New York ISO
Independent System Operator

BSM Renewable Exemption Study

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Agenda

- Background
- Candidate Intermittent Renewable Technologies – Total Estimated Cost
- Next Steps

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Background

A Grid in Transition – A Multifaceted Approach

- **Aligning Market Incentives**
  - Carbon Pricing
  - Comprehensive Mitigation Review
- **Prepare for New Technologies**
  - DER Participation Model
  - Energy Storage Participation Model
  - Hybrid Co-Located Model
  - Hybrid Aggregation Model
- And more….

Aligning Competitive Markets and New York State Clean Energy Objectives

- **Review Energy & Ancillary Services Design for Incenting Flexibility**
  - More Granular Operating Reserves
  - Regulation Up & Down Services
  - Ramping Services
- **Evolve the Day Ahead and Real-Time Markets to improve managing Forecast Uncertainty**
- **Track certain market metrics to evaluate incentives for flexible resources**
- And more…

Valuing Resource & Grid Flexibility

- **Enhancements to Resource Adequacy Modeling**
- **Improving Installed Capacity Market Incentives**
- **Review Capacity Market Resource Ratings to Reflect Reliability Contribution**
  - Expanding Capacity Eligibility
  - Tailored Availability Metric

Improving Capacity Market Valuation

Purpose

- **We are here today to provide a review of the total estimated costs for candidate intermittent renewable technologies.**
  - These costs are detailed in the "Renewable Technology Costs" consultant report, posted with today's meeting materials.
- **The draft list of candidate intermittent renewable technologies has not changed since the NYISO's June 2, 2020 presentation.***

*For more information, please see the NYISO's June 2, 2020 presentation at the following link: https://www.nyiso.com/documents/20142/12891716/6%20BSM%20Renewable%20Exemption%20Study%20Candidate%20Technologies.pdf/411569af-ddc0-4bdd-ddb7-0b260f2a12fe

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Candidate Study Technologies

Technology	NYISO Zones			
	G	H	I	J
Ground Mounted Solar PV Project Size: 1 - 10 MW	✓	✓	✓	✓
Ground Mounted Solar PV Project Size: 10 - 50 MW	✓	✓	✓	✓
Ground Mounted Solar PV Project Size: Greater 50 MW	✓	-	-	-
Wind Onshore 2 - 4 MW WTG* Size Project Size: 2 - 50 MW	✓	-	-	-
Wind Onshore 2 - 4 MW WTG* Size Project Size: 50 - 200 MW	✓	-	-	-
Wind Offshore 6 - 12.5 MW WTG* Size Project Size: up to 400 MW	-	-	-	✓
Wind Offshore 6 - 12.5 MW WTG* Size Project Size: 400 - 800 MW	-	-	-	✓
Run of River Hydro Project Size: 1 - 10 MW	✓	-	-	-
Landfill Gas (LFG) Project Size: 2 - 10 MW	✓	✓	✓	✓

* Note: WTG = Wind Turbine Generator

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Tariff Requirements

- **In each ICAP Demand Curve Reset Filing Year, the ISO must conduct a periodic review to determine the technology types that should be Exempt Renewable Technologies (MST 23.4.5.7.13.2.1)**
  - The ISO will determine, for each Mitigated Capacity Zone, which candidate intermittent renewable technologies have (a) high development costs and (b) a low capacity factory, such that considering (a) and (b) there is limited or no incentive and ability to develop the candidate intermittent renewable technology in order to artificially suppress capacity prices (MST 23.4.5.7.13.2.2)
  - The ISO's period review shall provide for: (a) the ISO's preliminary identification of candidate intermittent renewable technologies for stakeholder review and comment (MST 23.4.5.7.13.2.3), which was accomplished with the June 2, 2020 presentation to stakeholders.
  - The ISO will then issue a draft list of recommended Exempt Renewable Technologies, and the basis for the recommendation, for stakeholder and Market Monitoring Unit review (MST 23.4.5.7.13.2.3).
    - This presentation will occur after FERC acceptance of the 2021 to 2025 ICAP Demand Curves and annual update methodology.
  - After FERC acceptance of the ICAP Demand Curves and annual update methodology, the NYISO has 60 days to file with FERC the results of its Exempt Renewable Technology periodic review and determination (23.4.5.7.13.2.4).

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Candidate Intermittent Renewable Technologies – Total Estimated Cost

Total Estimated Capital Expenditure (CAPEX) and Operations & Maintenance (O&M) Cost*

Unit Technology	Ground Mounted Solar PV 2-10 MW	Ground Mounted Solar PV 10-50 MW	Ground Mounted Solar PV 50 MW and up	Wind - Onshore 2-4 MW WTGs up to 2-50 MW	Wind - Onshore 2-4 MW WTGs up to 50-200 MW	Wind - Offshore 6-12.5 MW WTGs up to 400 MW	Wind - Offshore 6-12.5 MW WTGs up to 400-800 MW	Run of River Hydro 1-10 MW	Landfill Gas (LFG) 2-10 MW
Zones	G,H,I,J	G,H,I,J	G	G	G	J	J	G	G,H,I,J
Base Case Size (MW)	10	20	100	50	100	400	800	5	10
Capacity Factor	16.80%	16.80%	16.80%	35%	35%	45%	45%	60%	70%
EPC Cost Components									
Total EPC Cost	$16,625,000 to $20,592,000	$33,250,000 to $41,192,000	$127,183,000	$81,858,000	$147,350,000	$1,719,767,000	$3,197,917,000	$37,742,000	$21,542,000 to $25,400,000
Total EPC Cost ($/kW)	$1,663 to $2,059	$1,663 to $2,060	$ 1,272	$ 1,637	$ 1,474	$ 4,299	$ 3,997	$ 7,548	$2,154 to $2,540
Non-EPC Cost Components									
Total Non-EPC Cost	$1,163,000 to $1,442,000	$2,329,000 to $2,884,000	$ 8,903,000	$ 5,731,000	$ 10,316,000	$ 120,385,000	$ 223,855,000	$ 2,641,000	$1,507,000 to $1,778,000
Total Non-EPC Cost ($/kW)	$116 to $144	$116 to $144	$ 89	$ 115	$ 103	$ 301	$ 280	$ 528	$151 to $178
Total CAPEX	$17,788,000 to $22,034,000	$35,579,000 to $44,076,000	$136,086,000	$87,589,000	$157,666,000	$1,840,152,000	$3,421,772,000	$40,383,000	$23,049,000 to $27,178,000
Total CAPEX ($/kW)	$1,779 to $2,203	$1,779 to $2,204	$ 1,361	$ 1,752	$ 1,577	$ 4,600	$ 4,277	$ 8,077	$2,305 to $2,718
O&M Cost									
Total Fixed O&M Cost ($/yr)	$175,000 to $196,000	$349,000 to $392,000	$ 1,616,500	$ 1,757,000	$ 3,514,000	$ 44,000,000	$ 88,000,000	$ 800,000	$ 271,000
Total Fixed O&M Cost ($/kW/yr)	$17.50 to $19.60	$17.45 to $19.60	$ 16.17	$ 35.14	$ 35.14	$ 110.00	$ 110.00	$ 160.00	$ 27.10
Total Variable O&M Cost ($/MWh)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5.80
Total Variable O&M Cost ($/yr)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 356,000
Total Other O&M Cost ($/yr)	$409,000 to $507,000	$819,000 to $1,014,000	$ 3,130,000	$ 2,015,000	$ 3,626,000	$ 42,323,000	$ 78,700,000	$ 929,000	$530,000 to $626,000
Total O&M Cost ($/yr)	$584,000 to $703,000	$1,168,000 to $1,406,000	$ 4,746,500	$ 3,772,000	$ 7,140,000	$ 86,323,000	$ 166,700,000	$ 1,729,000	$1,157,000 to $1,253,000

*Note that the Sargent & Lundy report, which includes more detailed data, has been posted with today's meeting materials.

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Next Steps

Next Steps

- The NYISO will use the candidate intermittent renewable technology cost information, along with the Capacity Market Demand Curves, to determine the candidate technologies exempt from buyer-side mitigation.
- After FERC issuance of an order accepting the 2021 to 2025 ICAP Demand Curves and annual update methodology, the NYISO will provide the draft Exempt Renewable Technology study for review and comment by stakeholders and the MMU.
- Per the Tariff, on or before the 60th day following the FERC issuance of an order accepting ICAP Demand Curves based on the ICAP Demand Curve periodic review, the ISO shall file with the Commission the results of its Exempt Renewable Technology periodic review and determination.

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The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

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