

Fuel and Energy Security Study Scope, Method, and Inputs

NYISO ICAPWG/MIWG

February 25, 2019

Table of Contents

Overview of Assignment

Modeling Structure and Inputs

Potential Model Scenarios

Next Steps

Context and Assignment

- Electricity market trends and projected changes may introduce potential reliability risks
 - Reliable system operations increasingly dependent on natural gas
 - Market trends increase economic pressures on traditional generation
 - Neighboring systems (New England, PJM) moving in similar directions, and have reviewed reliability of winter power operations given role of natural gas
- What are the conditions and the risks (if any) in New York?
- Analysis Group (AG) task: assess winter fuel/energy security for NYISO under various assumptions (and variations to assumptions) and scenarios; provide a report documenting the approach and findings
- Conditions to review
 - Extended period of cold weather in a future year
 - Deterministic assessment based on forecasts of demand, supply and fuel availability
 - Identify circumstances (if any) under which resources are insufficient to meet load plus reserves absent emergency actions, for the state and relevant load zones/regions
 - Evaluate fuel/energy adequacy under a wide range of future assumptions and potential electric and natural gas system scenarios

Table of Contents

Overview of Assignment

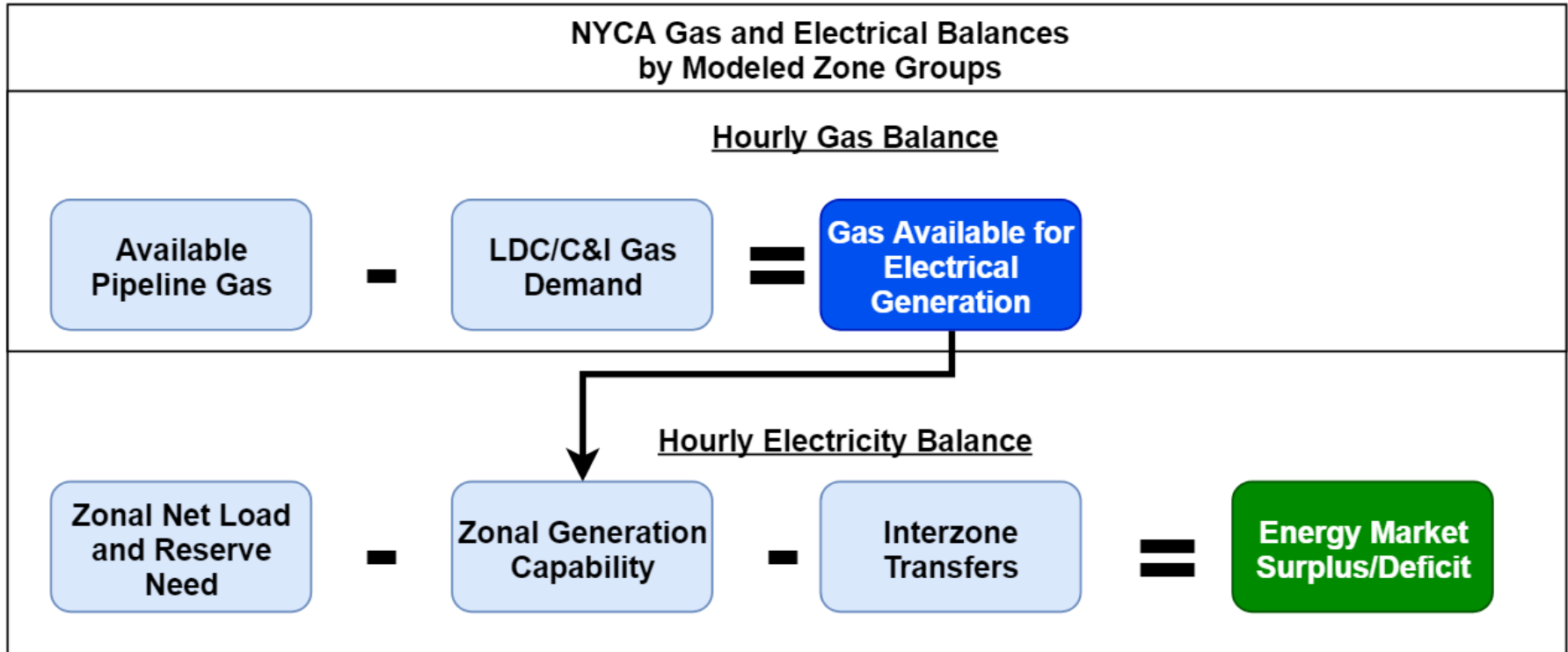
Modeling Structure and Inputs

Potential Model Scenarios

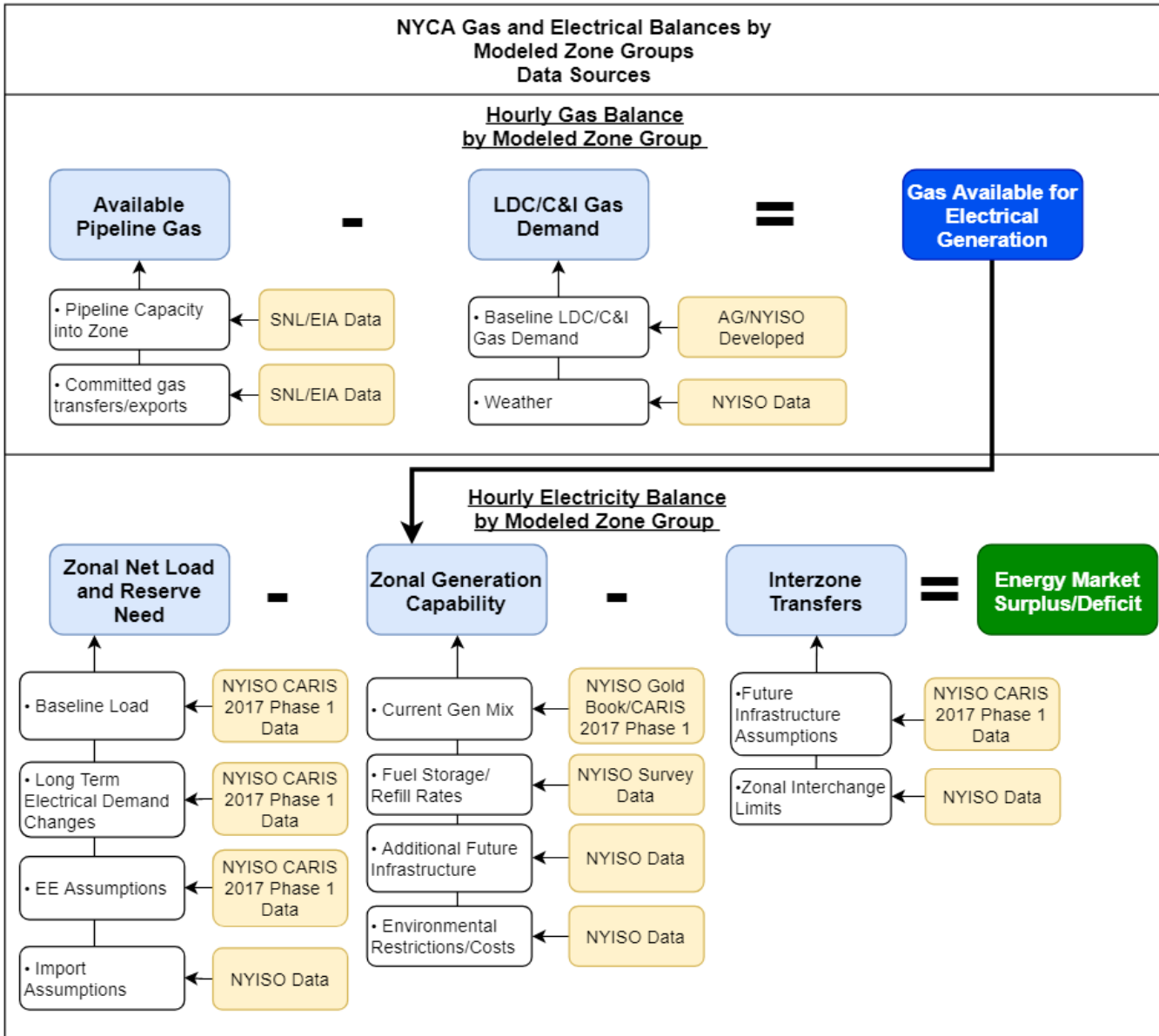
Next Steps

Model Overview

- Quantitative deterministic model – “stacking order” analysis
 - Not a production cost or transmission security modeling exercise
- Forecast period: Winter 2023/2024
- Cold weather “event”: extended cold weather period based on historic weather/load data
 - Estimate hourly natural gas and electric demand consistent with these conditions
- Proposed modeling period: 14 consecutive days (including a 3 day “cold snap;” but not a full winter analysis)
 - Based on a review of historical weather data
- Resource starting assumptions consistent with 2017 CARIS Phase 1 “System Resource Shift” case; little or no changes assumed to natural gas infrastructure
- Natural gas demand/supply and oil capability informs ordering of generating units under assumed load and resource conditions
 - Liquid fuel replenishment based on capacities and historical experience
 - Natural gas-fired power generation availability based on natural gas demand/supply outcomes
- Compare hourly generation to hourly load plus reserves

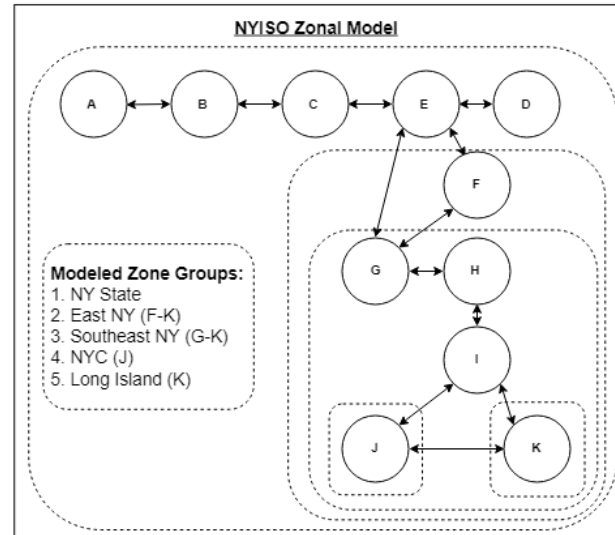
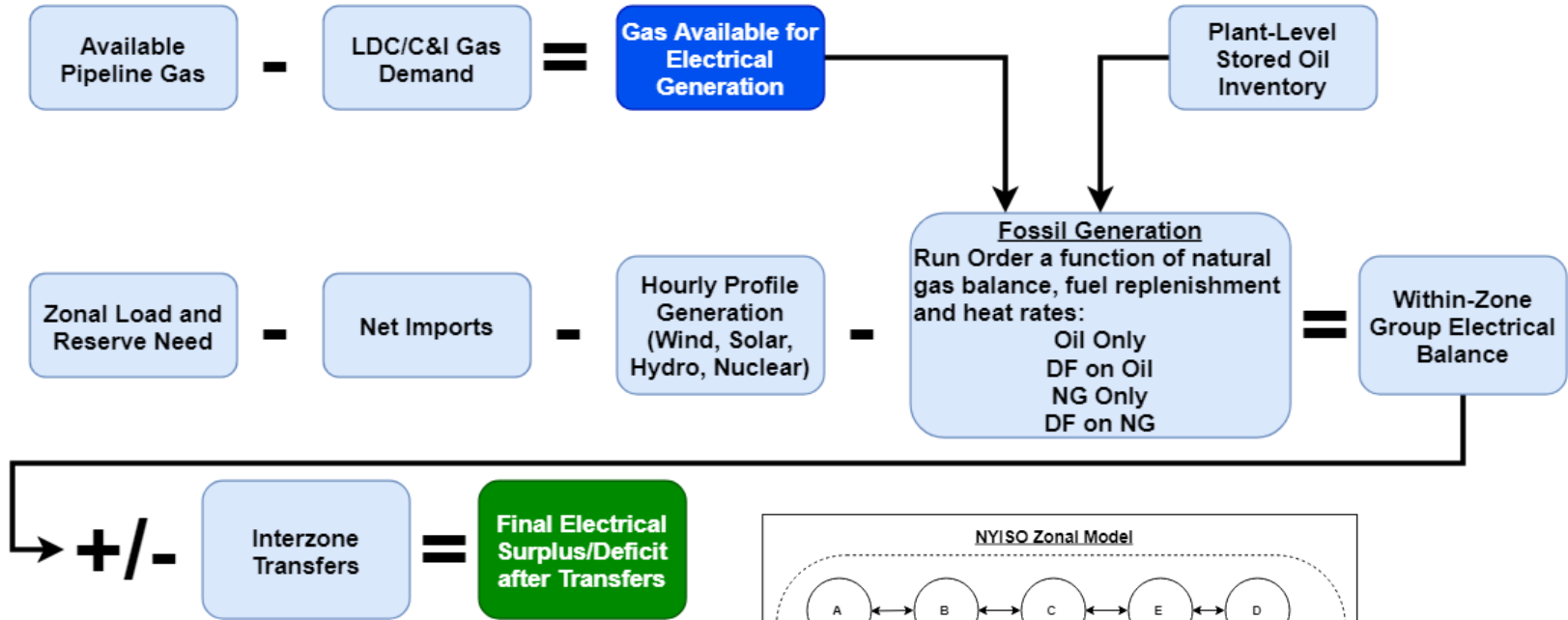


- Hourly balance of natural gas, to identify (hourly) *natural gas available for electric generation*
- With that (and information on output from and fuel for other generation sources) – conduct hourly evaluation of electric system balance
- Done over a defined/forecasted “event period” – proposing 14 consecutive days
- Forecast period: Winter 2023/2024



- Publicly-available data if available
- Load and resource assumptions previously vetted through NYISO committees (where possible)
- *Assumptions* – vary “base case” load, resource, and LDC demand assumptions
- *Scenarios* – postulate natural gas and electric system failures to stress test the results
- Seek natural gas LDC and NYISO stakeholder feedback

NYCA Gas and Electrical Balances by Modeled Zone Groups Detailed Model Logic



X 24 Hours / Day X 14 Winter Days

Data

- The starting point is the “System Resource Shift” case from 2017 CARIS Phase 1 study, with the following underlying assumptions:
 - NYISO zonal load forecasts for 2023/2024
 - NYISO emissions restrictions
 - All NY coal units retired
 - Indian Point retired
 - Integration of new renewables and energy efficiency to meet Clean Energy Standard
- Alternative assumptions will be developed based on draft NY DEC rule concerning combustion turbines
- The existing natural gas pipeline/storage network is assumed to stay the same through 2024
- Forecasts of natural gas LDC demand based on LDC forecasts

Table of Contents

Overview of Assignment

Modeling Structure and Inputs

Potential Model Scenarios

Next Steps

■ Terminology

- We use “assumptions” to indicate base case and alternative assumptions with respect to demand, resources, and policies
- We use “scenarios” to represent unexpected/additional losses of natural gas and/or power system infrastructure (pipelines, power plants, transmission facilities)
- Assumptions and scenarios will be combined into a manageable number of “cases” (model runs) that span the range of potential futures, and stress test the system

■ *Assumptions* - examples

- Baseline/business as usual
- Different quantities of renewable generating capacity
- Different quantities of unit retirements
- Higher/lower than expected economic load growth
- Higher than expected electrification of transportation and heating sectors

■ *Scenarios* - examples

- Loss of pipeline capacity (e.g., pipeline and/or compressor station outages)
- Loss of power plant capacity
- Restrictions on oil replenishment

Table of Contents

Overview of Assignment

Modeling Structure and Inputs

Potential Model Scenarios

Next Steps

■ Analysis Group/NYISO

- AG to complete model development
- AG to work with NYISO to complete and input model data/assumptions (with stakeholder input)
- Run model cases, generate tabular/graphical results
- Draft report, final report
- Present to stakeholders at various stages

■ Rough Schedule

- Today: AG presentation of high-level overview of model structure and inputs
- Early March 2019: AG discussion of feedback on proposed assumptions and scenarios
- Late April 2019: AG presentation of fuel security analysis findings
- June 2019: AG presentation of final findings and initial recommendations
- July 2019: AG presentation of final recommendations

Contact

Paul Hibbard, Principal

617 425 8171

phibbard@analysisgroup.com