

Consumer Impact Analysis: Proposed Assumption Framework

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IPPTF Issue Track 5

May 21, 2018

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Framework for Database Development

- This presentation provides stakeholders with a proposed framework for constructing the production cost model databases
 - Detailed assumptions will be provided in subsequent IPPTF meetings.
- The study framework under consideration proposes to:
 - Utilize the 2017 CARIS 1 “System Resource Shift” case as starting point
 - Capture material updates (as available) for three study years (2020, 2025, 2030)
 - Adjust renewable build-out to meet interim targets and “50 x 30” in 2030*
 - Implement alternative assumptions for renewable build-outs and nuclear unit retirements in three scenarios

* Renewable assumptions are currently being developed and details will be reviewed as part of the next presentation

General Description and Key Assumptions

Scenarios	Years	New Renewable Resources	Nuclear Plants	Retirements	Transmission System
Scenario A <i>CARIS Model</i>	2020, 2025, and 2030	CARIS, incl. 250 MW off-shore wind; mostly on-shore renewables; reflect latest renewable procurements; stretch-out renewable build-out	Indian Point retired in 2020/21 All Upstate nuclear in service past current license period	All NYCA Coal assumed to be retired.	Western NY and generic AC Transmission upgrades* included *Not project specific
Scenario B <i>Off-Shore Wind</i>	2030 only	2,400 MW off-shore wind by 2030, assume fewer new on-shore renewables			
Scenario C <i>Upstate Nuclear</i>	2030 only	Same as Scenario A	Same except Ginna and NMP1 retire in 2029		

Major Changes Anticipated

Year	Major Events	Event Category
Pre 2020	NYCA coal units retired; Selkirk, Binghamton, Greenport GT1 and Ravenswood 09 units retired	Thermal
2020	IP2 Retirement	Nuclear
2021	IP3 Retirement UPNY-ConEd Voltage Limit Increase	Nuclear, Transmission
2022	WNY Transmission In-Service NYSERDA Large Scale Renewables In-Service	Transmission Renewables
2023	AC Transmission In-Service, Athens SPS Out-of-Service	Transmission
2024	No Major Changes	
2025	No Major Changes	
2026-2028	No Major Changes	
2029	NMP1 and Ginna License Expiration, ZEC Expiration	Nuclear
2030	CES Target 50% (by 2030)	

Color Code: Nuclear, Transmission, Renewables, Others

Years highlighted in blue are proposed modeling years

NYCA Transmission Updates

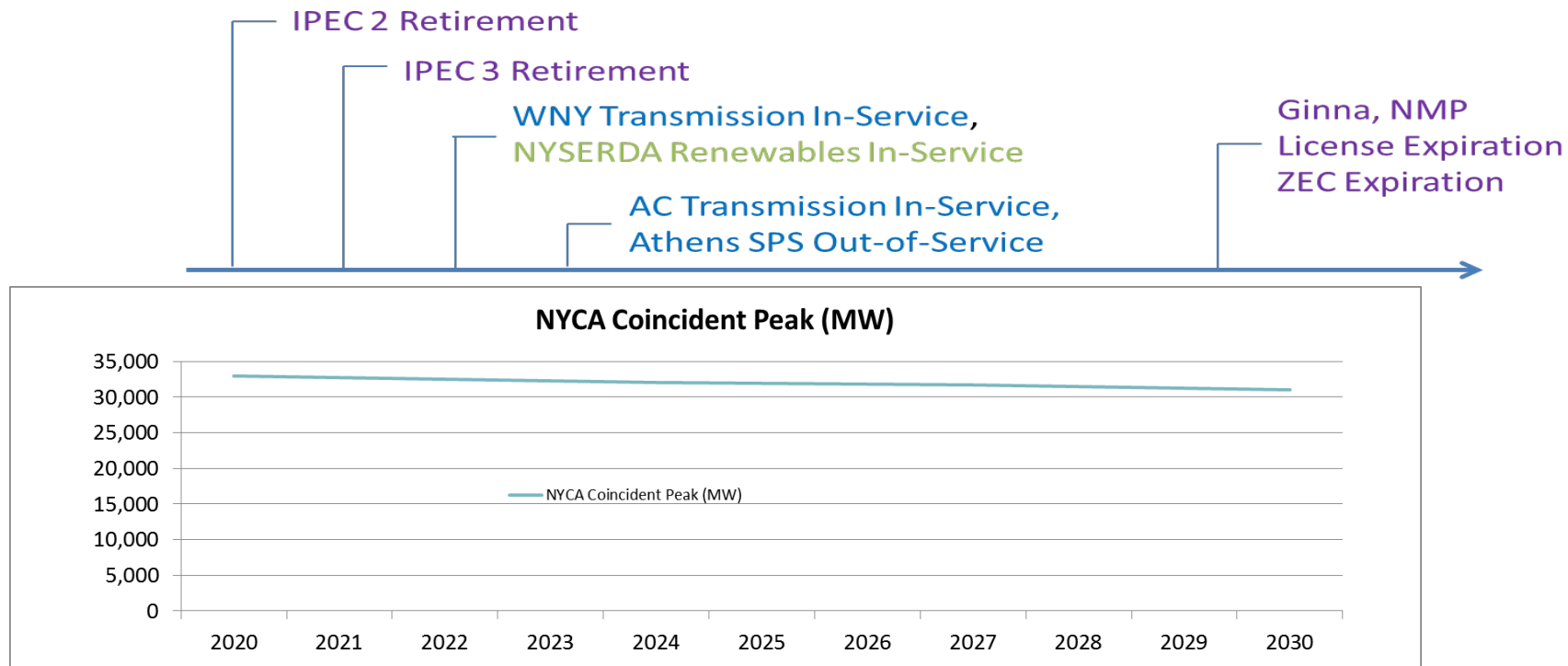
Transmission Updates from 2017 CARIS 1	Notes
UPNY-ConEd Voltage Limit	Increase to 6250 MW; In-Service for 2021
Zero Operating Base Flow Effective Date Change in PJM/NY JOA	OBF set to 0 as of 10/31/2019
South Perry 230kV/115kV Transformer	In-Service for 2020
Dunkirk - S.Ripley Series Reactor	In-Service for 2020
Leeds Hurley SDU	In-Service for 2020
Selected Western PP Project (Empire State Line Project)	In-Service for 2022
ACT PP Selected Project (Generic)	In-Service for 2023

Note: Consistent with 2017 CARIS 1 database, Athens SPS is modeled as in-service until the AC Project comes online.

Load Forecast Updates

- **New York Control Area**
 - 2018 Load and Capacity Data Report
 - Base forecast adjusted to reflect 2017 CARIS 1 energy efficiency assumptions for Clean Energy Standard
- **External Regions (PJM, ISO-NE, IESO)**
 - Latest Available Peak and Energy Forecasts for 2020 and 2025
 - Forecasts held constant from 2025 to 2030 (per NYISO CARIS procedure) for 2nd Ten-Year Study Period

Major Changes and Load Forecasts



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Emission Allowance Price Forecasts

- Annual and Seasonal NO_x , SO₂ and RGGI CO₂ values unchanged from 2017 CARIS 1 and AC Public Policy Analyses
- Current RGGI participation maintained
 - IESO modeled in the Western Climate Initiative
- No national CO₂ due to the uncertainty in the timing and nature of such a program.
- Additional carbon charges will be incorporated in the “simple” and “dynamic” model change cases to estimate consumer impacts.

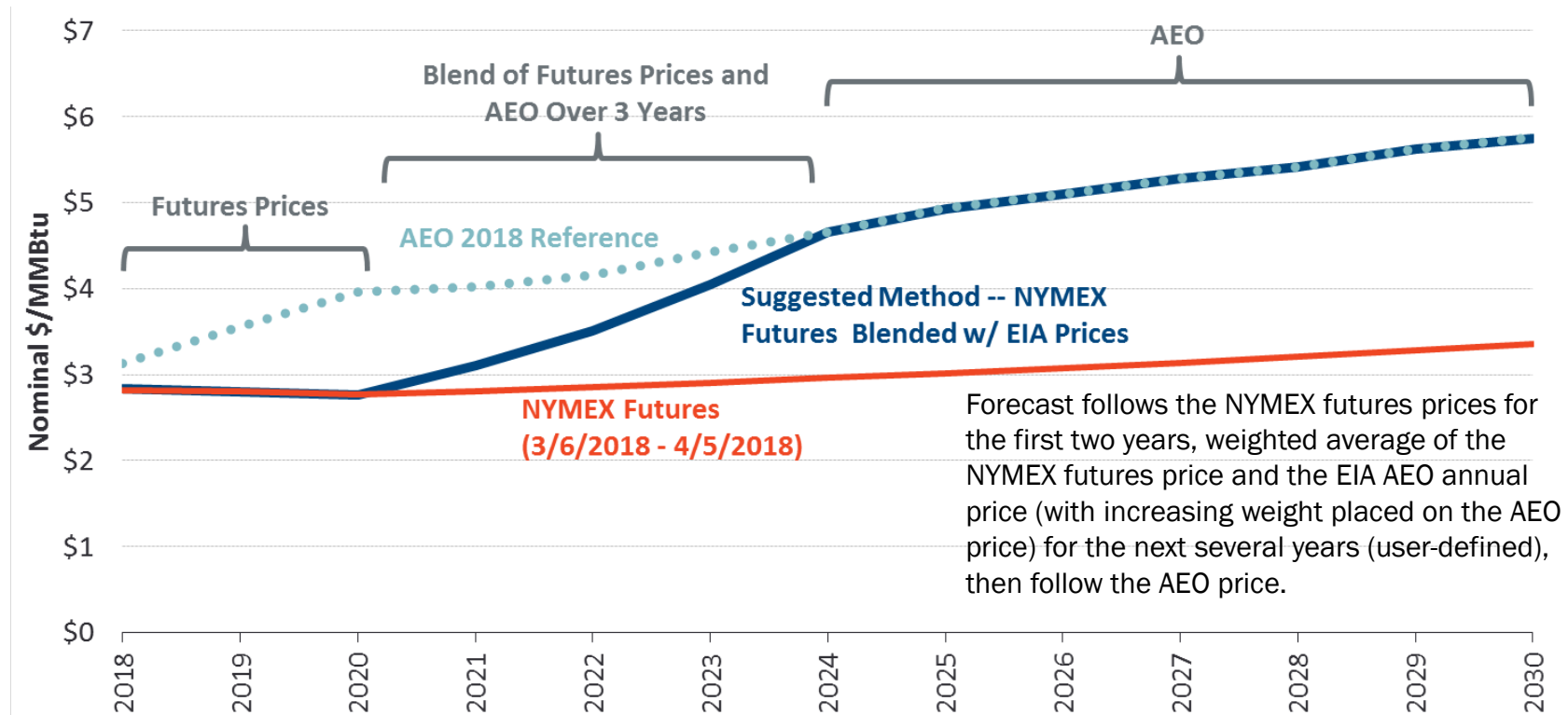
Fuel Price Forecasts

- Fuel price forecasts updated and extended from 2017 CARIS 1 to reflect latest EIA data
- CARIS forecast methodology for natural gas prices adjusted to utilize, (a) NYMEX futures prices in the near-term (2018-2020) (b) linear combination of NYMEX futures and EIA Annual Energy Outlook prices in mid-term (2021-2023) and EIA Annual Energy Outlook prices in the long-term (2024-2030)
- Monthly and weekly shaping process employed (as in CARIS) to capture price seasonality and price spikes

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Fuel Price Forecasts: Henry Hub

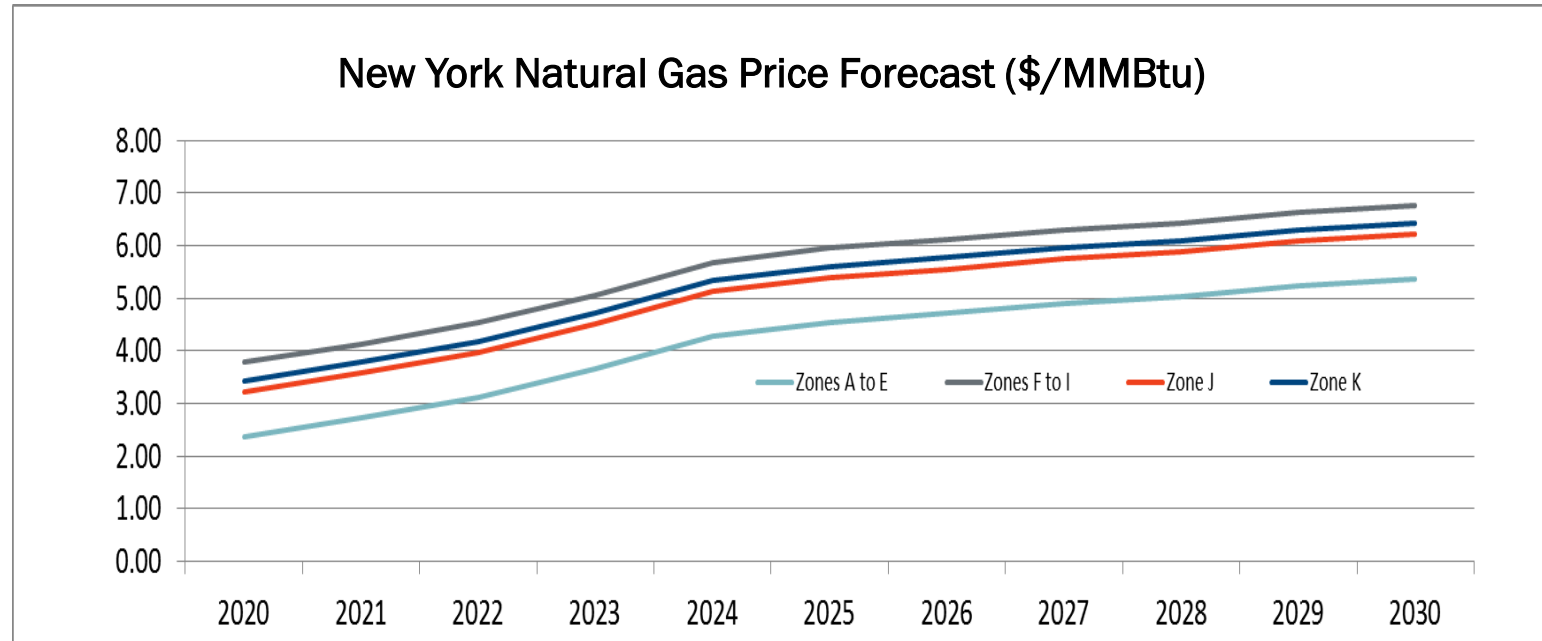


Forecast follows the NYMEX futures prices for the first two years, weighted average of the NYMEX futures price and the EIA AEO annual price (with increasing weight placed on the AEO price) for the next several years (user-defined), then follow the AEO price.

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Fuel Price Forecasts: New York



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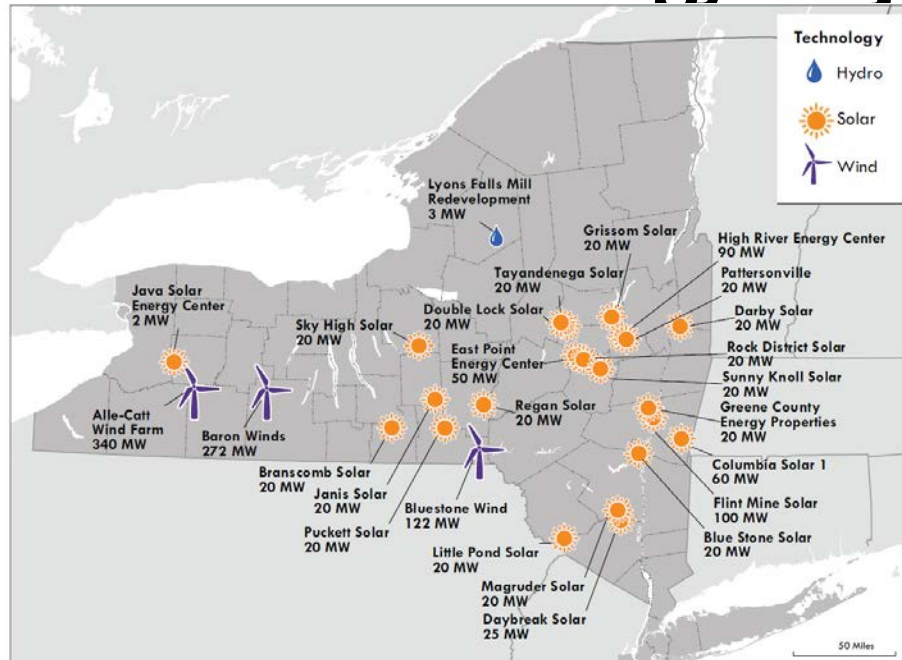
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NYCA Resources

- **Limited updates for NYCA generation resources from 2017 CARIS 1 SRS case**
 - Retirement of Selkirk I and II, Binghamton, Greenport GT1 and Ravenswood 09 units
- **Clean Energy Standard Renewable Additions (Scenario A)**
 - Utilize 2017 CARIS 1 allocation
 - Incorporate projects selected in NYSERDA's 2017 Large-Scale Renewable solicitation in 2022
 - Adjust renewables modeled in CARIS case accordingly to reflect newly-awarded projects
- **Clean Energy Standard Renewable Additions (Scenario B)**
 - Model a total of 2,400 MW of off-shore wind in 2030
 - Model fewer **new** solar and on-shore wind facilities (compensating for higher capacity factor for off-shore resources) to maintain achievement of "50 x 30"
- **Ginna and Nine Mile 1 (Scenarios A & C)**
 - Modeled as in-service in 2030 (past license expiration dates), reflective of ZEC payments, in Scenario A
 - Modeled as retired in Scenario C

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Large-Scale Renewable Energy Projects Awarded



<https://www.nysed.gov/-/media/Files/Programs/Clean-Energy-Standard/2017-RES-RFP-Results-Factsheet.pdf>



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External Region Resource and Transaction Modeling

- Updating resources in PJM, ISO-NE and IESO to reflect latest data available on unit retirements and additions
- Ontario nuclear refurbishment schedule maintained
- HQ is modeled as a fixed, hourly resource based on 2017 actual flows (including High Gate and Phase II)
- Inter-Control Area Hurdle Rates unchanged from 2017 CARIS 1

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External Transaction Modeling

- Proposed approach is to extract hourly flows from the “Base Case” and lock these down for the subsequent “Simple” and “Dynamic” change cases

Feedback?

- Questions and/or comments can be sent to IPP_feedback@nyiso.com

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- 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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