments for 2012 – 2014 CPs

<u>Category</u>	2012 Input	2013 Input	2014 Input (Draft)	2014 Input (Proposed Final)
Est. Annual Net Capacity Factor	25.0%	27.5%	26.0%	26.0%
Installed Cost (w/o Interconn.)	\$2,750/kW	\$3,200/kW	\$3,200/kW	\$3,200/kW
Interconnection cost estimate	\$117/kW	\$100/kW	\$150/kW	\$200/kW
Interest Rate on Term Debt	6.0%	5.5%	5.5%	6.5%
Monetization of Federal Tax Incentives	100%	90%	80%	80%
After Tax Return on Equity	13%	12%	12%	12%



# **OPERATING WIND PROJECT DATA:**

**SOURCE = MA CLEAN ENERGY CENTER,  
PRODUCTION TRACKING SYSTEM**





## Data Characteristics

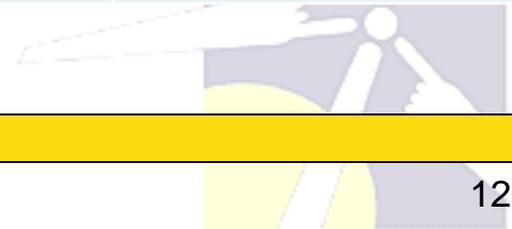
- Coastal Massachusetts
  - Assumed to be closest wind resource and topographic match to Rhode Island
  - All projects except one are southeastern MA (SEMA Zone)
  - One from north shore (NEMA Zone)
- At least 12 months of production data required
  - Assume first 6 to 12 months should always be filtered out due to standard start-up issues and turbine break-in period.
- Other considerations
  - When limited data available, should compare to long-term averages → does available data set represent a good or bad year?



# Wind Production Data

## Source = MassCEC Production Tracking System (PTS)

Project	Location	Net capacity factor (%), based on Mass CEC PTS
MA Military Reservation #1 (US Air Force)	Bourne & Falmouth, MA (Cape Cod)	~23%
Scituate Wind LLC	Scituate, MA (Southeastern MA)	~28%
Ipswich Municipal Light Plant	Ipswich, MA (Northeastern MA)	~25%
NOTUS Clean Energy	Falmouth, MA (Cape Cod)	~32%
Hull Wind 2	Hull, MA	~26%
Town of Kingston	Kingston, MA	~20%
MA Military Reservation #2 & #3 (US Air Force)	Bourne & Falmouth, MA (Cape Cod)	~26%





## Projects Not Included in Dataset

Project	Location	Reason for Exclusion
MWRA Deer Island	Winthrop, MA	Tower height restriction due to proximity to Logan Airport (CF < 20%)
Jiminy Peak	Hancock, MA	Inland location, higher elevation than available in RI (CF > 32%)
Falmouth Wind 1 & 2	Falmouth, MA	Curtailed operations imposed by pending litigation
Lightolier	Fall River, MA	Less than 12 months of available data
Fairhaven Wind LLC	Fairhaven, MA	Curtailed operations imposed by pending litigation
MWRA DeLauri Pumping Station	Charlestown, MA	Production data not included in PTS
Templeton Municipal Light Plant	Templeton, MA	Inconsistent data/operating history
Princeton Municipal Light Plant	Princeton, MA	Inconsistent data/operating history
Mount Wachusett Community College	Gardner, MA	Production data not included in PTS
No Fossil Fuels LLC	Kingston, MA	Production data not included in PTS
Berkshire Wind	Hancock, MA	Inland location, higher elevation than available in RI (CF > 40%)



## Other Resources

- LBNL/Bolinger 9/12 Presentation:  
[Is Class 2 the New Class 5?](#)

