Gas/Electric Interdependence: Challenges & Opportunities

Consumer Liaison Group Meeting

Richard L. Levitan, rll@levitan.com

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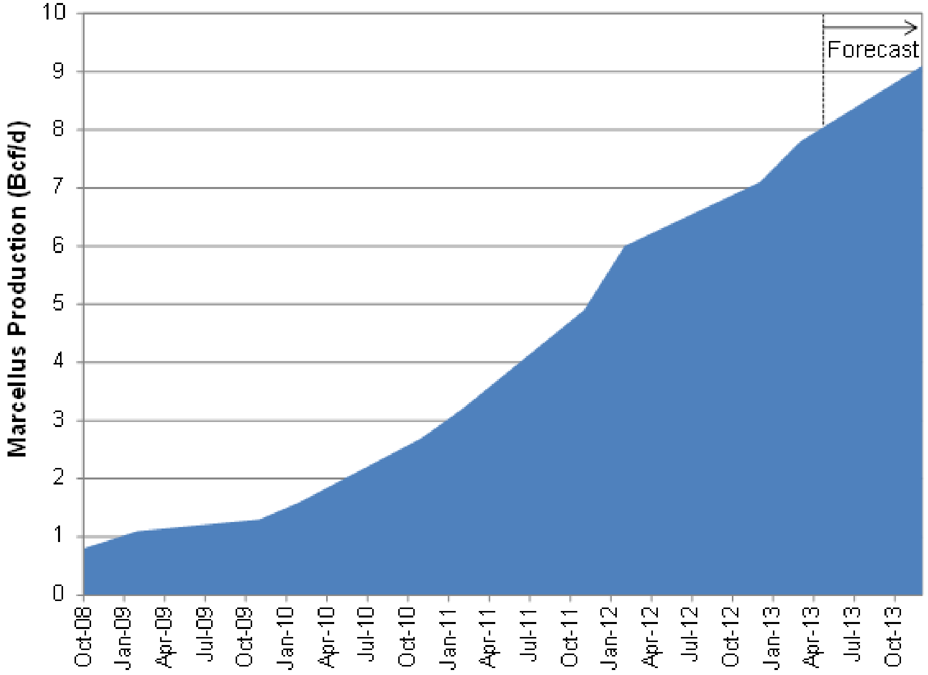
MARKET DESIGN, ECONOMICS AND POWER SYSTEMS

Primary Issues

- Marcellus shale E&P bolsters supply but not deliverability
- Decreased reliance on LNG imports
- Decline in gas portfolio diversity -- pipeline economic obsolescence
- Potential infrastructure expansion efforts
- Gas / electric coordination initiatives
- Possible solutions and impacts on end users

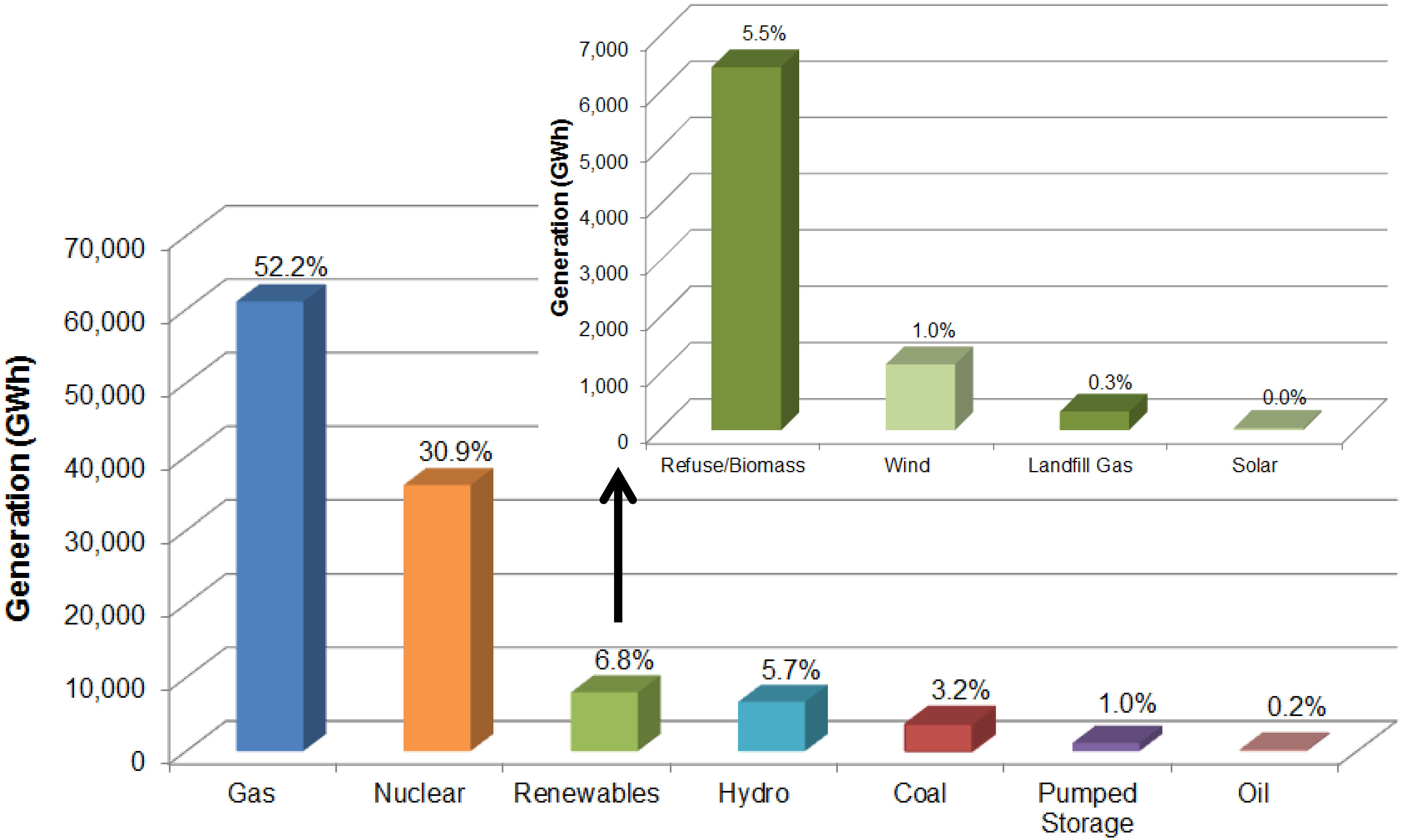
Radical Change in Traditional Flows

- Shale gas fundamentally altering traditional flows
  - Long haul transportation from WCSB obsolete
  - Marcellus gas supplanting gas from GoM and Canada
  - Declining Sable Island production, uncertainty around Deep Panuke
  - Reversal of flow through New York / Ontario
  - LNG imports limited to contract quantities, periodic arbitrage
    - Flexible cargoes to EU or Asia



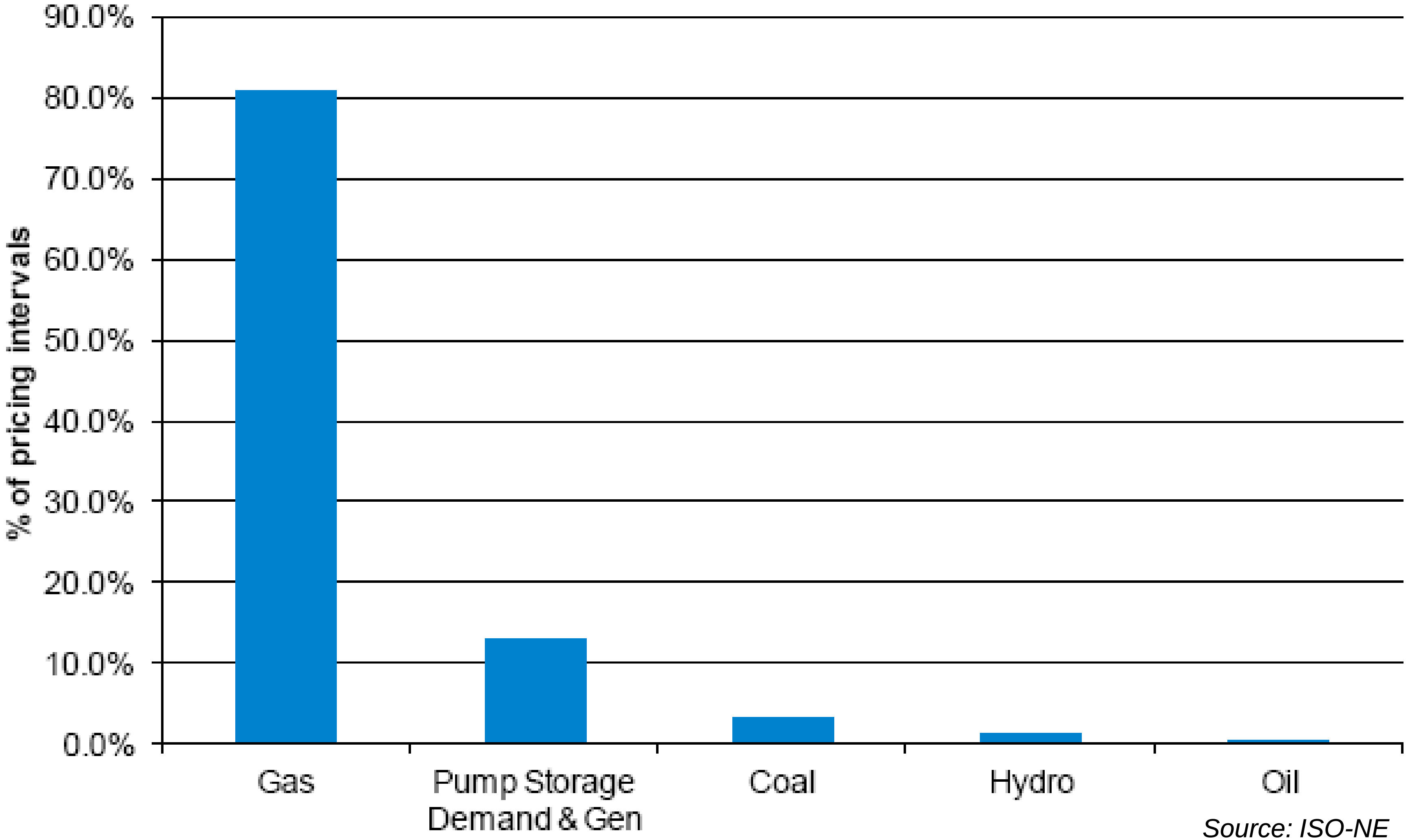
Source: Bentek Energy

Dependence on Gas for Electric Generation



Source: ISO-NE

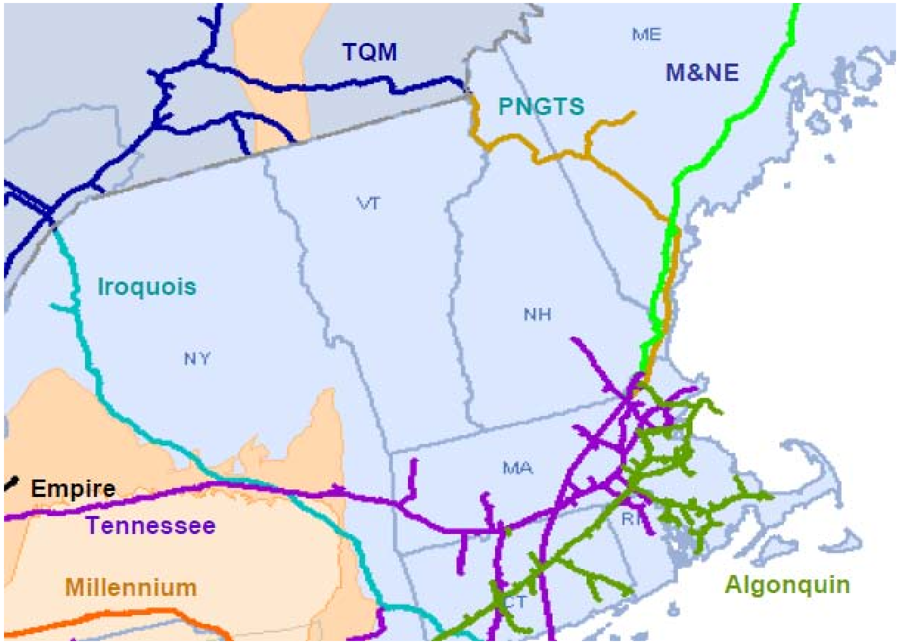
Energy Prices in New England Driven by Delivered Gas Cost



Source: ISO-NE

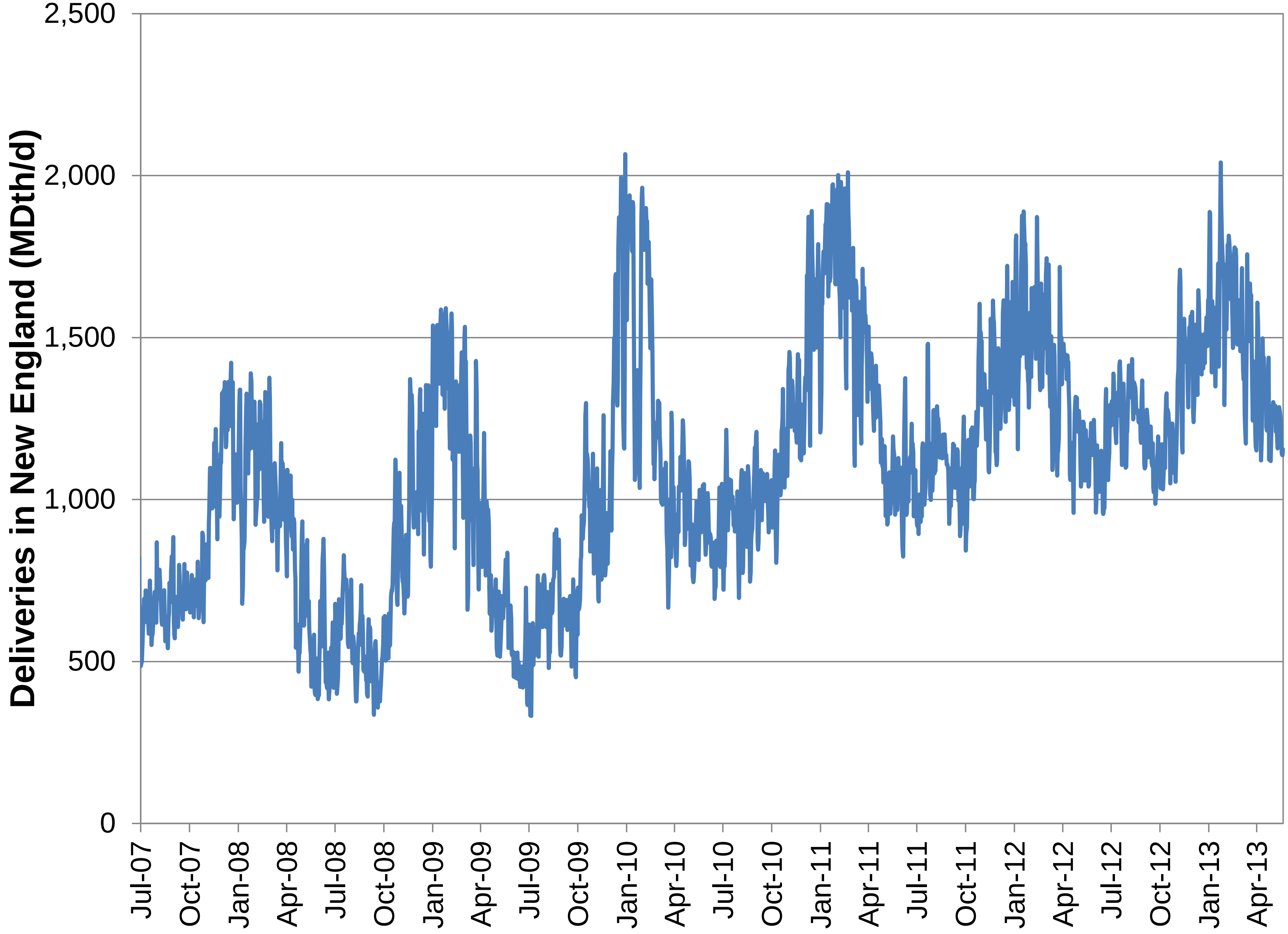
New England Pipeline Infrastructure

- High utilization on Algonquin and Tennessee
- Moderate utilization on IGTS, low utilization on PNGTS (may soon increase)
- M&N utilization low with Sable Island depletion, Deep Panuke delays, Repsol
- Virtually no use of offshore LNG import terminals



Source: NGA Regional Market Trends Forum

Algonquin Deliveries in New England



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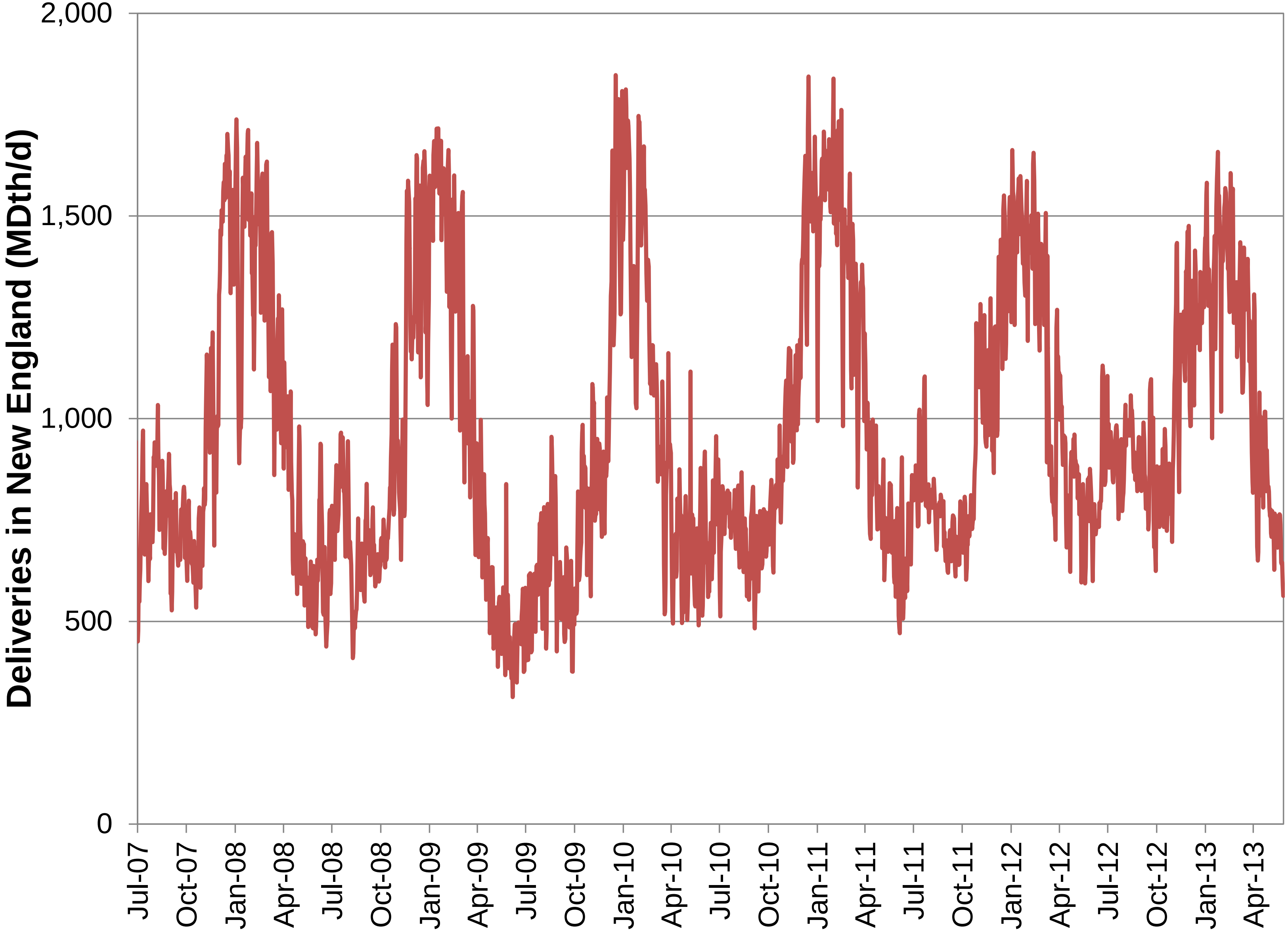
Tennessee Deliveries in New England



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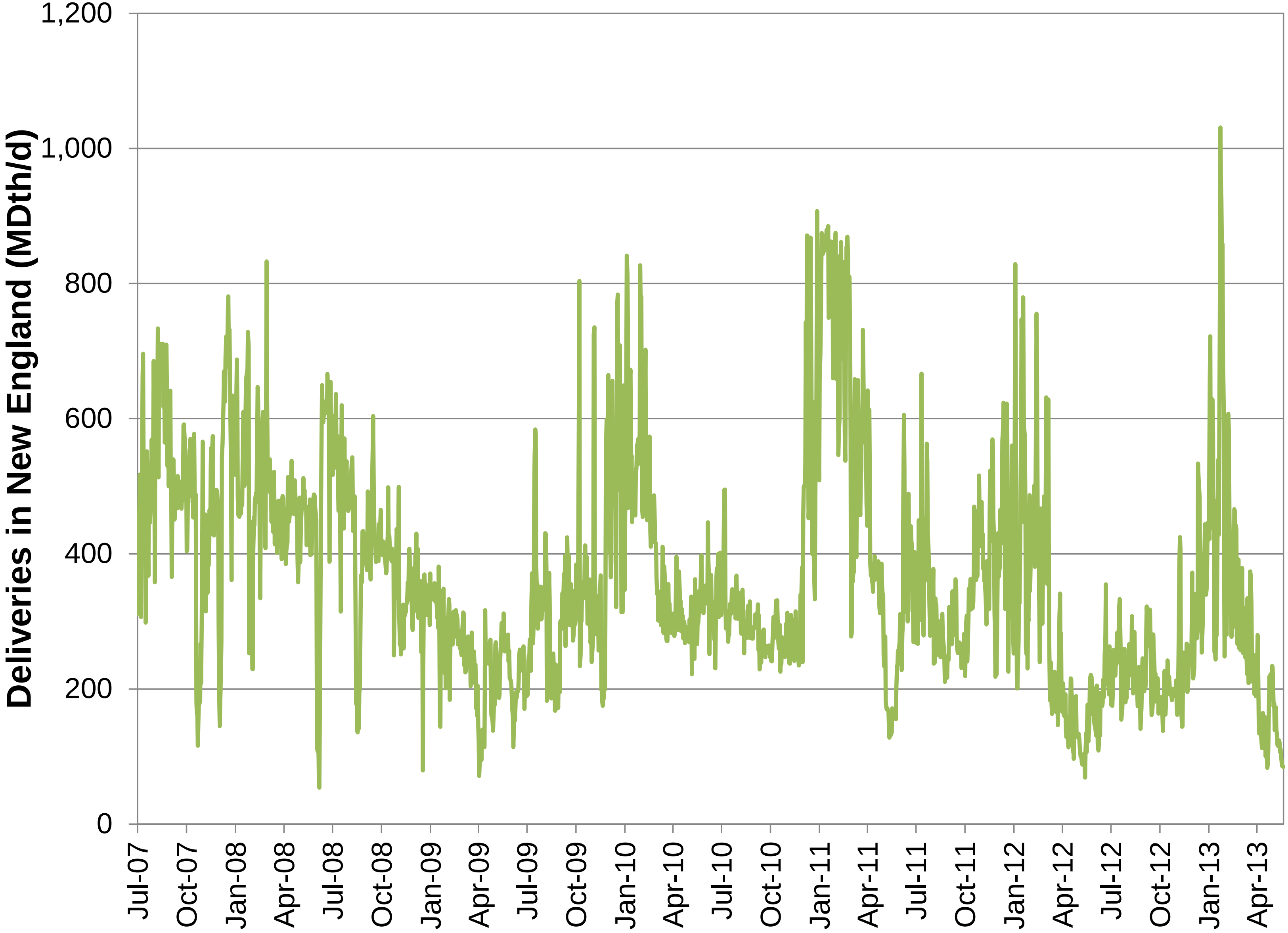
M&N Deliveries in New England



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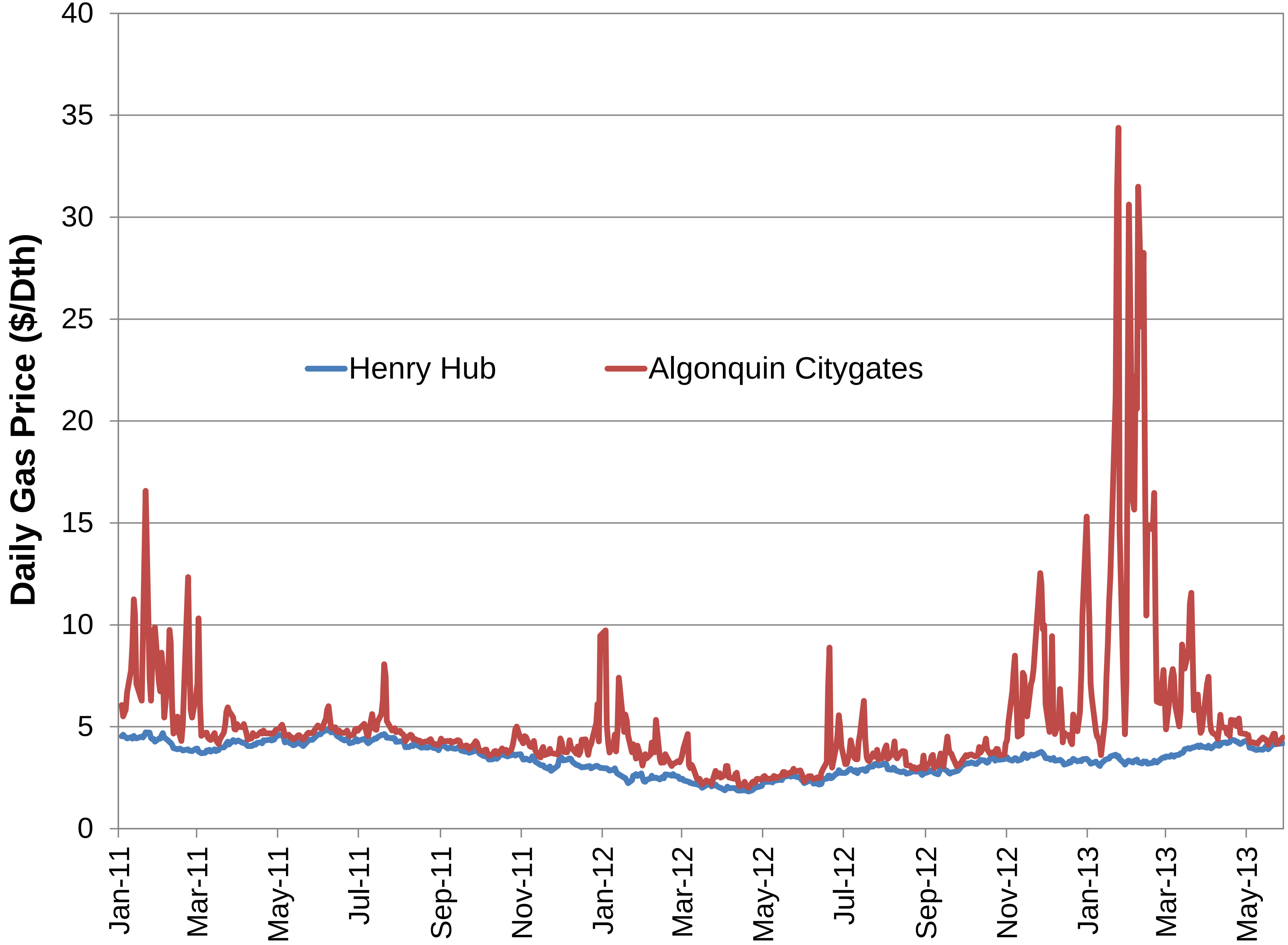
NE Pays a Premium During Tight Conditions



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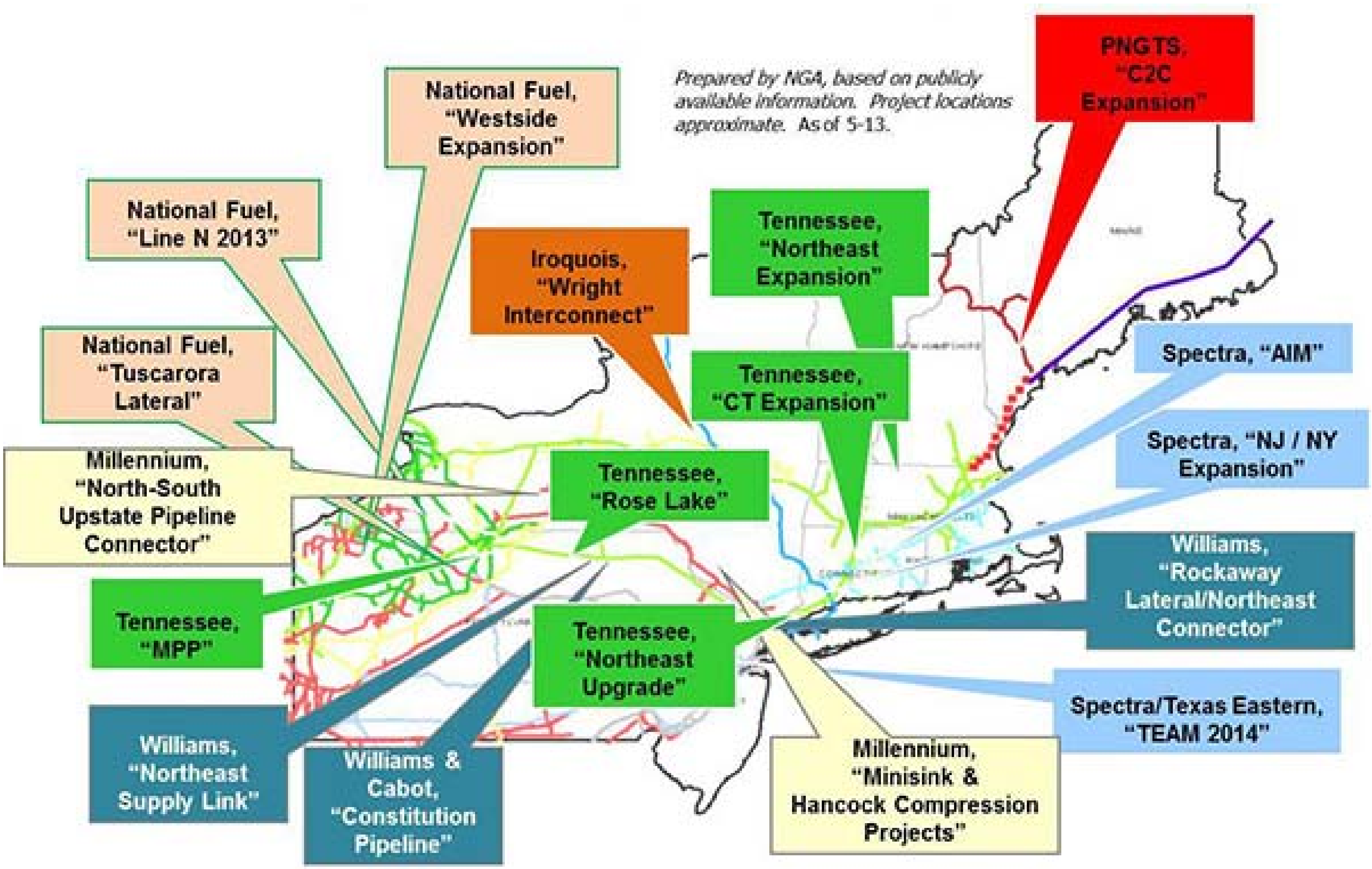
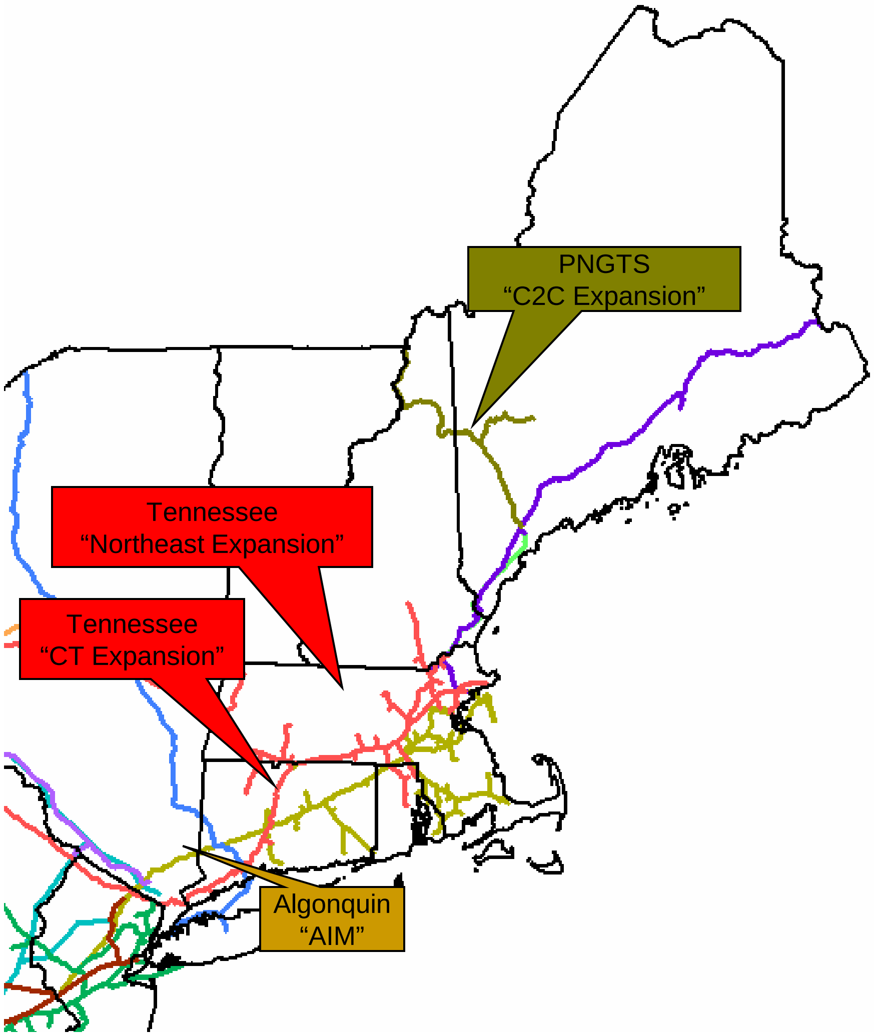
Pipeline Expansion Projects in Northeast



Source: Northeast Gas Association

Pipeline Expansion Projects in New England

- C2C Expansion may nearly double PNGTS mainline capacity (from 168 MDth/d to 300-350 MDth/d)
- AIM may add ~450 MDth/d capacity to NE markets
- NE Expansion links TGP Marcellus receipts to Iroquois / NE, may add 500+MDth/d
- CT Expansion adds 72 MDth/d to TN Lines 200/300



Source: Northeast Gas Association

Can NE's Current Infrastructure Meet the Region's Generation Fuel Needs?

- Significant gas-fired MW unavailable during January cold snap and Nemo
- Increasing P/L utilization west-to-east means limited IT availability and reduced quality of secondary releases
- Generators w/ non-firm transport
    - No guaranteed supply during high gas demand day
    - RFO inventories normally kept low
    - ULSD inventories normally kept low
- Generator recovery of cost for firm-up initiatives
- ISO-NE is pursuing short term tactical and long term strategic measures to manage risk
- Stakeholder and FERC process presently a wildcard

ISO-NE Solutions

Short Term

- Improve scheduling, information sharing between gas/electric entities
- Add more reserves
- Issue “Gap RFP” for stopgap energy/capacity/fuels products

Long Term

- FCM Performance Incentives
- Potential retooling of OATT penalty structure for non-performance due to fuel delivery constraints

FCM Performance Incentives

- Will reward/penalize resources for availability/unavailability when dispatched

- Payment system is revenue neutral but may create incentives for gas generators to achieve fuel assurance
  - Firm Transportation
  - Backup fuel
  - Call options on replenishment

- Fuel assurance methods create new expenses which will be priced into FCM bids