

# Additional LSR Financial Modeling Sensitivities

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## This presentation discusses the results of several additional sensitivities to the LSR Options Report

On June 1, 2015, Staff filed an LSR Options Report<sup>1</sup> which explored a range of policies, frameworks and structures for procuring and enabling cost-effective financing for LSR resources.

- The report presented criteria and economic analysis for evaluating the various options and identified several mechanisms for long-term procurements as a means of enabling cost-effective financing of new LSR generation at a scale contemplated by the State Energy Plan.

Public comments received through this proceeding requested additional economic analysis which is presented herein.

<sup>1</sup> Case 15-E-0302, et al. In the Matter of the Implementation of a Large-Scale Renewable Program, Large-Scale Renewable Energy Development in New York: Options and Assessment (June 2015)

## This presentation discusses the results of several additional sensitivities to the LSR Options Report

The sensitivities address the following issues:

- The inclusion of residual value in the UOG and Bundled PPA cases, assuming the full value of the PTC is monetized
- Considering the impact of UOG procurement mechanisms that place the risk of wind resource estimation bias on the developer
- Comparing different approaches to procuring residual RECs from projects with 20-year PPAs (i.e. an option to extend 10 years vs. a subsequent 10-year REC contract)
- Varying assumptions regarding the long-term equity IRR hurdle rates (motivated in part by the recent decline in YieldCo financing capacity)

In addition, we review and clarify the definition and usage of developer and long-term after-tax equity hurdle rates

Just as for the LSR Options Report, we use a hypothetical 100 MW wind facility in Upstate NY

Category	Input
<b>Project Costs</b>	
Commercial Operations Date	January 1 <sup>st</sup> , 2017
Installed Cost <sup>1</sup>	\$2,044 / kW
Fixed O&M <sup>2</sup> (Year 1)	\$70 / kW - yr (escalated at 2.5% annually)
Variable O&M (Year 1)	0.06¢ / KWh (escalated at 2.5% annually)
<b>Project Capacity and Production</b>	
Project Size	100 MW
Capacity Factor	35%
Project Useful Life	<b>20-30 years</b>
<b>Taxes</b>	
Federal Tax Rate (%)	35%
State Tax Rate (%)	6.5%
<b>Revenue</b>	
Market Prices <sup>3</sup>	NYISO CARIS 2014 Zone D Forecast, AEO 2015 High Oil & Gas Resource Case (Low Market Prices) and High Price Case (High Market Prices) for Upstate NY
<p><sup>1</sup> Assumed bid in 2015, with commercial operation date = 1/1/2017, Nominal \$, costs updated based on estimates of recent wind capital costs by LBNL</p> <p><sup>2</sup> Includes insurance, project management, property taxes and land lease/royalty.</p> <p><sup>3</sup> Note: The Market Price Forecast significantly impacts the modeling results. Prices were generated from GE-MAPS modeling for the NYISO's 2014 CARIS 2 study, the most current CARIS price projections available. The NYISO has started its 2015 CARIS 1 analysis, and updated draft prices (10 year projection) will be released in June 2015. The NYISO expects LBMP price projections from this analysis to be significantly lower than prices from the 2014 CARIS 2 study due to lower natural gas price and load forecast assumptions.</p>	

## We considered sensitivities based on two of the three base procurement options with the PTC

- **Reference (20-Year REC Contract)**
  - Current policy – 20-year fixed price Main Tier REC contract
- **Bundled PPA**
  - 20-year fixed price power purchase agreement (PPA) for bundled energy and RECs, either with a state-entity or an EDC
  - We add an option to extend the PPA at the same strike price out to 30 years, reduce production by 15% and use higher equity discount rates in years 21-30
  - We also consider options to extend with a 10 year REC-only contract at \$20, \$40, and \$60/MWh
  - Possible remuneration of utilities for PPAs of 1% increases the cost of a PPA by roughly \$0.70-\$1.00/MWh
- **Utility-Owned Generation (UOG)**
  - 100% utility ownership and rate-basing of an individual project
  - We assume a 30 year asset life, reduce production by 15% in years 21-30
  - We consider a case in which utility procurement shifts resource estimation bias risk to developers
  - Assume utility has the tax capacity to fully monetize tax credits

## Most financial inputs from LSR options paper, added higher discount rate for terminal cash flows

Financial Metrics	Utility-Backed PPA	Utility-Owned Generation (UOG)
<b>Equity Return Targets<sup>a</sup></b>		
After-tax Developer Target IRR	12.75%	12.75%
After-tax Long Term Equity Target 20-year IRR	8.75- <b>9.5%</b>	9.00%
After-tax Equity Discount Rate for Years 21-30	<b>9-15%</b>	<b>9.00%</b>
<b>Debt Financial Metrics</b>		
Maximum Leverage	n/a	52%
Debt Term	18	20
Debt Costs / Fees	2.00%	n/a
Debt Minimum DSCR (P90) <sup>b</sup>	1.20x	n/a
Utility Debt Cost <sup>c</sup>	n/a	4.75%
Project Debt Cost <sup>d</sup>	6.25%	n/a
<sup>a</sup> Equity return targets are based on ranges in Mintz-Levin (2012) <sup>b</sup> Minimum DSCR requirements are applied on annual P90 cash flows <sup>c</sup> Utility debt cost was estimated based on the implied forward 20-year treasury yield in 2017 of 3.25% and a projected spread for A-rated utility bonds of 150bp based on recent historical spread data <sup>d</sup> Project debt costs were calculated using BBB corporate bond yields + 75bp for illiquidity and structuring		

- The returns required by investors for long-term ownership of an operating wind facility are development / construction risk.
- The financial model separately accounts for the after-tax return to the project developer for taking on development and construction risk, which is assumed to be 12.75% for most cases (corresponding to a pre-tax return of over 21%).
- Increasing long-term equity returns by 100bp increases PPA costs by \$0.91/MWh

# Summary of Results

Sensitivity	Discounted Premium Over 30 Years Including Residual REC Costs	Change in 30-Year PPA Price Incl REC Costs relative to Base Case	20-Year PPA Price	Long-Term Investor Realized 30-Year Equity IRR
<b>EDC Owns 100%, with PTC, 30 year life</b>				
Base Case	-\$15.17	\$63.95		
Developers Bear Resource Risk	-\$18.73	<b>-\$3.55</b>		9.50%
<b>Utility-Backed PPA Cases with PTC</b>				
10 year PPA extension, 15% term. IRR	-\$10.86	<b>\$4.33</b>		9.24%

**Including the impact of residual value, UOG can save ratepayers over \$4/MWh relative to a 20 year PPA with an option to extend to 30 years.** Consideration of residual value increased the modeled benefit of UOG relative to a PPA by about \$1-2/MWh relative to the corresponding comparison of cases with the PTC in the LSR options paper.

**UOG procurement mechanisms that shift resource estimation bias risk to developer can save a further \$3-4/MWh.** For example, this could involve a procurement mechanisms that ties developer compensation to actual resource performance over the first three years.

## Summary of Results

Sensitivity	Discounted Premium Over 30 Years Including Residual REC Costs	Change in 30-Year PPA Price Incl REC Costs relative to Base Case	20-Year PPA Price	Long-Term Investor Realized 30-Year Equity IRR
<b>Utility-Backed PPA Cases with PTC</b>				
10 year PPA extension, 15% term. IRR	-\$10.86	\$68.27		9.24%
10 year \$20 REC extension	-\$9.54	<b>\$1.31</b>	\$66.53	10.59%
10 year \$40 REC extension	-\$6.56	<b>\$4.30</b>	\$66.11	10.78%
10 year \$60 REC extension	-\$3.57	<b>\$7.29</b>	\$65.70	10.96%

A 20-year PPA with an option to extend to 30 years can save ratepayers between \$1-\$7/MWh relative to a future REC-only extension at \$20-\$60/MWh. The 20-year PPAs in which the developer willing to provide an option for extension at the same price reduce costs over 30 years, but may appear to be less competitive on the strike price for the 20-year PPA relative to developers who may instead bank on getting market prices for their RECs down the road. This issue should be accounted for in any evaluation process.



## Summary of Results

Sensitivity	Discounted Premium Over 30 Years Including Residual REC Costs	Change in 30-Year PPA Price Incl REC Costs relative to Base Case	20-Year PPA Price	Long-Term Investor Realized 30-Year Equity IRR
<b>PPA Cases with 10 year extension, PTC</b>				
15% terminal discount rate (Base Case)	-\$10.86	\$68.27		9.24%
12% terminal discount rate	-\$11.18	-\$0.32		9.27%
9% terminal discount rate	-\$11.77	-\$0.91		9.08%
9.5% 20-yr IRR, 15% terminal disc. rate	-\$9.51	\$1.34		8.78%
9.5% 30-yr IRR	-\$10.35	\$0.51		9.94%

**The choice of terminal equity discount rate used for years 21-30 had little effect on the 30 year PPA price.** Increasing the after-tax, terminal equity discount rate from 9% to 15% increased the PPA price by less than \$1/MWh.

**Increasing the long-term after-tax 20-year IRR from 8.75% to 9.5% (keeping the 15% terminal rate fixed) increased the 30 year PPA price by \$1.34/MWh.** Further, assuming a uniform 9.5% after-tax equity IRR over 30 years led to roughly the same price as increasing the discount rate to 15% only over the last 10 years.