



Eastern Interconnection Planning Collaborative

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# EIPC Gas-Electric Study

## Target 1 Results

Stakeholder Steering Committee

February 28, 2014

**LEVITAN & ASSOCIATES, INC.**

MARKET DESIGN, ECONOMICS AND POWER SYSTEMS

# Acknowledgement and Disclaimer

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### Acknowledgement:

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# Agenda

- ◆ Review Target 1 Research Goals
- ◆ Highlights of LAI's research and findings by key task
- ◆ Review Gas-Electric Interfaces – Case Example (NYISO)
- ◆ Qualitative Assessment of Key Interfaces Across 6 PPAs
- ◆ Q&A

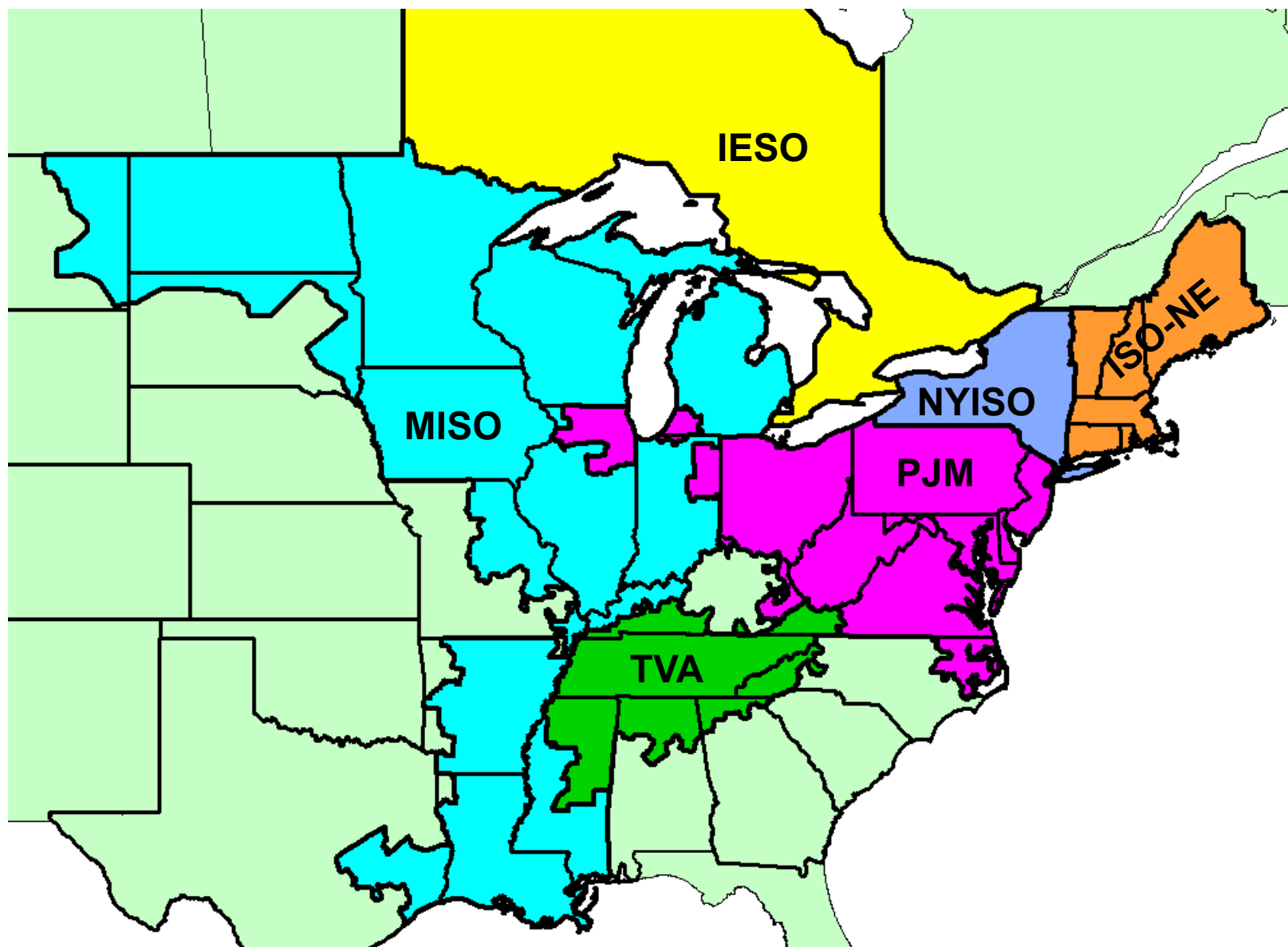
# Study Targets

- ◆ **Target 1:** Develop baseline assessment, including descriptions of the natural gas-electric system interfaces, interaction effects, specific drivers of the pipeline/LDC planning process
- ◆ **Target 2:** Evaluate the capability of the natural gas systems to meet individual and aggregate core and non-core gas demand over a 5- or 10-year horizon
- ◆ **Target 3:** Identify contingencies on the natural gas system that could adversely affect electric system reliability, and *vice versa*
- ◆ **Target 4:** Review the operational / planning issues affecting the availability of dual fuel capable generation, including fuel assurance objectives

# Target 1 Study Framework

- ◆ Assess baseline gas-electric systems and interfaces
- ◆ Define gas pipeline, storage facilities
- ◆ Define pipeline and LDC transportation options for generators
- ◆ Assess generator contracting and fuel assurance practices
- ◆ Evaluate secondary market for released capacity

# Study Region



# Generator Statistics By PPA

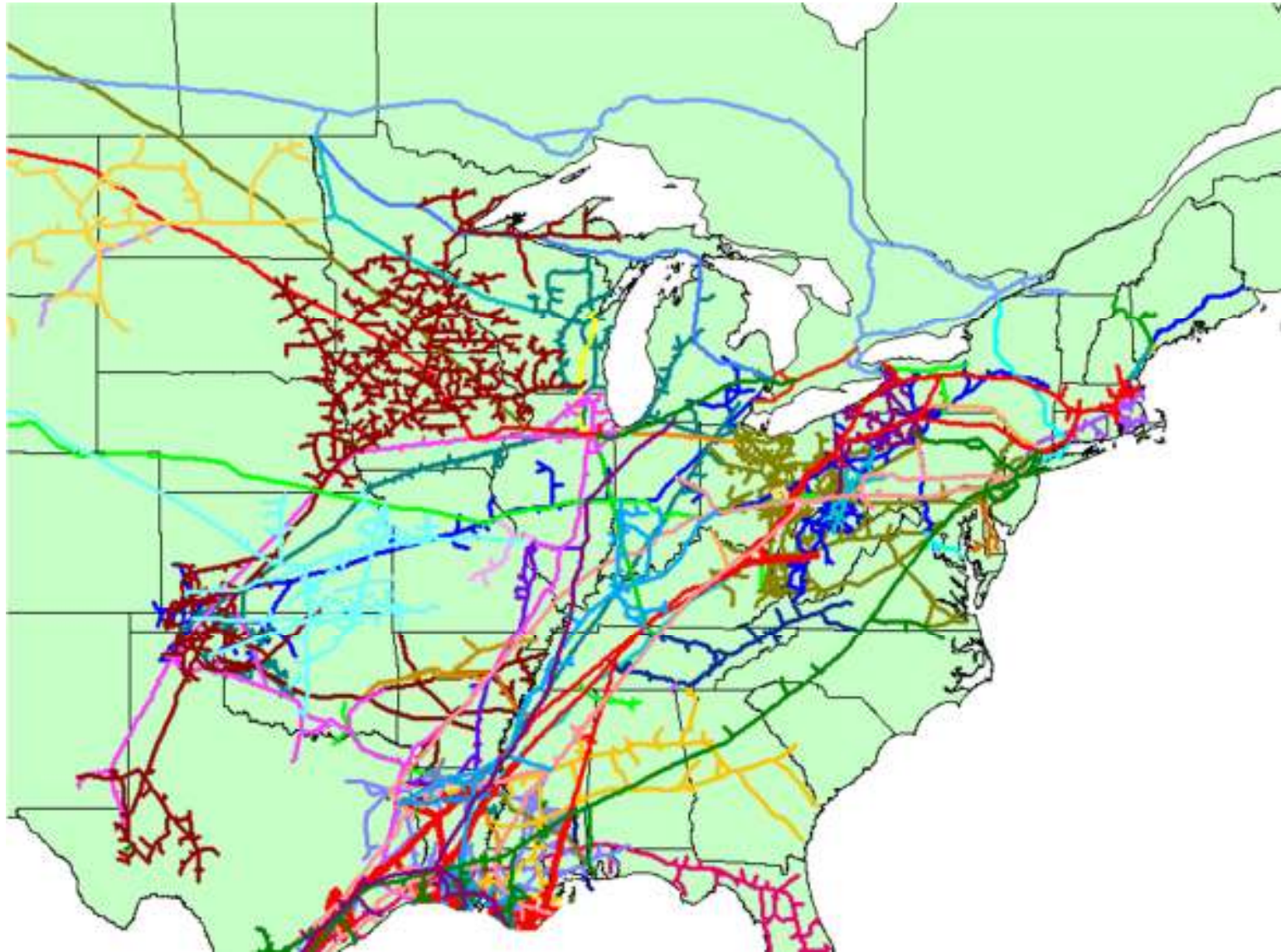
PPA	% GWh Gas (2012)	Total ICAP (GW)	Gas-Capable ICAP (GW)	% Total (GW)	Direct-Connect ICAP (GW)	LDC-Served ICAP (GW)
PJM	19%	185	78.7	43%	35.1	43.6
MISO	9% <sub>(N/C)</sub> / 52% <sub>(S)</sub>	177	68.0	38%	44.8	23.2
NYISO	45%	38	24.7	65%	7.4	17.3
ISO-NE	50%	35	18.6	54%	14.3	4.3
TVA	12%	34	10.6	31%	8.0	0.6
IESO	15%	33	9.9	28%	1.2	8.7
Total		502	208.5	41%	110.8	97.7

Note: N/C – MISO North & Central Regions, S = MISO South Region

Source: PPAs

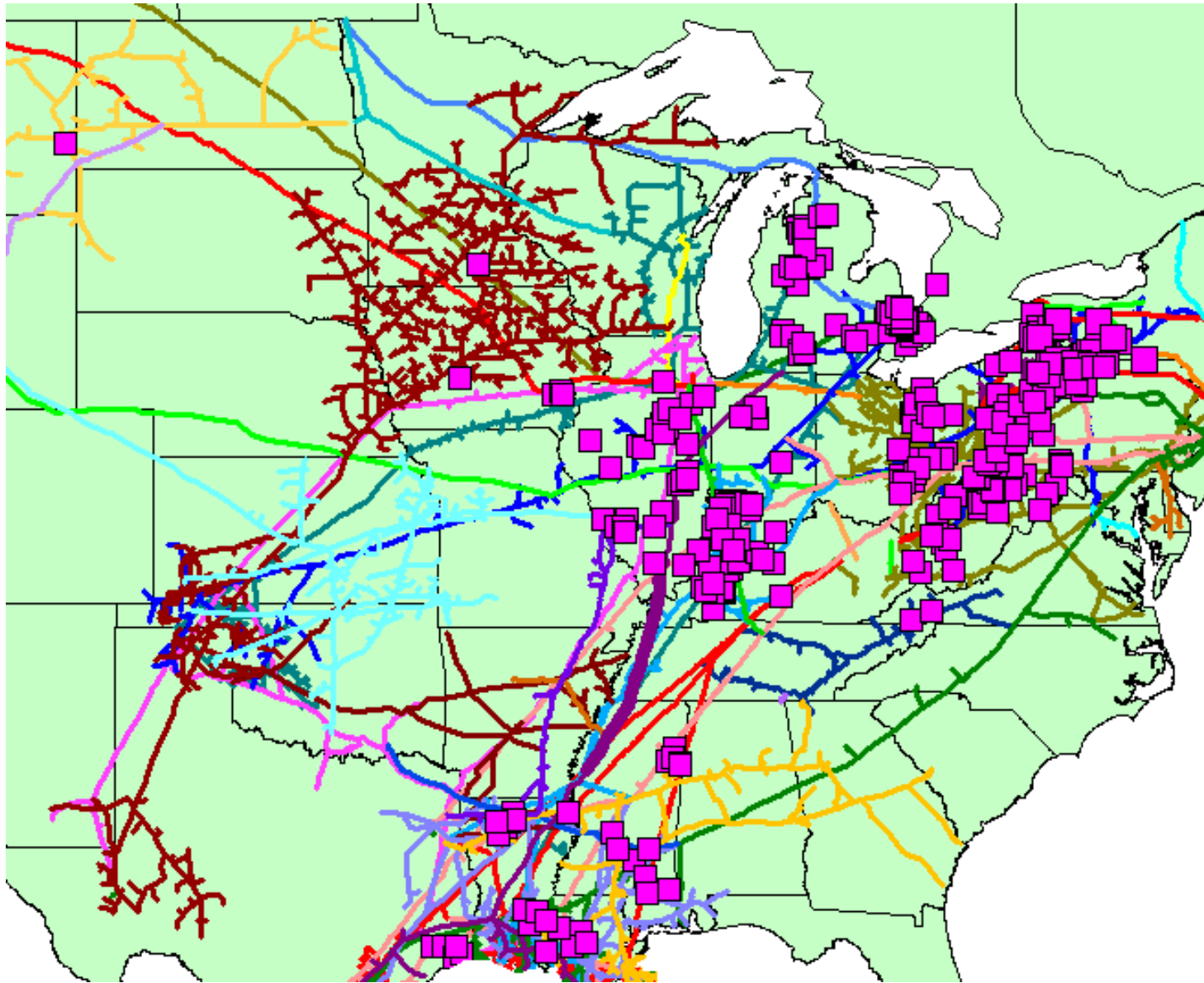


# Interstate Pipelines Operating in the Study Region

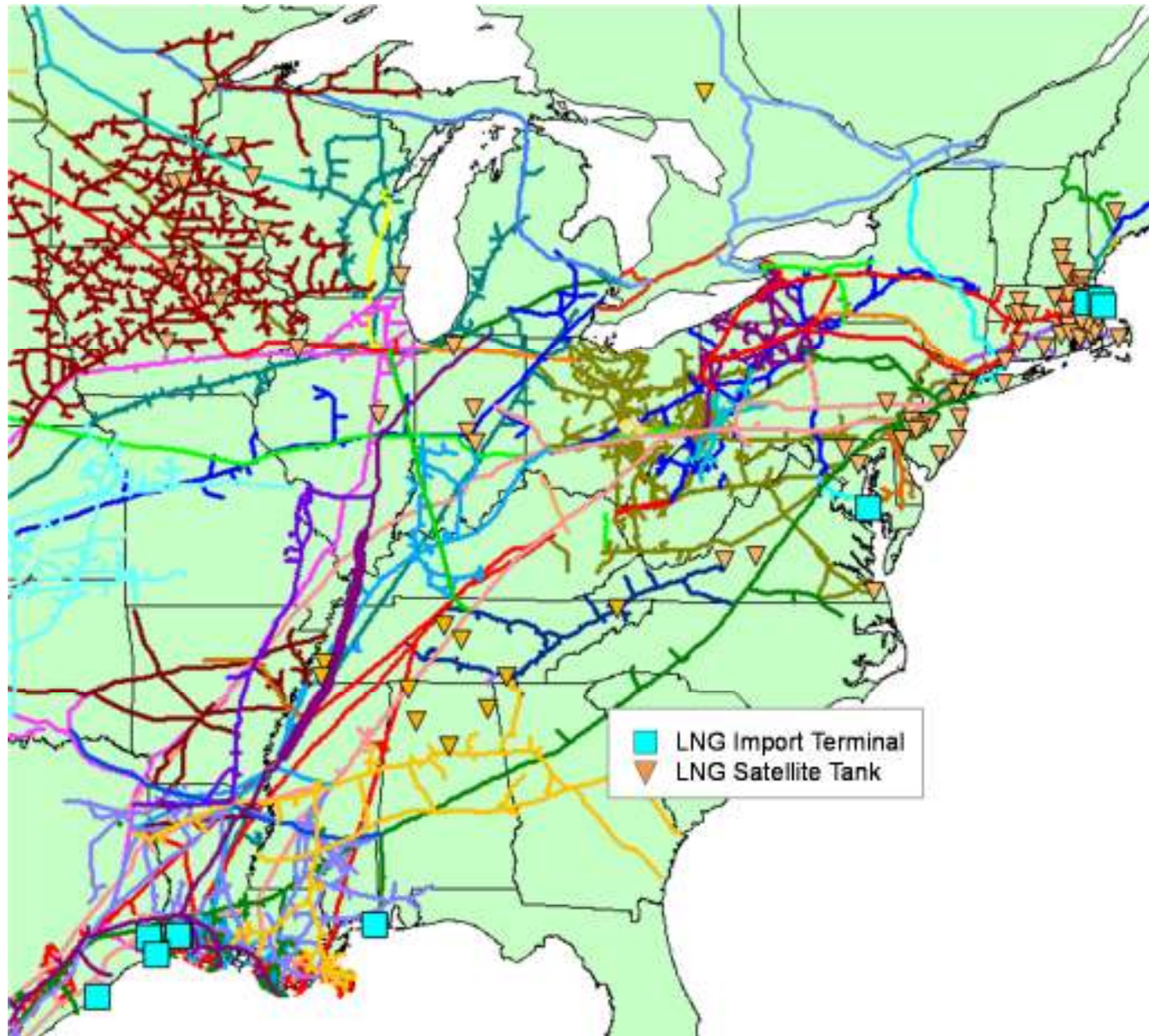




# Underground Storage in the Study Region



# LNG Facilities in the Study Region



# FERC Regulation

- ◆ Jurisdiction over interstate pipelines; including rates, services, environmental review, certification and approval of new facilities
  
- ◆ Landmark FERC Orders / Policy Statements
  - Order 636 (Open Access)
  - PL94-4 (Roll-in rates vs. incremental pricing)
  - Order 637 (Increased flexibility in the secondary market)
  - Order 712 (Waive price cap for short term capacity releases)
  - PL05-8 (Creditworthiness)
  - Order 698 (NAESB standards for gas-electric scheduling)
  - Order 787 (Pipeline (P/L) information sharing)

## Gas Facilities and Operations (DOT Jurisdiction)

- ◆ Pipeline and Hazardous Materials Safety Administration (PHMSA) is responsible for safe, reliable, and environmentally sound liquid / gas pipeline operations
- ◆ Pipeline Safety Act (2011) doubled civil penalties and mandated new rulemakings
  - Mandatory use of automatic and remote controlled shutoff valves, testing to confirm maximum operating pressures in high consequence areas
  - Cast iron pipe replacement also a priority

# Pipeline Maintenance Practices

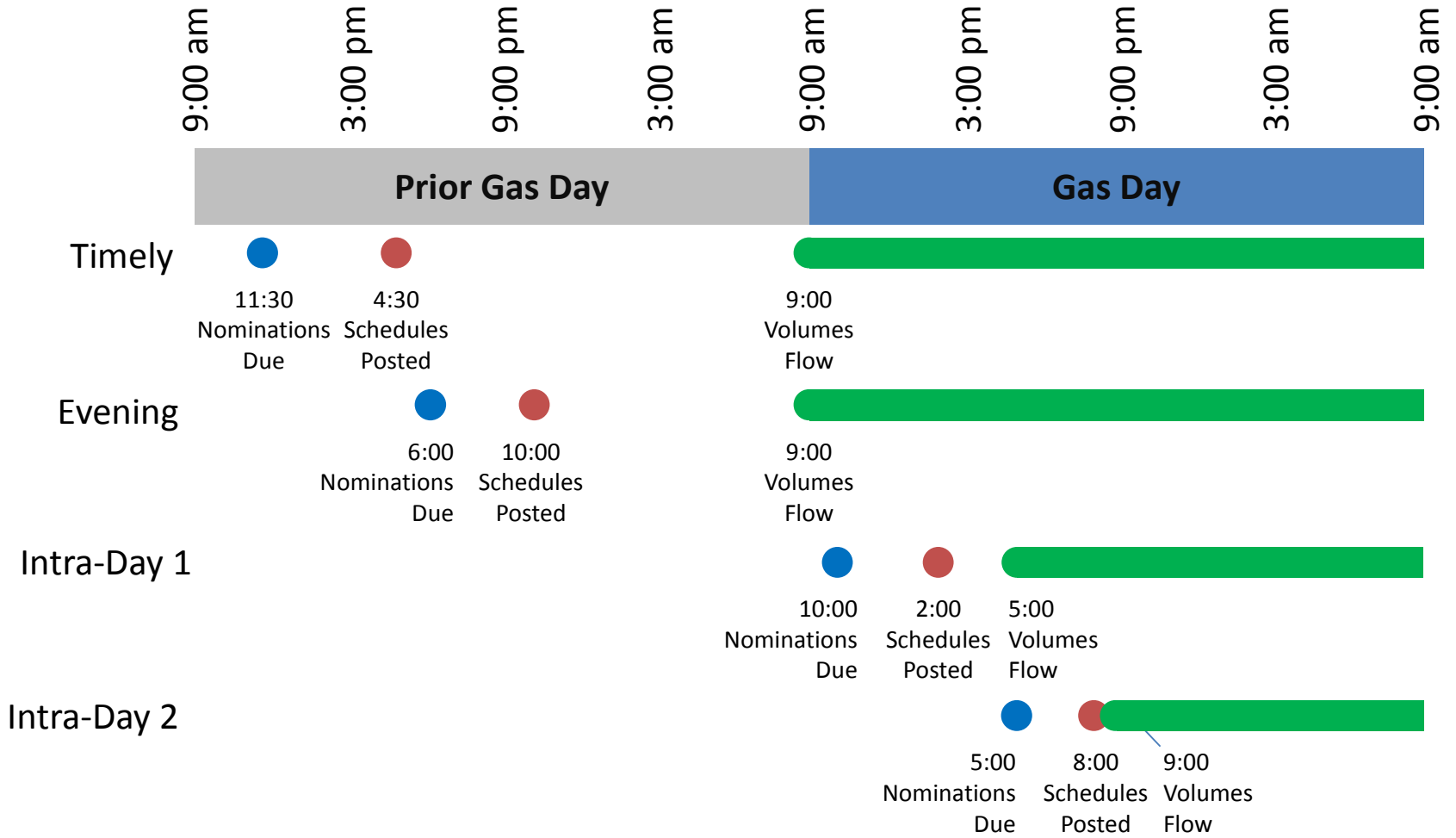
- ◆ Interstate pipelines typically undertake major planned maintenance during the spring shoulder season
- ◆ Most pipelines post maintenance schedules on their EBBs as well as announce them during customer meetings
- ◆ Frequent communication and active coordination among P/L companies, gas and electric utilities, power generators, end-users, state commissions
- ◆ PHMSA requires P/L's to implement Integrity Management Programs, *i.e.*, safety management, O&M processes to protect High Consequence Areas



# Scheduling Practices and Service Priorities

- ◆ Transportation Service Options
- ◆ NAESB Scheduling Protocols
- ◆ Scheduling Priorities
- ◆ Operational Balancing Agreements (OBAs)
  - Follow NAESB recommended Standards
  - Contractual arrangements that addresses imbalances when actual gas flow differs from nominations
  - Ratable takes (1/24<sup>th</sup> each hour)
  - Imbalance resolution procedures

# Standard NAESB Nomination Cycles





## Pipeline and LDC Services to Generators

- ◆ P/L interruptible transportation (IT) service rates are negotiable
- ◆ LDC transportation rates may be negotiated based on character of service, other value of service factors
- ◆ Some LDCs offer tariff rates and service specifically for generators
- ◆ Unauthorized gas takes typically trigger heavy penalties
- ◆ P/L and LDC tariffs allow for interruption of gas-fired generators (without firm transportation (FT)) on short notice
- ◆ Some LDCs have dual fuel requirements for generators and large industrials taking non-firm service

# Generator Contracting Trends

- ◆ Most generators across the Study Region do not hold primary firm transportation contracts, except on laterals
  - Generators in Ontario and TVA are the exceptions
- ◆ Most generators do not actively participate in the secondary market for released capacity
- ◆ Many generators obtain these services through third party suppliers or gas marketers
- ◆ Many generators arrange aggregated services under Asset Management Agreements (AMAs)
  - AMAs are not in the public domain and are customized
- ◆ Broad generator preference for non-firm transportation

## Secondary Market for Released Capacity

- ◆ Except Ontario and TVA, robust secondary market for released capacity
  - Receipt and delivery point flexibility promotes liquidity
  - Released capacity is posted on the pipeline's EBB and clears based on max bid prices
  - LDCs are the most active assignors
  - Gas marketers are the most active assignees
  - Gas marketers aggregate secondary capacity with other entitlements to serve gas-fired generation and other large customers
  - Short-term capacities releases (one month or less) are the most common
  - Capacity released during the heating season almost always recallable by the assignor

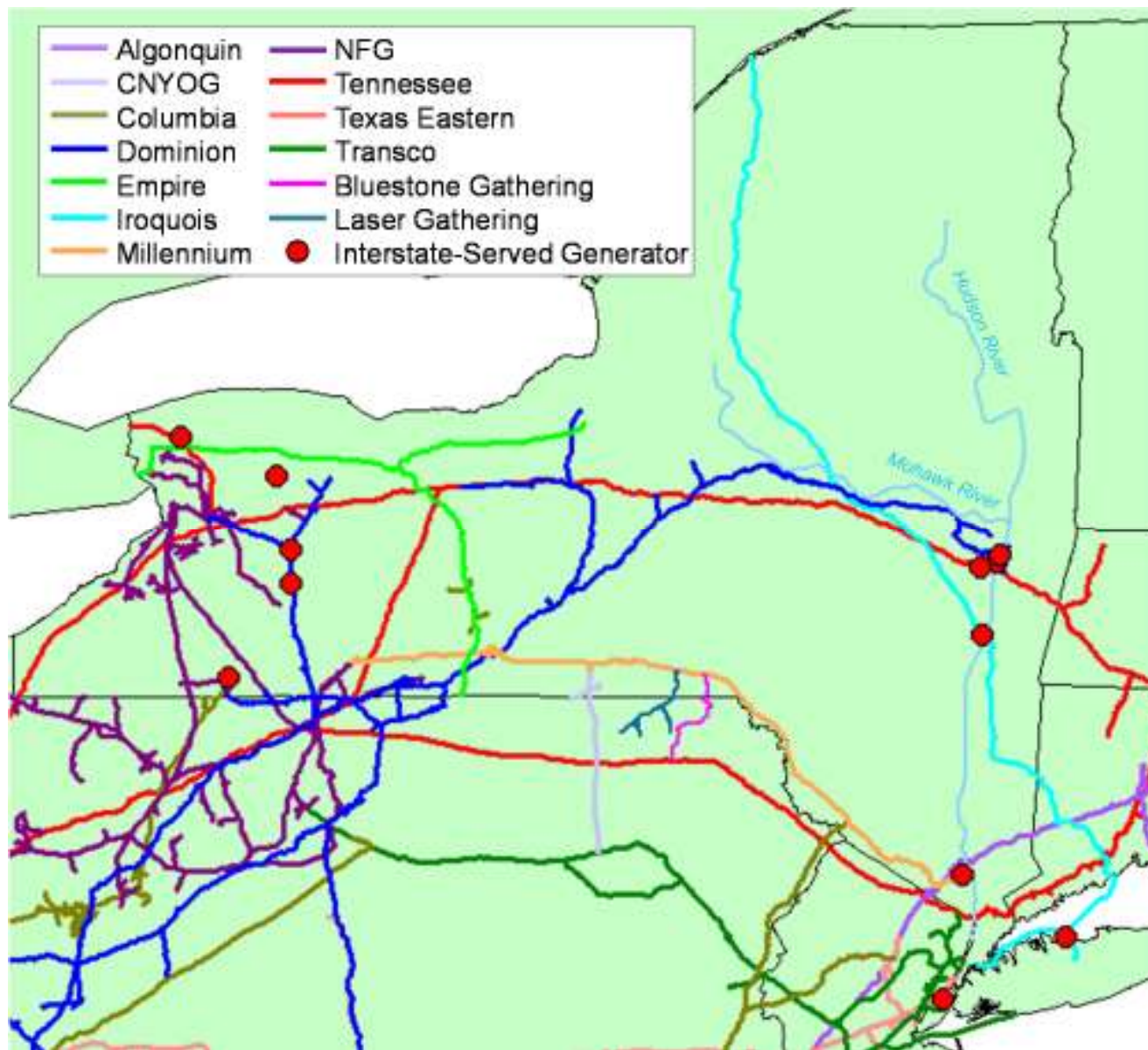
## Case Example: NYISO (1)

- ◆ 11 interstate pipelines
- ◆ 2 non-FERC jurisdictional production/gathering systems
- ◆ 26 conventional underground storage facilities in upstate New York
- ◆ 3 LNG storage facilities supporting the New York Facilities System (Con Edison and NGrid facilities serving NYC/LI)
- ◆ 1 intrastate pipeline and 7 LDCs serve generators >15 MW

## Case Example – NYISO (2)

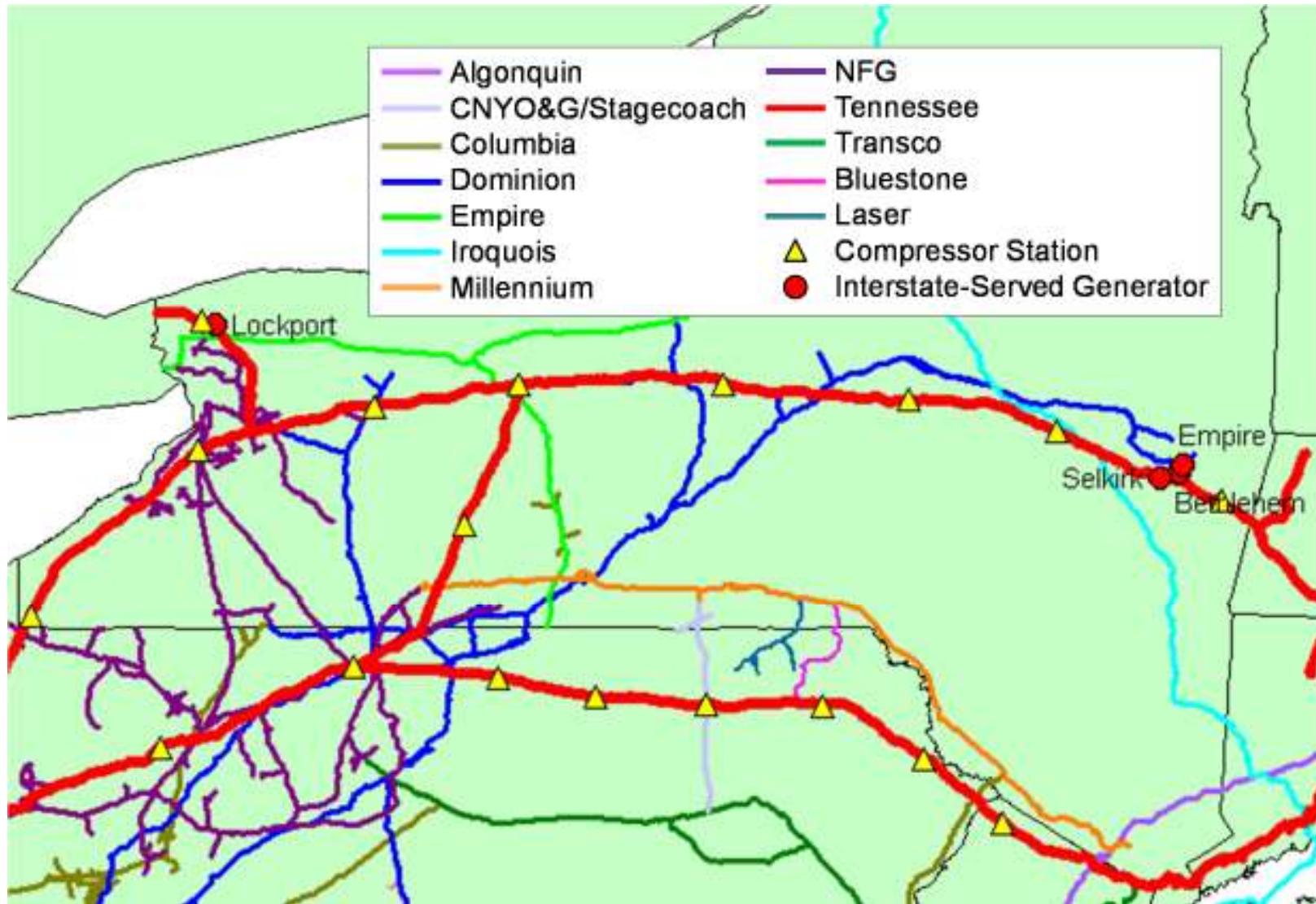
- ◆ NY LDCs offer IT service under negotiated rate schedules
- ◆ NY LDCs require dual fuel capability for generators taking non-firm service
- ◆ Certain generators have FT rights for a portion of their fuel requirements
- ◆ Con Edison and NGrid are active assignors in the capacity release market, primarily on Transco and Texas Eastern
- ◆ Capacity releases are short-term and are subject to recall

# Interstate Pipelines Operating in New York



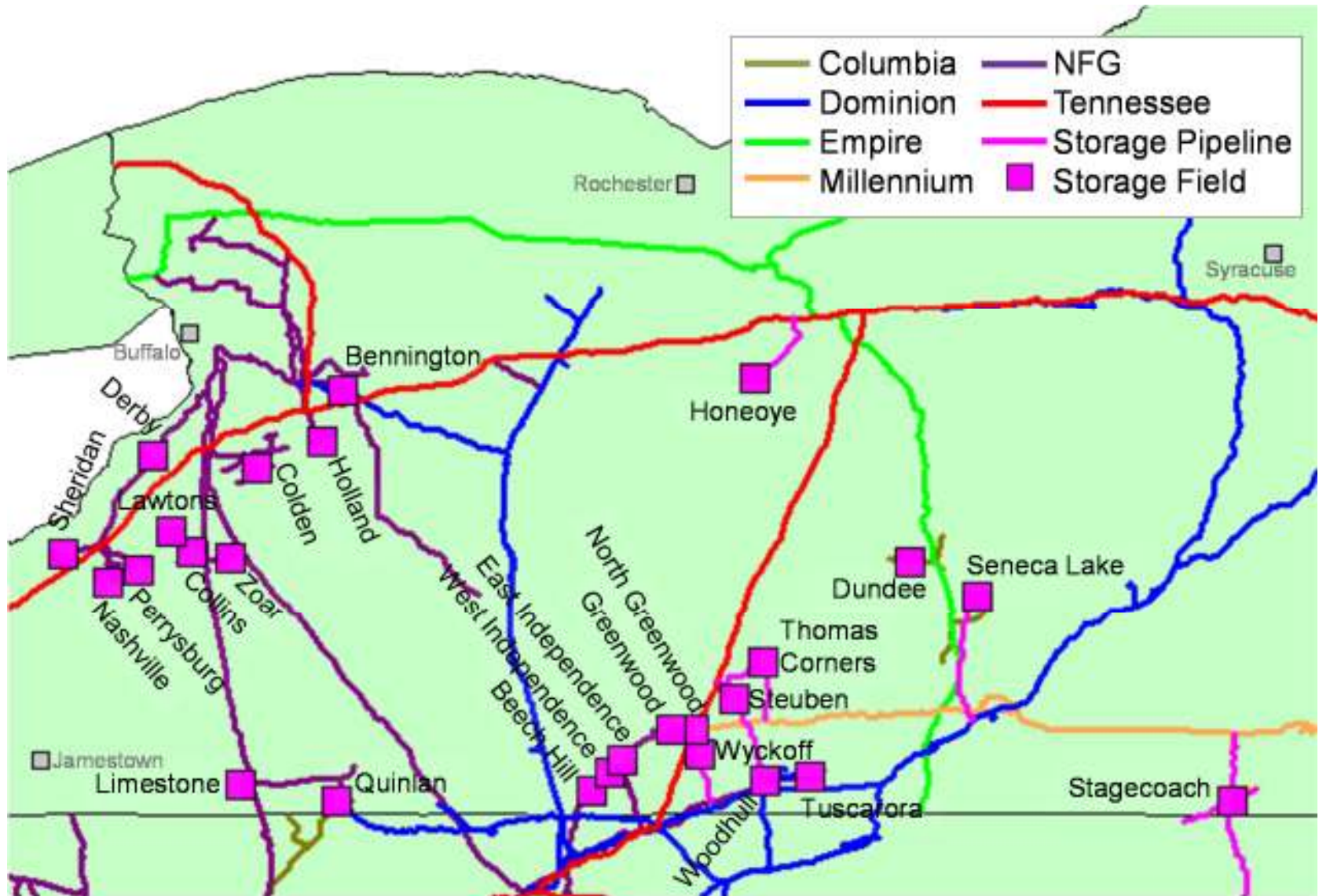


# Tennessee Pipeline Facilities Serving NYISO

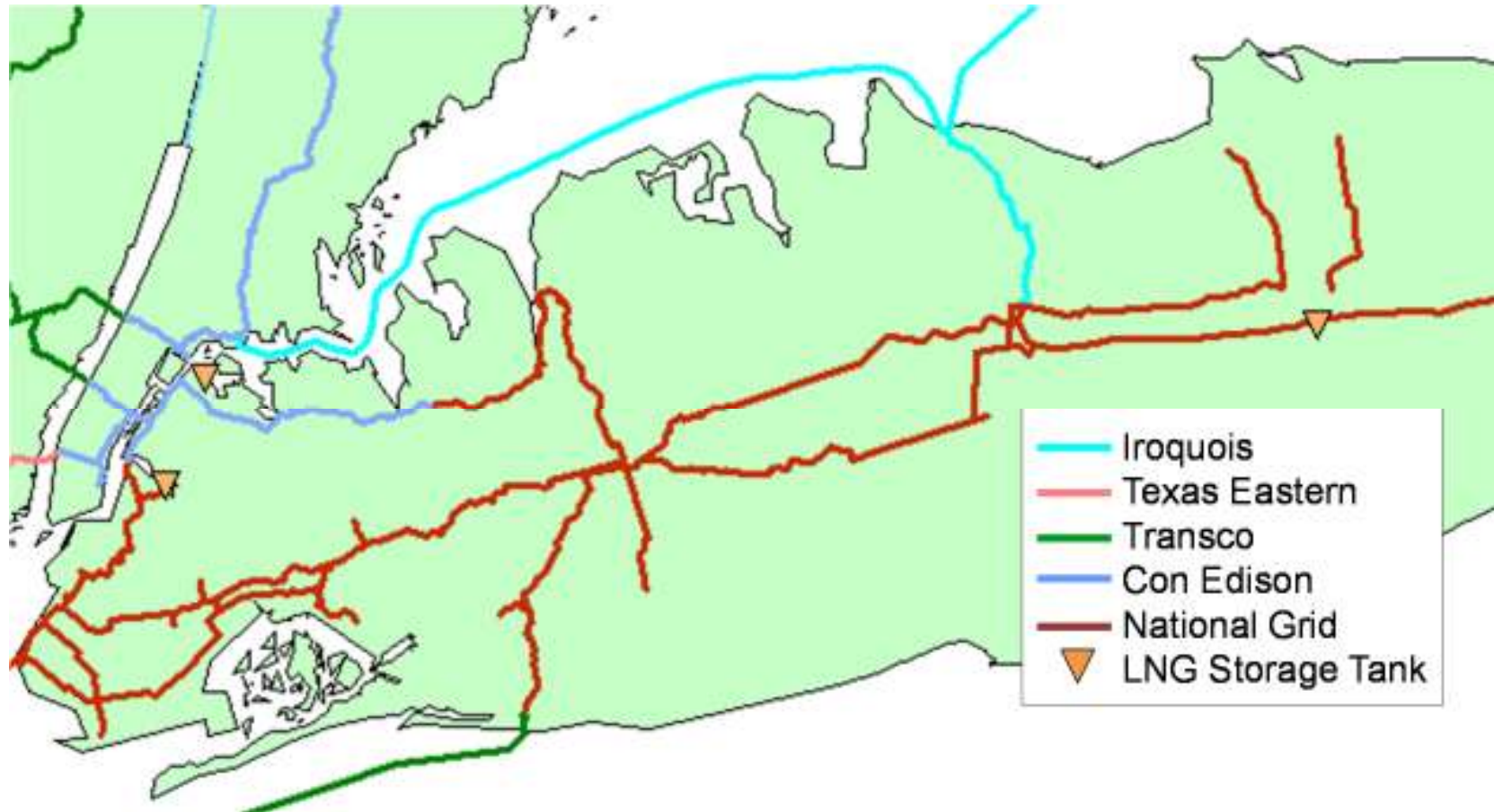




# Underground Storage Facilities in New York

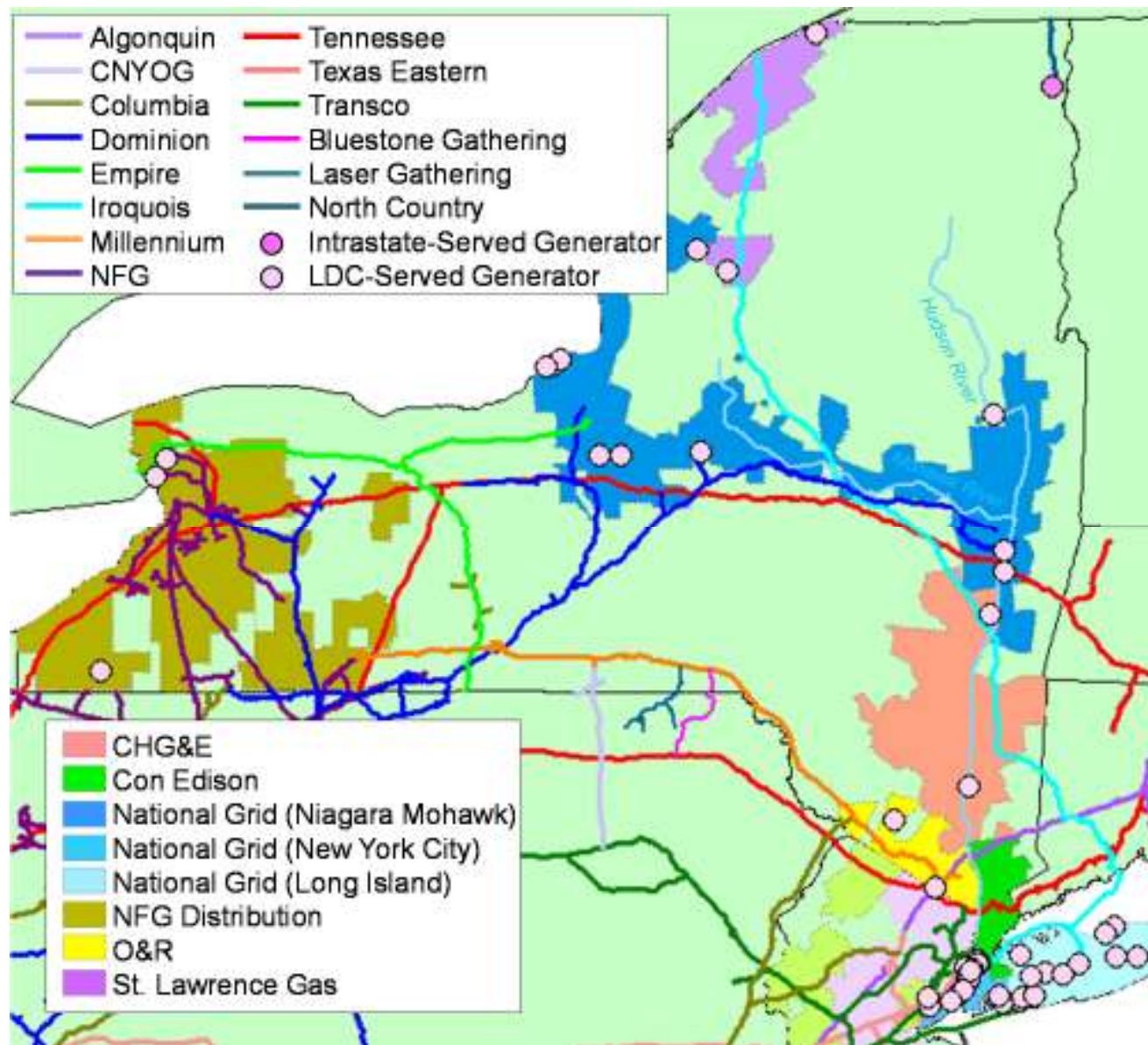


# LNG Facilities in New York

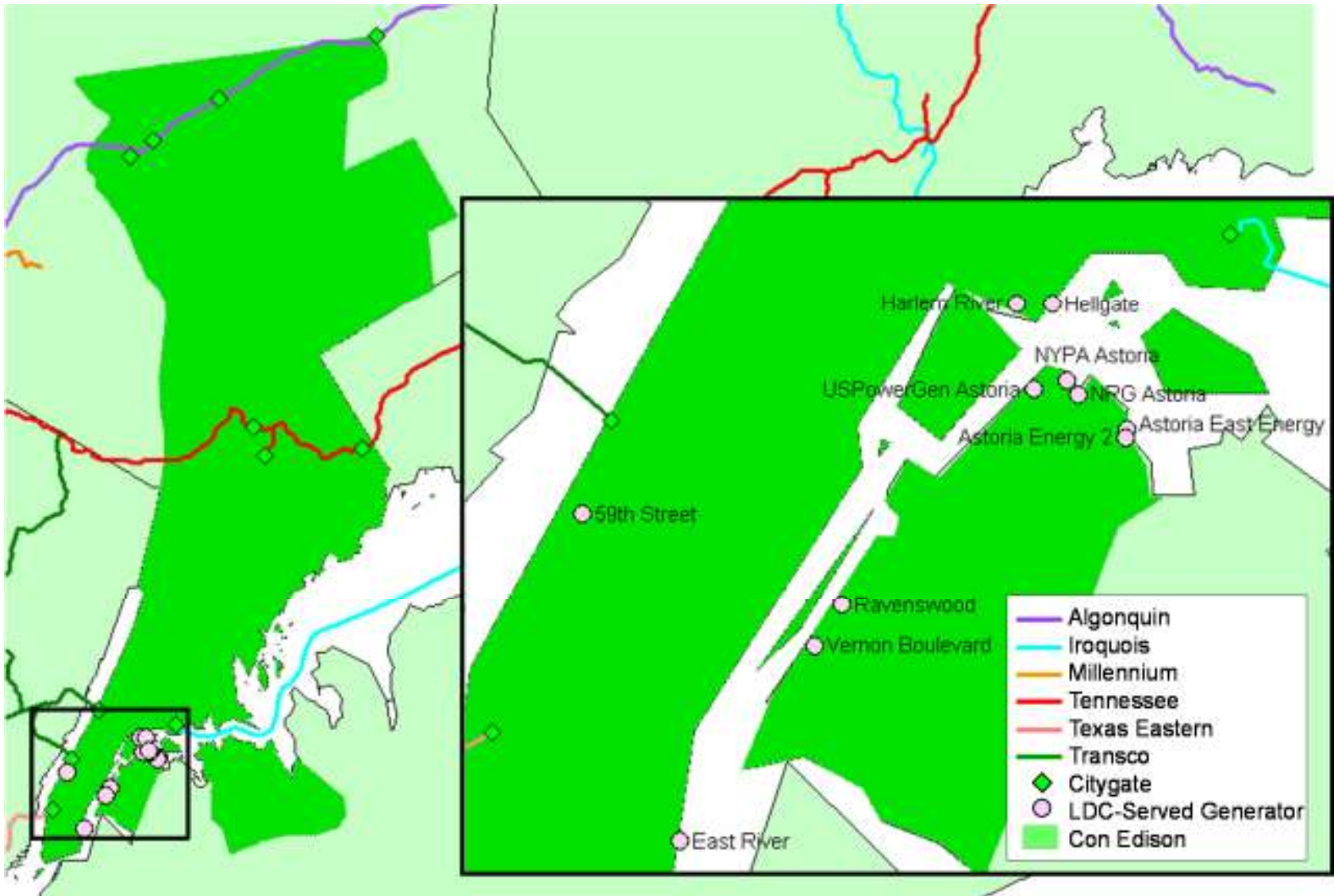




# Intrastate Pipelines and LDCs Serving NYISO

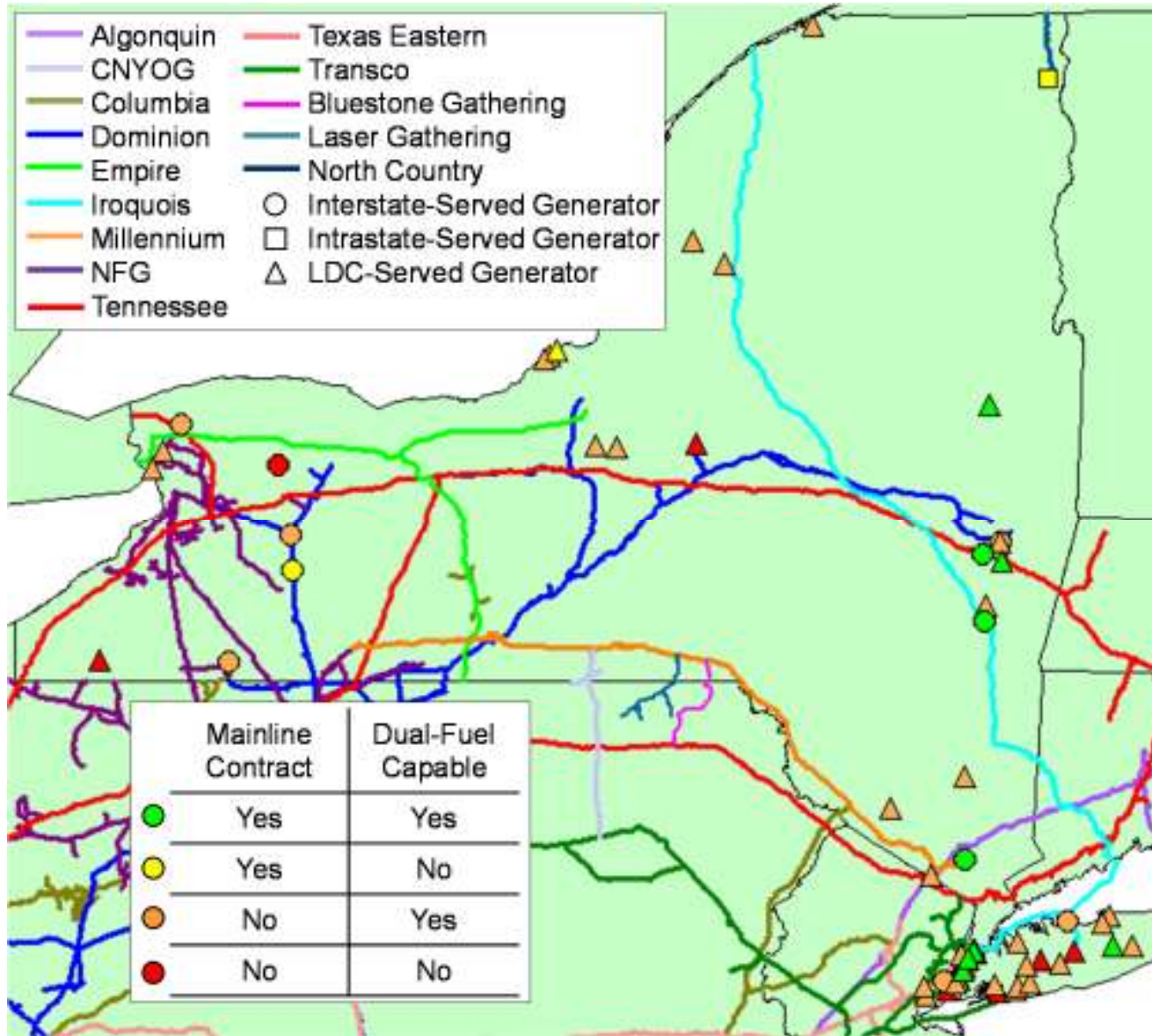


# Con Edison LDC Service Territory





# NYISO Generator Fuel Assurance



# Qualitative Assessment of Gas/Electric Interface

- ◆ Gas-electric interface addressed for each PPA
- ◆ Considers bulk power security and resource adequacy issues from the ISO / RTO perspective
  - Gas supply diversity
  - Access to pipeline and storage infrastructure
  - Character of service
  - Tariff provisions and penalties
  - Secondary market liquidity
- ◆ Relational assessments relative to the six PPAs
  - Green: favorable conditions
  - Yellow: neutral conditions
  - Red: unfavorable conditions

# Qualitative Assessment Matrix

	Criterion	PJM	MISO	NYISO	ISO-NE	TVA	IESO
Natural Gas Supply	Gas Supply Portfolio Diversity	Green	Green	Green	Red	Yellow	Green
	Pipeline Connectivity Level	Green	Green	Green	Red	Yellow	Yellow
	Conventional Storage Deliverability	Green	Green	Yellow	Red	Yellow	Green
	LNG Storage Capability	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Electric-Gas Interface	Firm Transportation Entitlements	Yellow	Yellow	Yellow	Red	Yellow	Green
	Direct Pipeline Connectivity	Green	Green	Yellow	Green	Green	Green
Gas Tariff Impact on Electric Market	Pipeline or LDC Penalties	Red	Red	Red	Red	Red	Green
	LDC Provision of Flexible Service	Green	Yellow	Green	Yellow	Yellow	Green
	Active Secondary Market	Green	Green	Green	Green	Yellow	Red



# Questions?