Natural Gas Outlook for Connecticut

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Connecticut Power and Energy Society

Southern Connecticut Gas
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CNG

Yankeegas
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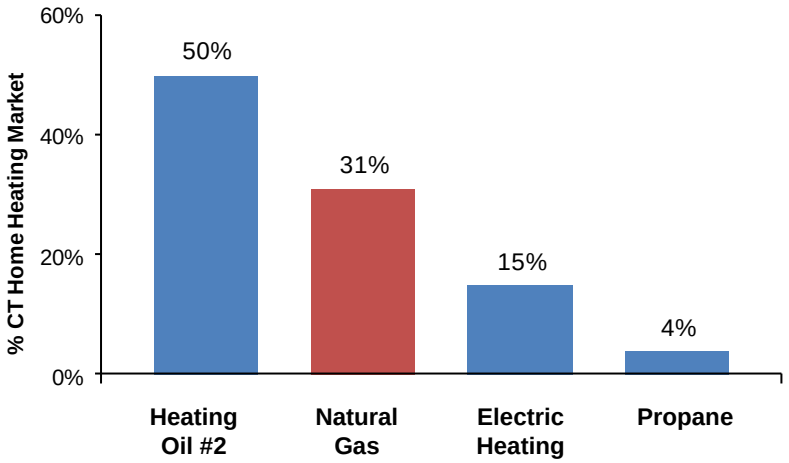
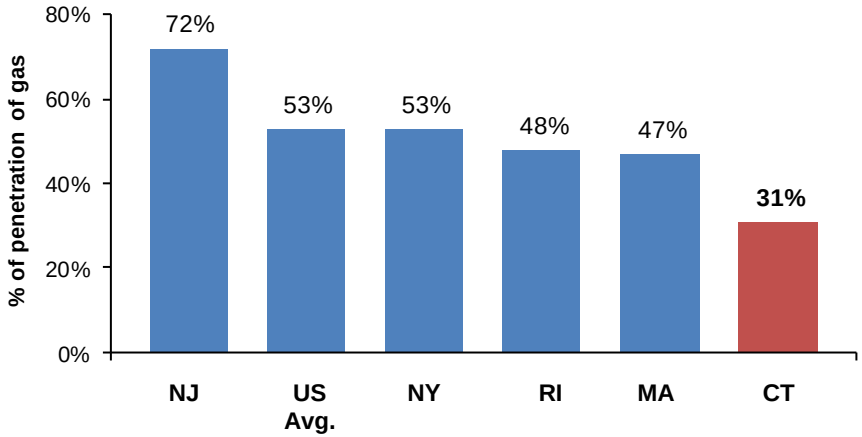
Connecticut Has High Growth Potential

CT Home Heating Market Penetration



Natural gas heating penetration



Sources: SNL; Energy Information Administration State Energy Data System (SEDS); Northeast Gas Association

- Energy production and delivery infrastructure of New England represents "best practice" across the country in terms of clean, reliable energy
- Exception is energy for heating and industrial manufacturing, where the region significantly lags surrounding states in the utilization of natural gas
- Oil maintains a 50% market share in Connecticut's residential heating market, by comparison, fuel oil penetration in the entire US is only 7%
- Natural gas' share of the heating market is only 30% with electricity and propane comprising the balance (15% and 4% respectively)

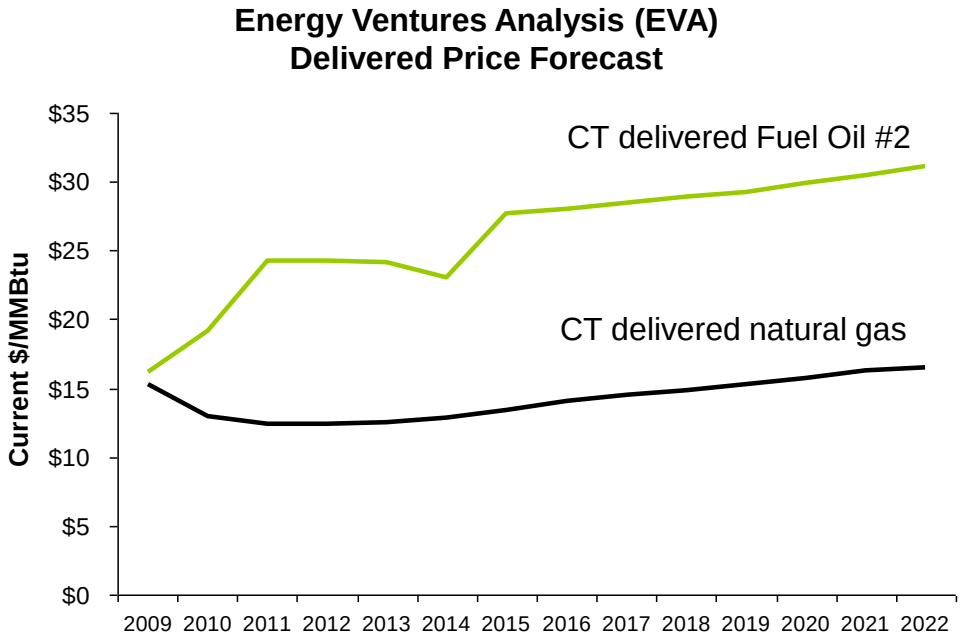
Why Now?

Abundant domestic supplies…

- Marcellus Shale is a “game changer” with enormous potential for the region:
  - Abundant, 100+ year supply
  - World’s second largest natural gas field
  - Nation’s largest gas field

… leading to forecast low prices

- Gas and oil prices are expected to continue to be disconnected
- Gas delivery prices stay in the $15/MMBtu range for the next 10 years



Environmental Opportunities for Connecticut's Natural Gas Market

- In addition to economic benefits, expansion of natural gas access and utilization among ALL market segments can reduce greenhouse gas emissions and help achieve environmental goals

Emission Levels: Natural Gas Vs. Oil

Pounds per Billion Btu of Energy Input

Pollutant	Natural Gas	Oil
Carbon Dioxide	*117,000*	*164,000*
Carbon Monoxide	*40*	*33*
Nitrogen Oxides	*92*	*448*
Sulfur Dioxide	*1*	*1,122*
Particulates	*7*	*84*
Mercury	*0.000*	*0.007*

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Environmental Benefits of Natural Gas

- Most environmentally benign energy source widely available.
- Domestically abundant and secure source of energy.
- Reduces greenhouse gas emissions -- 30 percent less carbon dioxide than oil, and 45 percent less than coal.
- Unlike combustion of other fossil fuels, natural gas combustion does not produce ash residues or sulfur dioxides.
- For transportation, cuts down on pollution from gasoline and diesel powered vehicles.
- Increasingly important, efficient, competitively priced fuel for generating electricity.

Many Benefits of Natural Gas Expansion in Connecticut

Job Creation

Economic Impact

Residential Customer Savings

Business Competitiveness

Energy Independence

Environmental Benefits

Challenges for Connecticut's Natural Gas Market

Pipeline Infrastructure Constraints

" There are gas transmission constraints in New England from all geographic directions, effectively isolating the region and calling for more pipeline capacity or reliance on LNG import terminals…."

- US Federal Energy Regulatory Commission

- Shale gas flowing to CT via existing pipeline capacity contracts
- There has not been a major forward haul expansion on either of the two major pipelines serving Connecticut in several years
- Interstate pipelines are fully subscribed into New England
- Pipelines fully loaded many winter days and operating at high load factors
- Long term commitments required for large-scale infrastructure expansions
  - Pipelines ready, willing and able to expand consistent with historical, supported by long term shipper commitments
  - To make larger expansions economically viable, shippers must consider contracting for long-term growth requirements that may leave some capacity underutilized in the near term
  - There is a multi-year lead time for expansions
  - Future expansions to be more expensive than historical
- Pipeline mainline expansions to serve gas utility growth work in concert with smaller delivery laterals upstream of city gate, metering requirements and LDC distribution needs downstream which also may need to be expanded
- LNG import terminal question marks for future

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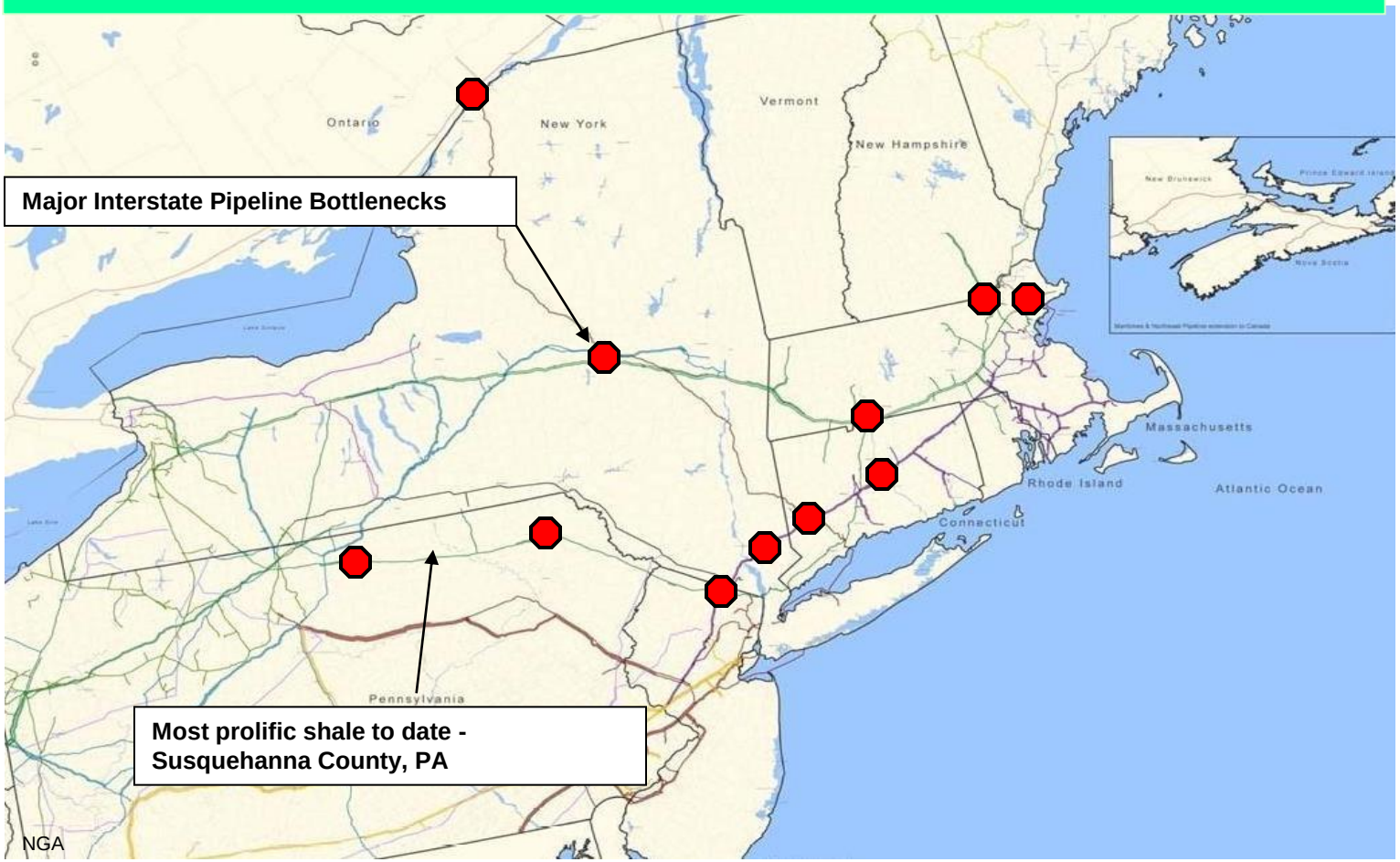
Natural Gas Market Overview

Shale Gas Production – Infrastructure Challenges to Overcome Bottlenecks

NUMEROUS PIPELINE EXPANSIONS
UPSTREAM OF BOTTLENECKS TO MOVE MARCELLUS
SHALE GAS BACKWARDS AND SIDEWAYS
BUT NONE ADD CAPACITY TO NEW ENGLAND



Sources and Notes: Original Map — NGA, Restriction points per pipeline flow restriction notices

Challenges for Connecticut's Natural Gas Market

Ensuring Long Run Gas Growth Capability and Reliability

- CT LDC's are in a good capacity situation to accommodate gas growth
  - Diverse portfolios (firm trans, storage and peaking)
  - Long term commitments
  - Capacity additions and conservation working together to address growth
  - "Just-in-time" strategy not used

- FERC has opened a national docket regarding gas /electric "harmonization" in the new lower cost gas environment
  - Ability of the gas and electric systems to work together to provide safe, reliable, cost-effective gas and electricity service to customers will be an important policy area going forward

- New England gas and electric systems seeking to address some important usage and planning issues
  - Electric industry seek to use gas inconsistent with gas system design and capabilities (hourly, intra-day, fast start)
  - Current electric industry market rules and structure do not support gas reliability and flexibility (i.e. gas generators rely on interruptible,secondary gas)

- Gas industry (pipelines, LDC's, physical asset owners) focus is on offering solutions to these issues, solutions will require electric industry adjustments

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Challenges for Connecticut's Natural Gas Market

Remarkable Gas Industry Response – Reflection

- Speed in which US independent producers applied shale gas drilling and production technology since 2008
  - Efficiency gains and cost reductions
- Reduction in gas prices to consumers
- In 2008 the US produced 55 bcf /day of gas, 2011 64 bcf /day of gas produced
- In 2008 LNG importation was seen as a key future supply source, in 2012 LNG exports from the US are proposed
- Over the past few years billions or dollars of pipeline infrastructure has been committed to and constructed, for example, to de-bottleneck Marcellus shale gas
- LDC's have responded to new environment with aggressive growth initiatives
- Numerous other responses
  - Coal to gas conversions
  - Transportation
  - Feedstock/industrial

Summary

- Production technological breakthrough resulted in strong natural gas supply picture which triggered competitive advantages
- The economic advantage of natural gas is sustainable
- Conversion opportunities are abundant with many benefits and need to be incorporated into planning process to allow for the efficient and manageable build out of systems and supply resources
- There are important and regional infrastructure challenges similar to those previously overcome by the industry
- The gas industry response to the shale revolution has been remarkable, timely and aggressive
- Solutions are being advanced to accommodate high growth direct gas use and electric industry desire to use more gas and to use gas in a way the current system is not designed for