ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

NYISO 2019/2020 ICAP Demand Curve Reset

ICAP Working Group

June 10, 2020

Today:

- Overview of Draft Report
- Updated Preliminary Reference Point Prices
- Appendix: Gas Hub Pricing for Load Zone C
- Appendix: Backup Data for PILOT Payments

Overview of Draft Report

Preliminary Draft Report Results

Preliminary Results are Subject to Change

- Contents of the draft report, including recommendations, are preliminary and subject to change
- The recommended reference point prices reflect our research and analyses to date
- Data, assumptions and methods used in developing our recommended reference point prices may change given new information and re-evaluation of preliminary recommendations in response to feedback received
- Final reference point prices will reflect updated data for certain parameters
  - Historical LBMPs, reserve prices, and certain variable operating costs (fuel and emissions) for the relevant 3-year period, September 2017 – August 2020
    - Preliminary values reflect 3-year historic period, September 2016 – August 2019
  - Winter-to-summer ratio for the relevant 3-year period, September 2017 – August 2020
    - Preliminary values reflect 3-year historic period, September 2016 – August 2019
  - Gross CONE cost escalation factors and level of excess adjustment factors
- Final recommendations will be incorporated into our final report (August 2020); updated final values will be provided in September 2020 along with NYISO staff final recommendations

Preliminary Draft Report Results

Preliminary Results are Subject to Change

- We continue to evaluate certain data and assumptions either because of on-going changes in market conditions or because recommendations were only recently developed and communicated to stakeholders:
  - Financial parameters, including potential changes to account for updated information on the impact of COVID-19 on financial markets
  - Peaking plant design (emissions controls and dual fuel capability) in certain locations, including whether to incorporate SCR emissions controls in Load Zone G (Dutchess County) fossil peaking plant design
  - Fuel gas pricing hubs in certain Load Zones, including hubs for Loads Zones C and G (Rockland County)
    - Additional information regarding the preliminary recommendation for Load Zone C is provided in the appendix
  - Level of excess adjustment factors (LOE-AFs)

Overview of Draft Report

Introduction and Summary

- Introduction, Purpose, and Process
  - Independent review for the establishment of ICAP Demand Curves
  - Overview of stakeholder process and ICAPWG discussions
- Analytical Approach
  - Assessment of: peaking plant technology, gross cost of new entry (CONE), net Energy and Ancillary Services (EAS) revenues, reference point price determination, annual updates
  - Objectives and criteria: economic principles, accuracy, transparency, feasibility, historical precedent and performance
- Summary of Recommendations
  - Contains current *draft/preliminary* recommendations for reference point prices and underlying recommended assumptions related to, among other things, peaking plant technology, dual fuel status, emissions controls, financial parameters, and gas hubs

Overview of Draft Report

Technology Options and Costs

- Overview and Technology Screening Criteria
  - Analysis of simple cycle (aeroderivative and frame gas turbines), energy storage, and informational combined cycle units
  - Criteria: Standard and available technology, proven operating experience, ability for economic dispatch, ability to provide peaking service (cycle), practically constructible, able to meet environmental requirements
  - Representative technologies selected for review:
    - Three Siemens SGT-A65 units
    - One GE 7F.05 unit
    - One GE 7HA.02 unit
    - 200 MW 4-hour, 6-hour, and 8-hour lithium-ion batteries
    - 1x1 GE 7HA.02 combined cycle (for informational purposes only)

Overview of Draft Report

Technology Options and Costs

- Plant Environmental and Siting Requirements
  - Air permitting, cap and trade, cooling and other requirements
- Dual Fuel Capability
  - Recommends continued use of dual fuel in Load Zones G, J, and K
  - Recommends continued use of gas-only in Load Zones C and F
- Capital Investment Costs
  - Includes plant design basis, engineering, procurement and construction (EPC) cost estimates, owner's costs, interconnection costs, and summary tables
- Fixed and Variable Operations and Maintenance (O&M)
  - Fixed costs: Plant expenses, site leasing, fixed O&M, taxes, insurance
  - Variable costs: Routine maintenance, water, SCR emissions controls related costs, and non-fuel consumables
- Operating Characteristics

Overview of Draft Report

Gross Cost of New Entry

- Financial Parameters
  - Includes discussion of proposed amortization period, financial parameters and resulting weighted average cost of capital (WACC)
- Levelization Factors
  - The translation of one-time installed capital costs into an annualized cost over the assumed economic life of the plant
- Annualized Gross Costs
  - Preliminary gross CONE by technology

Overview of Draft Report

Energy and Ancillary Services Revenues

- Overview and Approach
  - Net EAS revenues are estimated based on the simulated dispatch of the peaking plant using a 3-year rolling historical sample of prices and costs
- Fossil Model Logic
- Battery Model Logic
- Model Data
  - LBMPs, reserve prices, fuel prices, emission allowance prices, and other inputs
- Level of Excess Adjustment Factors
  - The draft report reflects the preliminary LOE-AF values reviewed at the May 19, 2020 ICAPWG meeting

Overview of Draft Report

ICAP Demand Curve Model and Reference Point Prices

- Introduction
- ICAP Demand Curve Shape and Slope
  - Description of the zero crossing point, winter-to-summer ratio, and level of excess criterion
- Reference Point Price Calculations
  - Walkthrough of mathematics of the reference point price calculation
- Preliminary ICAP Demand Curve Parameters
  - Preliminary Reference Point Prices by technology
  - Preliminary reference point prices are also included at the end of this slide deck

Overview of Draft Report

Annual Updating of the ICAP Demand Curve Parameters

- Annual Updates to Gross CONE
  - Reflects changes due to updates to Services Tariff, Section 5.14.1.2.2.1
    - These changes call for annual update escalation rates to be calculated by comparing the most recent year of data to the data in the year of the DCR

$$Annual\ Composite\ Escalation_{\ t} = \sum_{i=1}^{4}(weight_i) * \left(\frac{Index_{i,t}}{Index_{i,DCRYear}} - 1\right)$$

  - Provides preliminary recommendations for escalation indices for construction and labor, materials, gas and steam turbine, storage battery, and the GDP deflator, by technology, to be updated with more recent data for final report
- Annual Updating of Net EAS Revenues
  - Description of methodology consistent with the 2016 DCR

Updated Preliminary Reference Point Prices

Preliminary Reference Point Prices

Discussion of Indicative Prices

- Preliminary reference point prices are provided for informational purposes only and are subject to change
  - The preliminary values are reflective of the preliminary recommendations for various inputs/assumptions as of the date of this presentation, as described in next two slides
  - The analysis to date indicates that the H-class frame turbine (GE 7HA.02) is the lowest cost technology option in all locations; preliminary values are based on the H-class frame

Preliminary Reference Point Prices

Review of Key Assumptions

- Time Period: Preliminary results based on historic data from September 2016 through August 2019
  - Final values for 2021/2022 Capability Year will be based on data from September 2017 through August 2020 (results to be updated in September 2020)

Financial Parameters Summary		
Inputs	**Recommended Value**	
Return on Equity	13.0%	
Cost of Debt	7.7%	
Debt to Equity Ratio	55/45	
WACC	10.1%	
	Zone J	Other zones
Tax Rate	36.4%	27.5%
ATWACC	8.5%	8.9%

Preliminary Reference Point Prices

Review of Key Assumptions

- Key technical assumptions discussed in 4/22/2020 and 5/19/2020 presentations

	Zone C	Zone F	Zone G (Dutchess)	Zone G (Rockland)	Zone J	Zone K
Unit Design Specification (GE 7HA.02)[1]	15 ppm, Gas-only, no SCR	15 ppm, Gas-only, no SCR	15 ppm, Dual Fuel, no SCR[2]	25 ppm, Dual Fuel, with SCR	25 ppm, Dual Fuel, with SCR	25 ppm, Dual Fuel, with SCR
Recommended Proxy Gas Hub	TGP Zone 4 (200L)	Iroquois Zone 2	Iroquois Zone 2	TETCO M3	Transco Zone 6 NY	Iroquois Zone 2

Notes:
[1] GE 7HA.02 specification lists base quantity of NO_x emissions before emission control technologies are used.
[2] AG is still evaluating the potential for SCR installation in Load Zone G (Dutchess); preliminary results for plant design with SCR emissions controls is provided in the draft report.

Preliminary Reference Point Prices

Preliminary Reference Point Prices ($2021/kW-mo.)						
	Zone C	Zone F	Zone G (Dutchess)[1]	Zone G (Rockland)	Zone J	Zone K
2021/2022 Demand Curve	$8.13	$9.23	$12.98	$12.75	$21.72	$20.29

Note:
[1] AG is still evaluating the potential for SCR installation in Load Zone G (Dutchess); preliminary results for plant design with SCR emissions controls is provided in the draft report.

Previous Reference Point Prices ($/kW-mo.)						
	Zone C	Zone F	Zone G (Dutchess)	Zone G (Rockland)	Zone J	LI
2020/2021 Demand Curve	N/A	$10.65	$17.67	N/A	$23.31	$17.88 (with collar) $21.13 (w/o collar)
2019/2020 Demand Curve	N/A	$9.83	$16.59	N/A	$21.95	$15.96 (with collar) $18.83 (w/o collar)

Preliminary Gross CONE and Net EAS Offset Values

Preliminary Gross CONE ($2021/kW-yr.)						
	Zone C	Zone F	Zone G (Dutchess)[1]	Zone G (Rockland)	Zone J	Zone K
2021/2022 Demand Curve	$122.30	$123.40	$139.82	$157.24	$201.26	$167.36

Preliminary Net EAS Revenues ($2021/kW-yr.)						
	Zone C	Zone F	Zone G (Dutchess)[1]	Zone G (Rockland)	Zone J	Zone K
2021/2022 Demand Curve	$45.58	$36.46	$35.38	$55.96	$42.62	$59.87

Note:
[1] AG is still evaluating the potential for SCR installation in Load Zone G (Dutchess); preliminary results for plant design with SCR emissions controls is provided in the draft report.

Appendix: Gas Hub Pricing for Load Zone C

Gas Hub Pricing for Load Zone C

Load Zone C						
Decision Criteria		TETCO M3	TGP Zone 4 (200L)	TGP Zone 4 (Marcellus)	Dominion North	Dominion South
	Market Dynamics	High LBMP Correlation	Medium LBMP correlation	Medium LBMP correlation	Medium LBMP correlation	Medium LBMP correlation
	Liquidity	High	High	Medium	Medium	High
	Geography	No	Yes	Yes	Yes	No
	Recommendation		✔			
Precedent	2016 DCR	Yes	No	No	No	No
	CARIS (2019) Phase I	No	No	No	No	Part of Zones A-E Blend
	SOM (2018)	No	No	No	Yes	No

Appendix: Backup Data for PILOT Payments

Backup Data for PILOT Payments

Summary of NY PILOTS (Gas Only)

Project Name	Operating Capacity (MW)	Fuel Type	Technology Type	Total Project Amount ($million)	Total PILOT Payments Due	Effective Tax Rate
WPS Beaver Falls Generation	92	Natural Gas	Combined Cycle	$9.0	$83,640	0.93%
Brooklyn Navy Yard	296	Natural Gas	Combined Cycle	$370.0	$4,684,328	1.27%
Bethlehem Energy Center	932	Natural Gas	Combined Cycle	$400.0	$3,816,819	0.95%
Freeport Generating Station	96	Natural Gas	Combustion Turbine	$59.5	$1,273,101	2.14%
Empire Generating Project	676	Natural Gas	Combined Cycle	$358.0	$1,750,000	0.49%
Saranac Facility	277	Natural Gas	Combined Cycle	$166.5	$420,000	0.25%
Athens Generating Station	1,189	Natural Gas	Combined Cycle	$750.0	$4,896,986	0.65%
Independence Station	1,212	Natural Gas	Combined Cycle	$800.0	$5,466,666	0.68%
Pinelawn Power, LLC	77	Natural Gas	Combined Cycle	$92.0	$998,400	1.09%

Gas Plant Average	**0.94%**
2020 DCR PILOT Rate Proposed	**0.90%**
2016 DCR PILOT Rate Used	**0.75%**

Notes:
[1] Empire PILOT escalates to $1,750,000 in the 7th year, to $2,000,000 in the 12th year, and to $2,250,000 in the 17th year (effective tax rate ranges from 0.28% to 0.63%).
[2] Bethlehem PILOT increases by 2.5% per year for 20 years starting at $2,875,000 (effective tax rate ranges from 0.72% to 1.15%).

Sources:
[1] "Financial Data for Local Governments." Office of the New York State Comptroller. Available at https://www.osc.state.ny.us/localgov/datanstat/findata/index_choice.htm.
[2] SNL Financial.

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