

The Energy Consortium  
Recent Developments and the Outlook for  
Natural Gas in the Northeast

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**LEVITAN & ASSOCIATES, INC.**  
MARKET DESIGN, ECONOMICS AND POWER SYSTEMS

# Northeast Overview

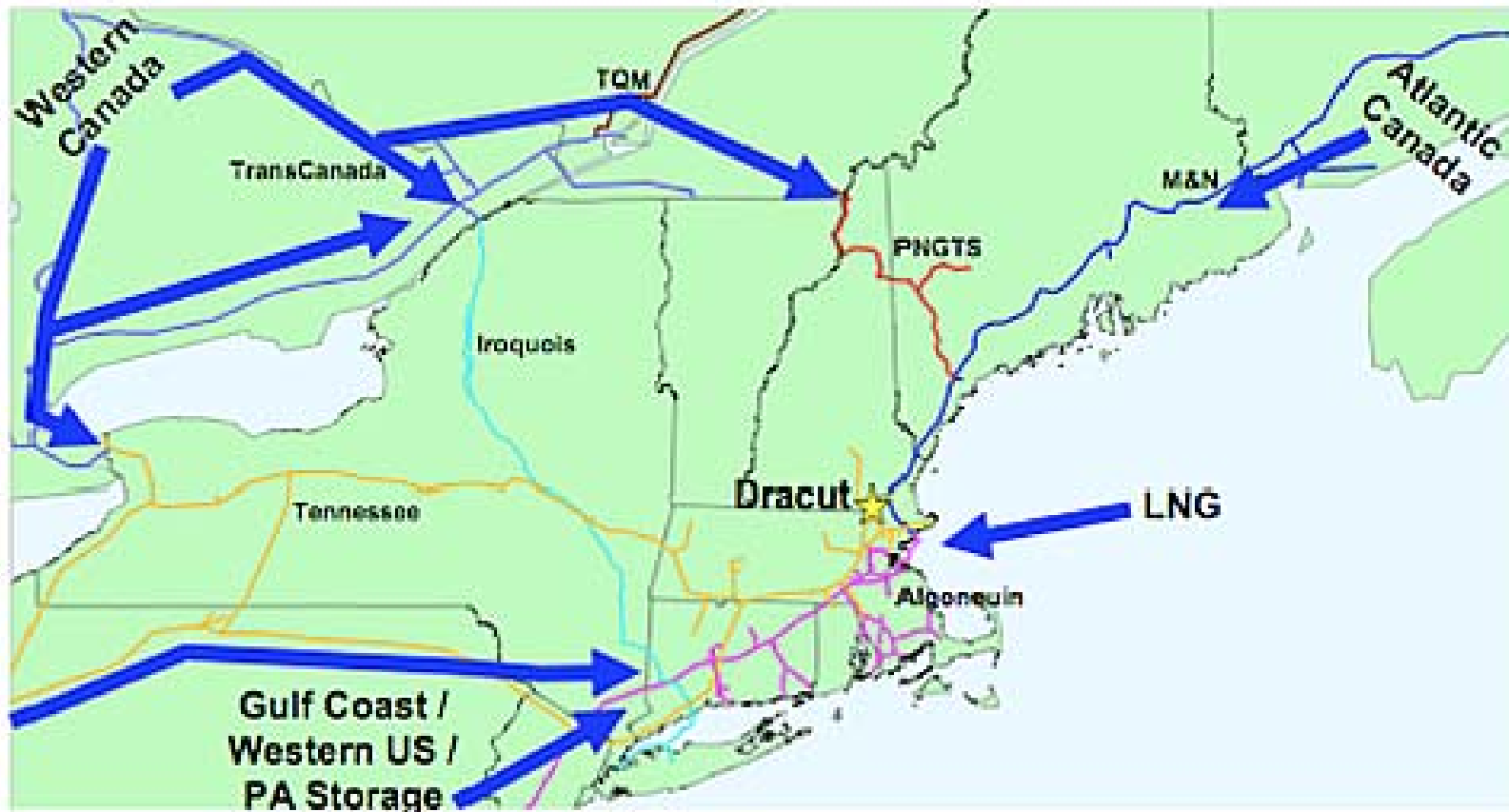
- ◆ Traditional Sources of Supply
  - Gulf Coast
  - Western Canada (WCSB)
  - Sable Island (Atlantic Canada)
  - LNG (Everett, MA)
  - Appalachian (conventional and CBM)
- ◆ Current Northeast Demand
  - Average 7.0 Bcf/d
    - Industrial 0.6 Bcf/d
    - Commercial 1.6 Bcf/d
    - Residential 2.2 Bcf/d
    - Electric Generation 2.5 Bcf/d

Sources: EIA, Northeast Gas Association

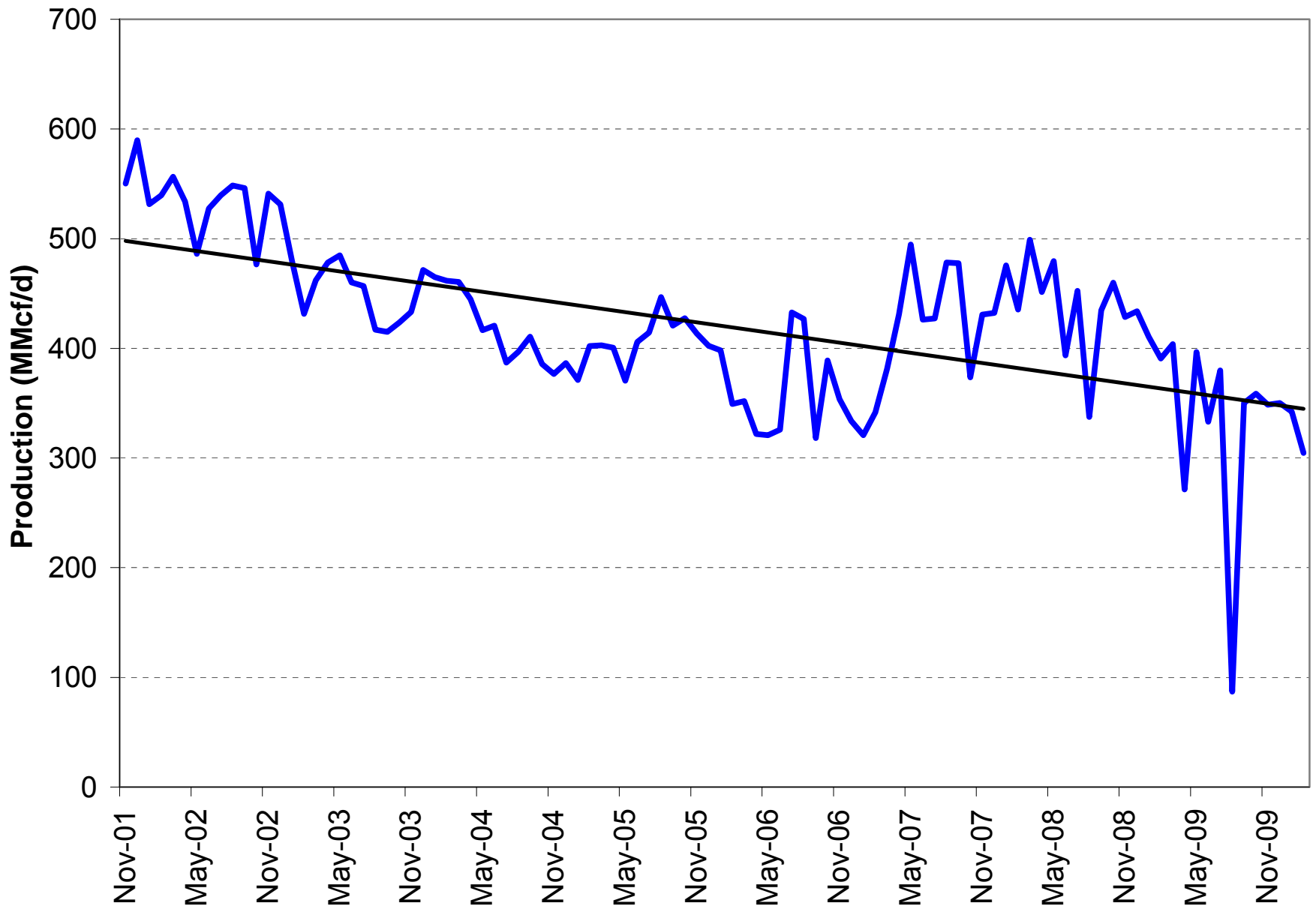
# Traditional Supply Issues

- ◆ Northeast at the “end of the pipe”
- ◆ Majority of gas supplies traveling long distances on pipelines from the Gulf Coast or Western Canada
  - High transportation costs
  - Declining production and reserves in maturing conventional fields
    - WCSB
    - Conventional onshore and offshore fields in the Gulf Coast experiencing rapid depletion
  - Deliveries subject to interruptions and pipeline bottlenecks
    - Hurricanes
    - Peak demand basis blowouts
- ◆ Atlantic Canada – Sable Island Disappointing

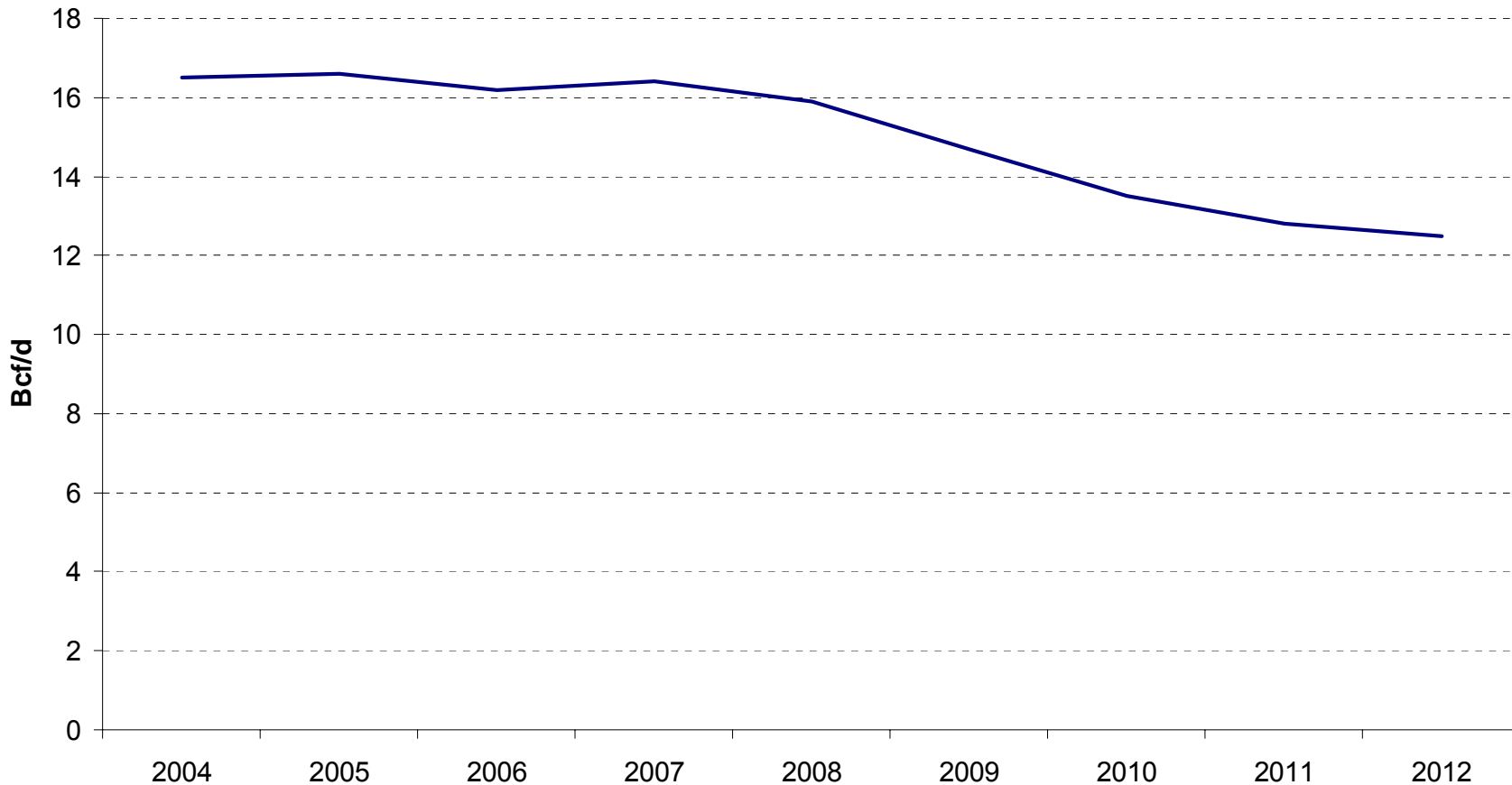
# New England Gas Supply Sources



# Declining Sable Island Production



# WCSB Conventional Production and Reserves



Source: NEB

Proved Reserves	56 Tcf
Remaining Conventional Resources	90 Tcf
<b>Total Recoverable Conventional Resources</b>	<b>146 Tcf</b>

Source: CAPP

# Gulf Coast Proved Reserves and Production – 2003 v. 2008

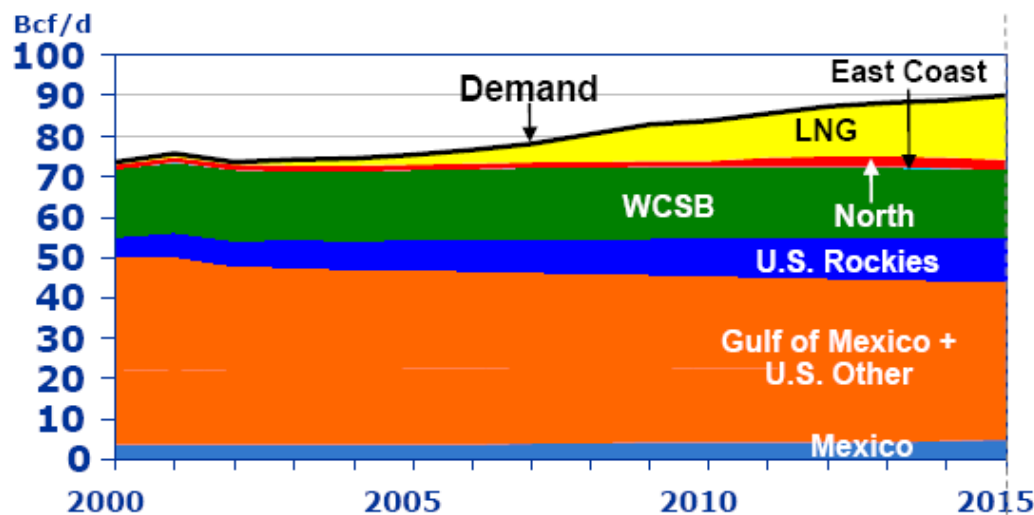
<u>Proved Reserves (Tcf)</u>	<u>12/31/2003</u>	<u>12/31/2008</u>	<u>Change</u>
Onshore	20.9	18.0	-14%
Offshore	23.0	14.0	-39%
Total	43.9	32.0	-27%
<u>Annual Production (Tcf)</u>	<u>2003</u>	<u>2008</u>	<u>Change</u>
Onshore	3.3	2.8	-15%
Offshore	4.5	2.4	-47%
Total	7.8	5.2	-33%

Source: EIA

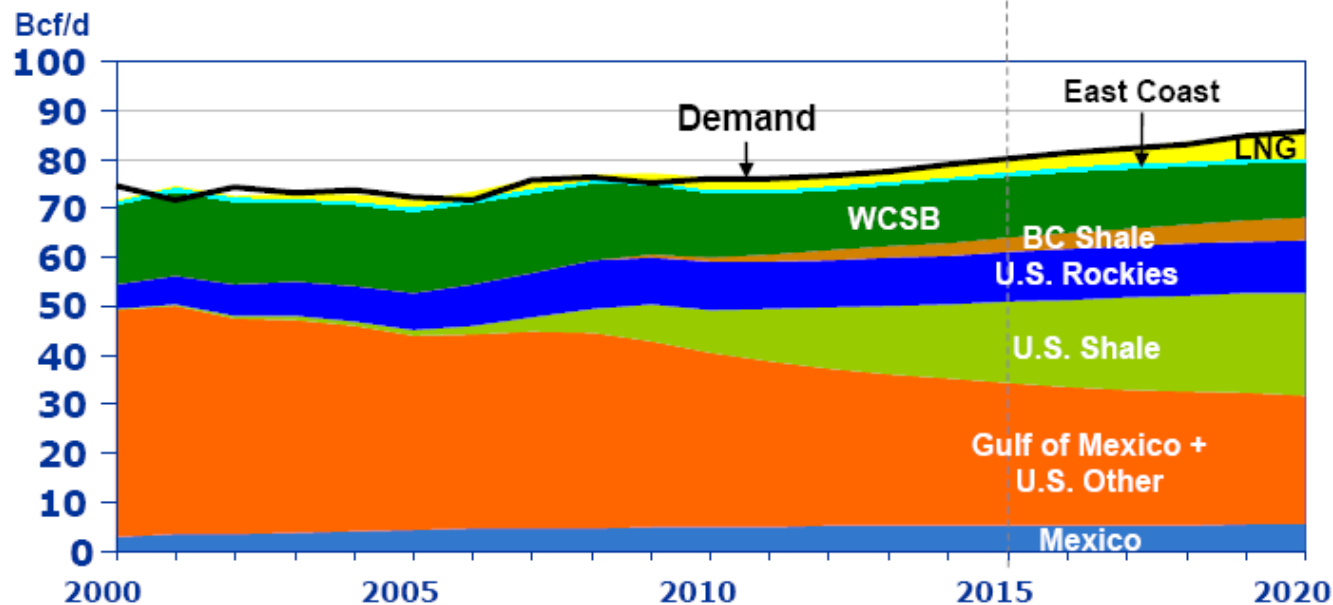
# The Good News

- ◆ U.S. proved reserves increased 29% from 2003 to 2008
  - 189.0 Tcf as of 12/31/2003
  - 244.7 Tcf as of 12/31/2008
- ◆ More than half of the increase was due to increases in unconventional gas reserves (CBM and shale gas)
  - CBM and Shale Gas Proved Reserves were 21.7 Tcf at the end of 2003 and increased to 53.6 Tcf by the end of 2008
  - Shale gas reserves increased by more than 900% over this period
  - Shale gas increased from about 1% of total U.S. production in 2003 to 20% by 2009

# Fundamental Shift in North American Supply/Demand



**2005  
Base Case  
Outlook**



**2010  
Base Case  
Outlook**

Source: TransCanada, September 28, 2010 NECA Conference on Natural Gas and Fuel Issues



# Recent Developments Expand Regional Supply

## ◆ Liquefied Natural Gas

- From New Brunswick (Canaport) via Maritimes & Northeast pipeline (0.8 Bcf/d)
- From two offshore terminals: Northeast Gateway (0.4 to 0.8 Bcf/d) and Neptune (0.4 Bcf/d)

## ◆ Rocky Mountain

- Rockies Express pipeline: 1.5 Bcf/ into eastern Ohio
- Transported to the Northeast via several pipelines

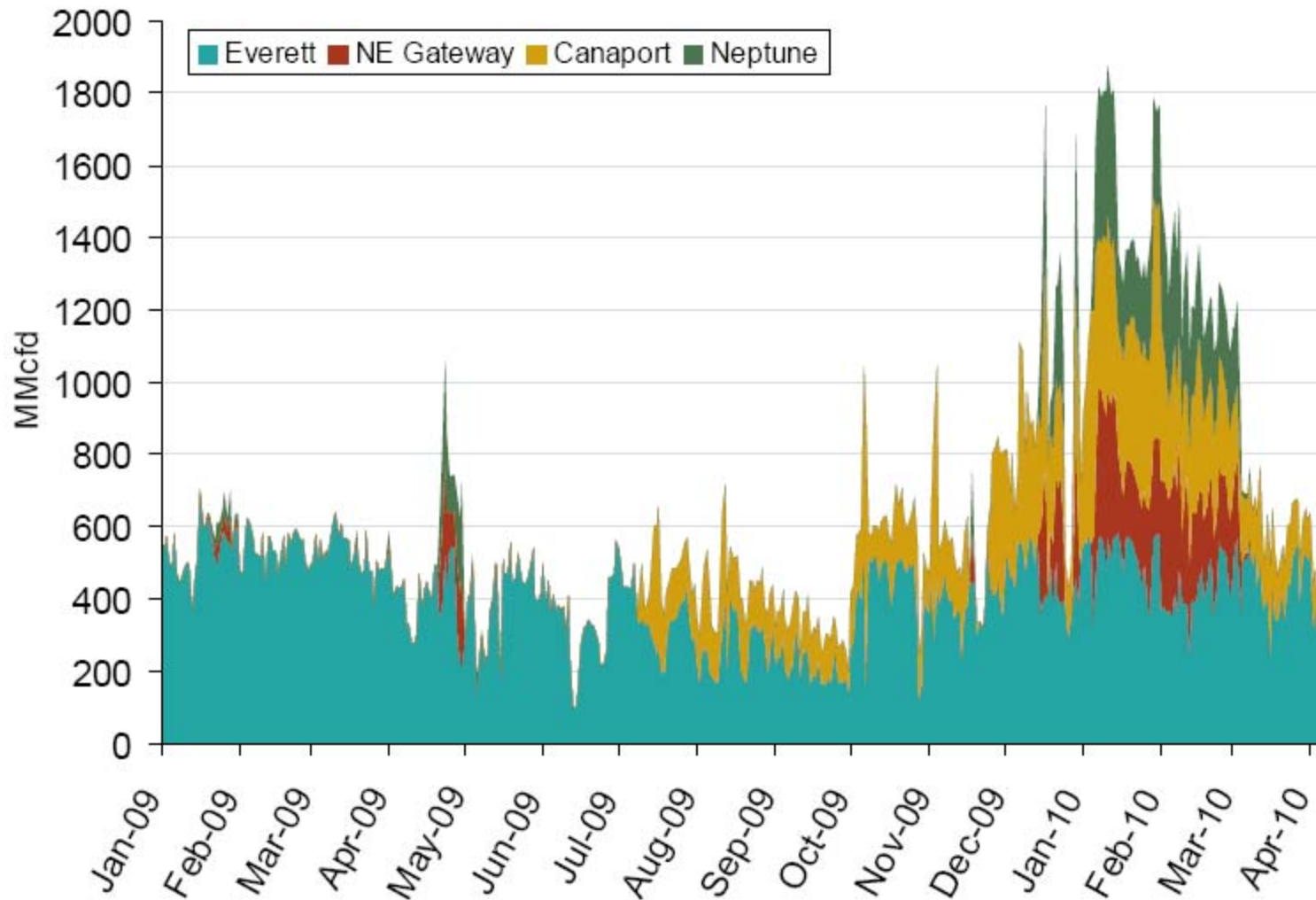
## ◆ Marcellus Shale

- Current production is 0.5 Bcf/d
- Expected to grow to 3 Bcf/d by 2015

# LNG Supplies for the Northeast

- ◆ Expanded LNG receiving capacity
  - Dstrigas (Everett) – continued supply to core LDC markets and electric generation (New Mystic)
  - Canaport – supplement declining Sable Island production
  - Offshore terminals – supplies that will dampen winter peak demand basis blowouts
- ◆ Excess global LNG capacity through at least 2015
  - 2009 global LNG trade 8.6 Tcf
  - U.S. LNG imports 0.45 Tcf
  - Since 2008 global LNG capacity increased by 3.1 Tcf
  - Capacity will increase by another 38% through 2013 with the completion of liquefaction trains under construction

# Sendout From New England LNG Terminals



Source: FERC Market Oversight Updated October 7, 2010

# Expanded Northeast Supplies

- ◆ Bring new conventional wisdom regarding gas prices and availability for end-users
  - Old conventional wisdom
    - Expensive gas
    - Frequent winter basis blowouts
    - Peak demand delivery restrictions
  - New conventional wisdom
    - Moderate prices
    - Less volatility
    - Increased availability

# Key Questions

- ◆ What's the new conventional wisdom and why the radical shift?
- ◆ How will the Northeast benefit from more diversified supplies?
- ◆ Is the Marcellus Shale a game changer with regard to Northeast gas supplies?
- ◆ How will new supply sources and regional pipeline expansions impact prices and availability?

# What's the new conventional wisdom and why the radical shift?

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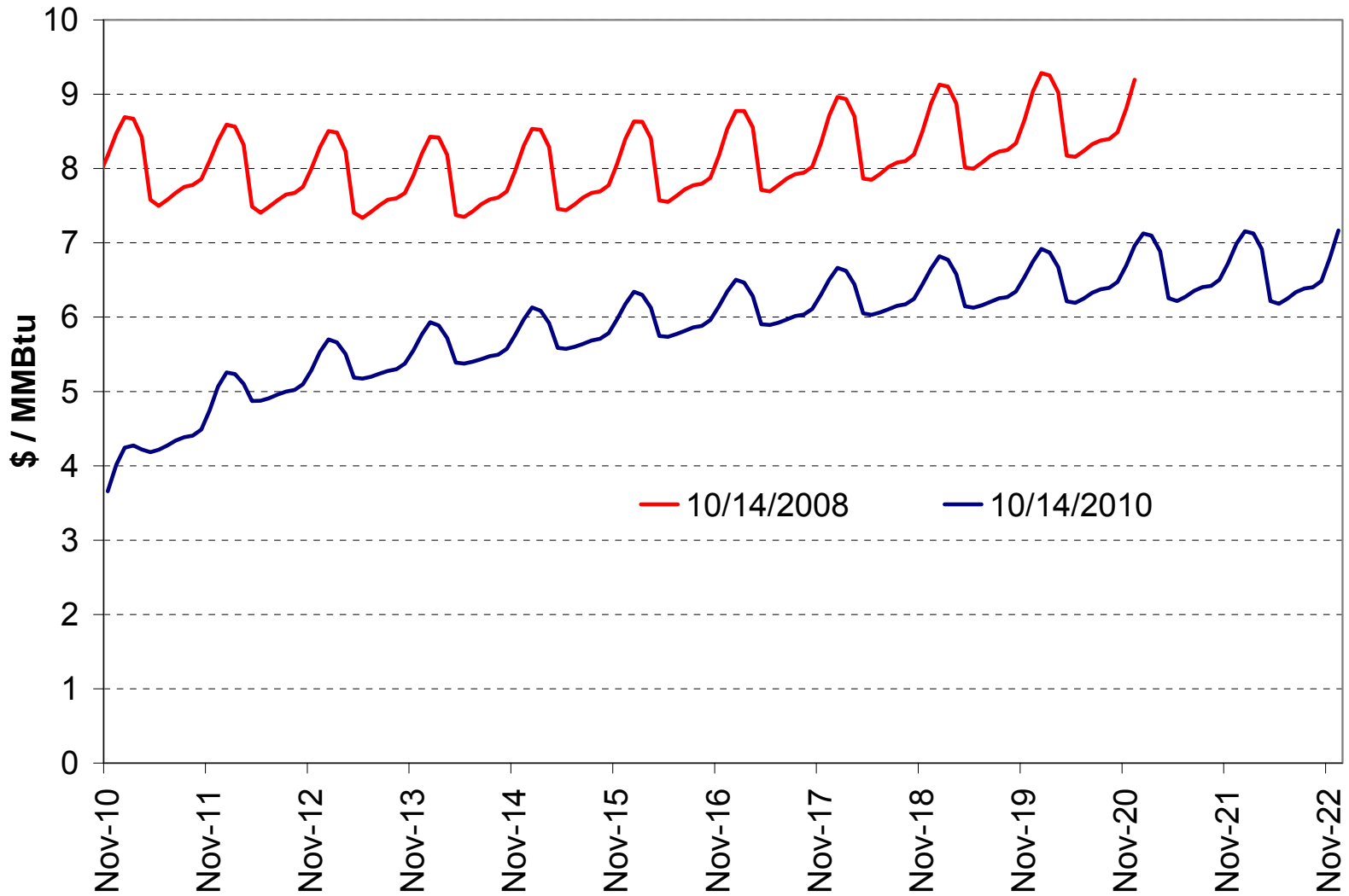
- ◆ A dramatic increase in the development and production of gas from unconventional resources, especially shale gas
- ◆ Changes in fracturing and horizontal drilling technology allow for less expensive and more rapid development
- ◆ Maturation of conventional producing fields will be more than offset by unconventional gas production
- ◆ Massive increase in worldwide liquefaction capability, LNG tankers, and U.S. regasification capability
- ◆ Critical reliance on LNG no longer required to ensure commodity balance

# Is cheap natural gas a transient phenomenon or here to stay?

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- ◆ Natural gas will remain volatile but moderately priced over the long run, i.e., \$5.00 - \$8.00 into-the-pipe
- ◆ “Basis” to New England will reflect increased commoditization of gas supplies across North America, in particular, growth of Marcellus shale
- ◆ Basis blowouts due to periodic deliverability constraints will be less frequent and short-lived

# NYMEX Henry Hub Futures

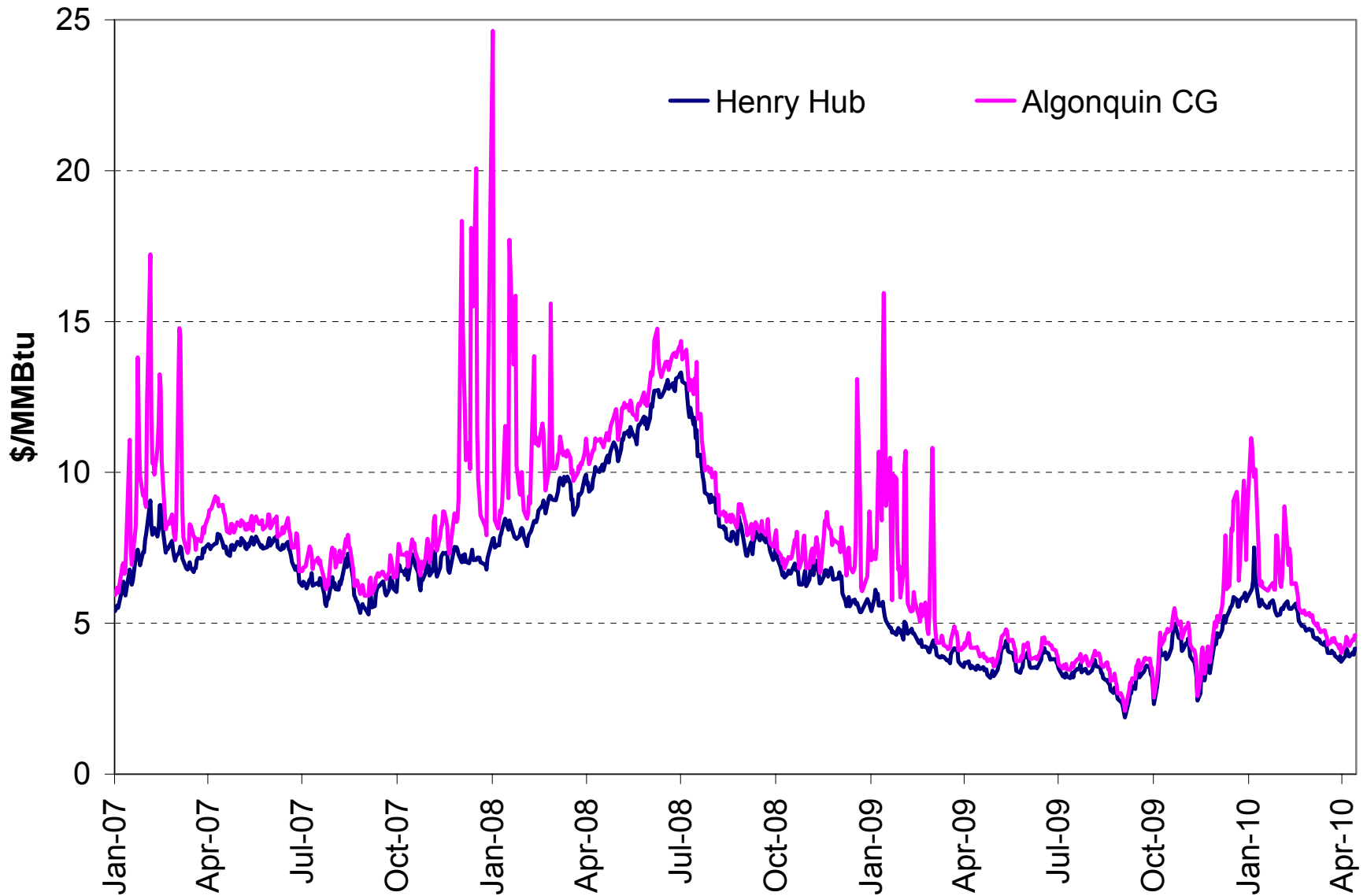


# World LNG Estimated October 2010 Landed Prices



Source: FERC Market Oversight Updated October 7, 2010

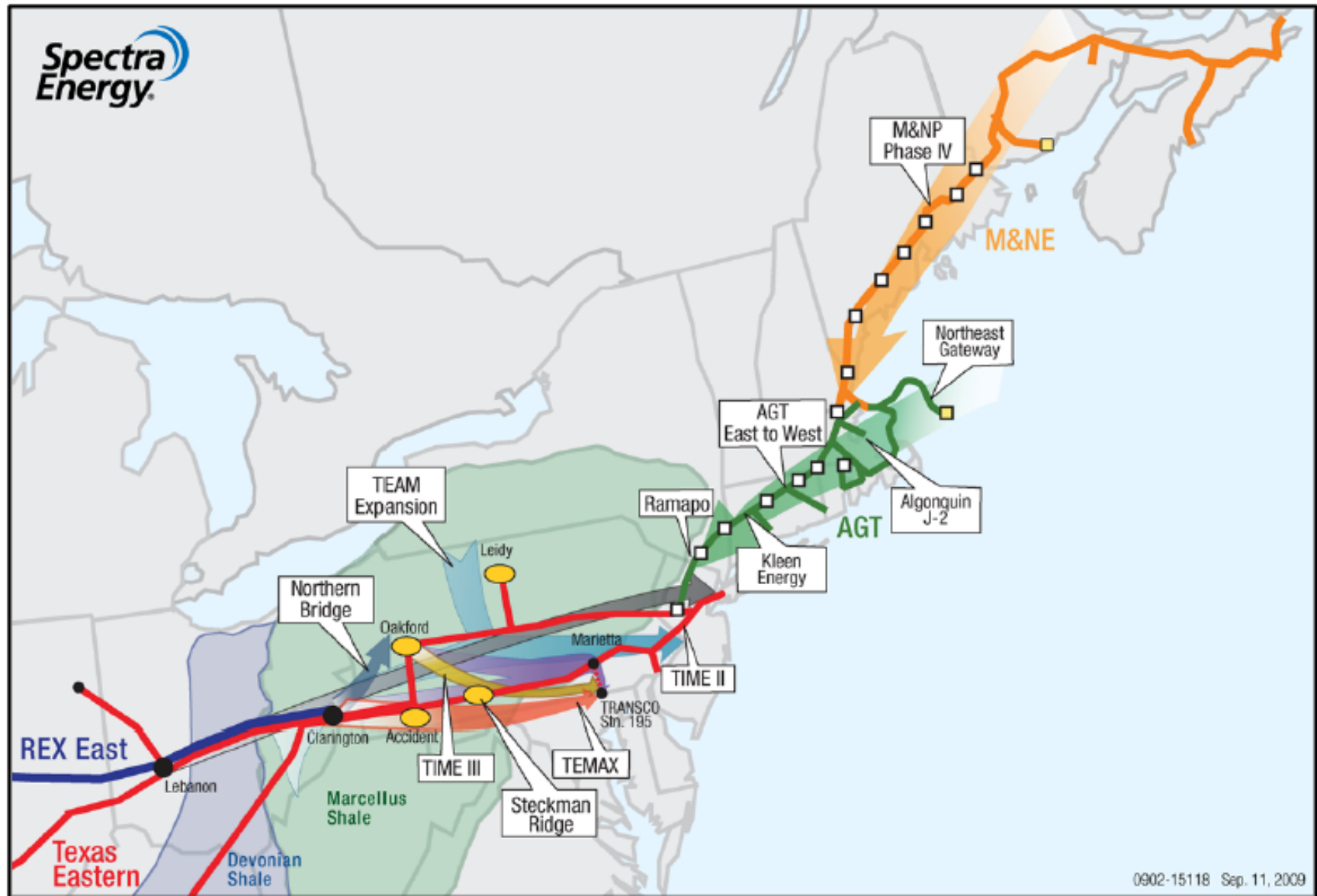
# Natural Gas Daily Spot Price



# Is Marcellus Shale a game changer, one that will indefinitely flood the market in the greater Northeast?

- ◆ Proximity to market center, sense of momentum, horizontal multi-frac technology a definite game changer
- ◆ Increased gas-on-gas competition will hold prices down
- ◆ Will contribute to a redistribution of gas flows on the pipeline infrastructure serving the Northeast
- ◆ Disparate views re production forecasts, ramp-up

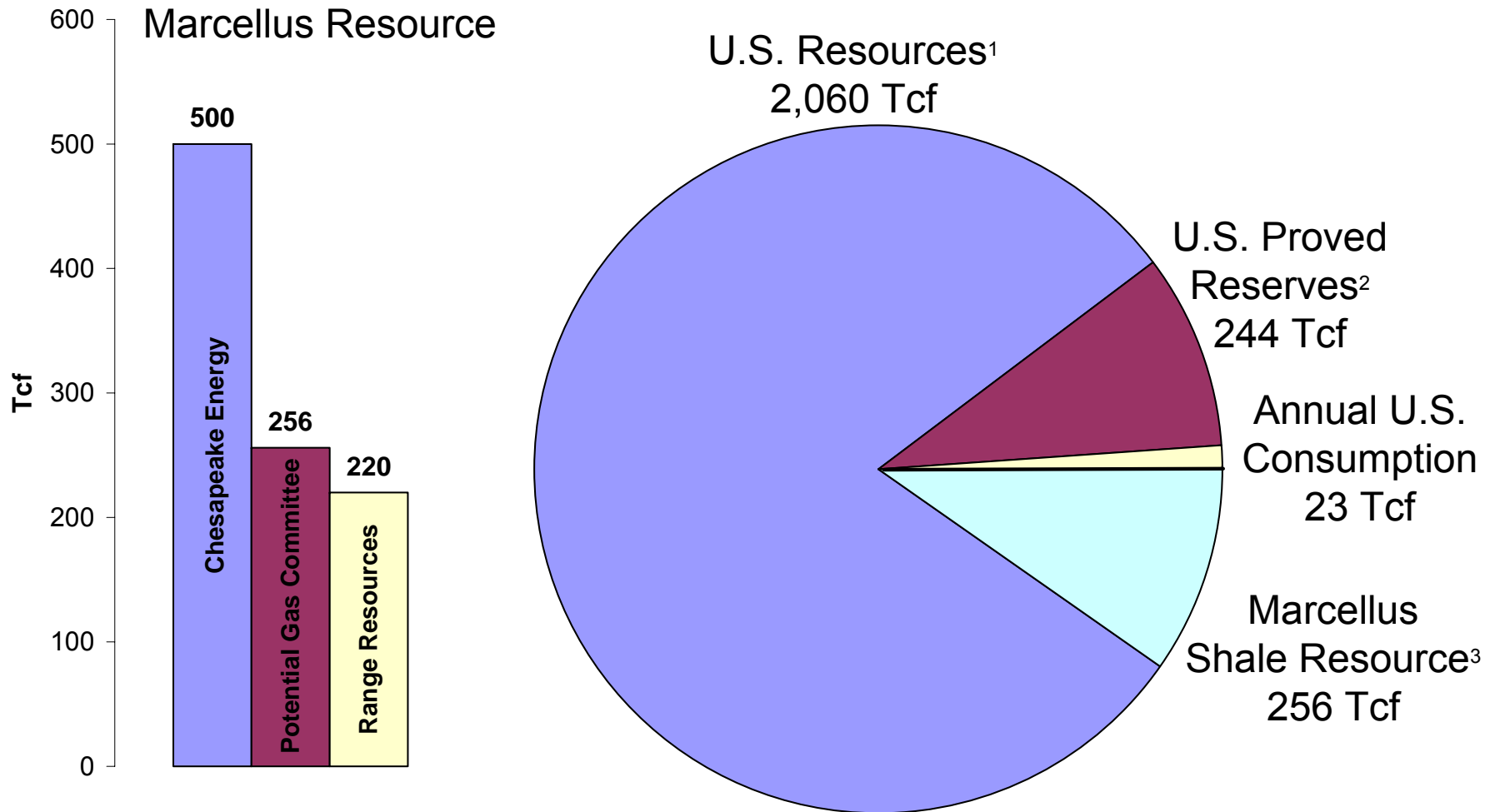
# Location of Marcellus Shale



Source: Spectra Energy Northeast Project Update.  
Sean Maher. NECA Fuels Conference. 9/22/2009.

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# Marcellus Shale Resources

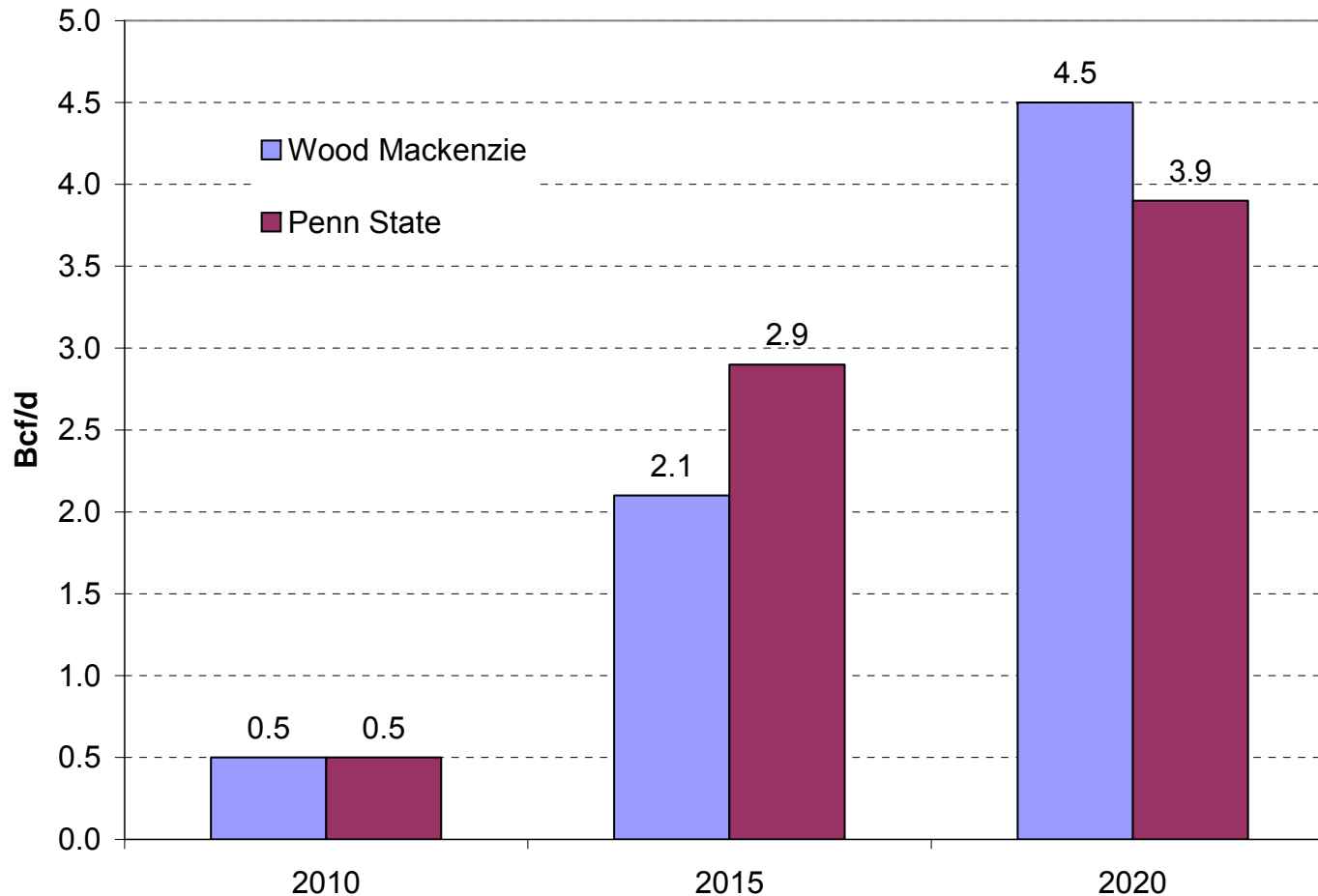


<sup>1</sup> Potential Gas Committee, June 18, 2009

<sup>2</sup> U.S. Energy Information Administration

<sup>3</sup> Marcellus Proved Reserves < 1 Tcf

# Marcellus Shale Production Forecasts



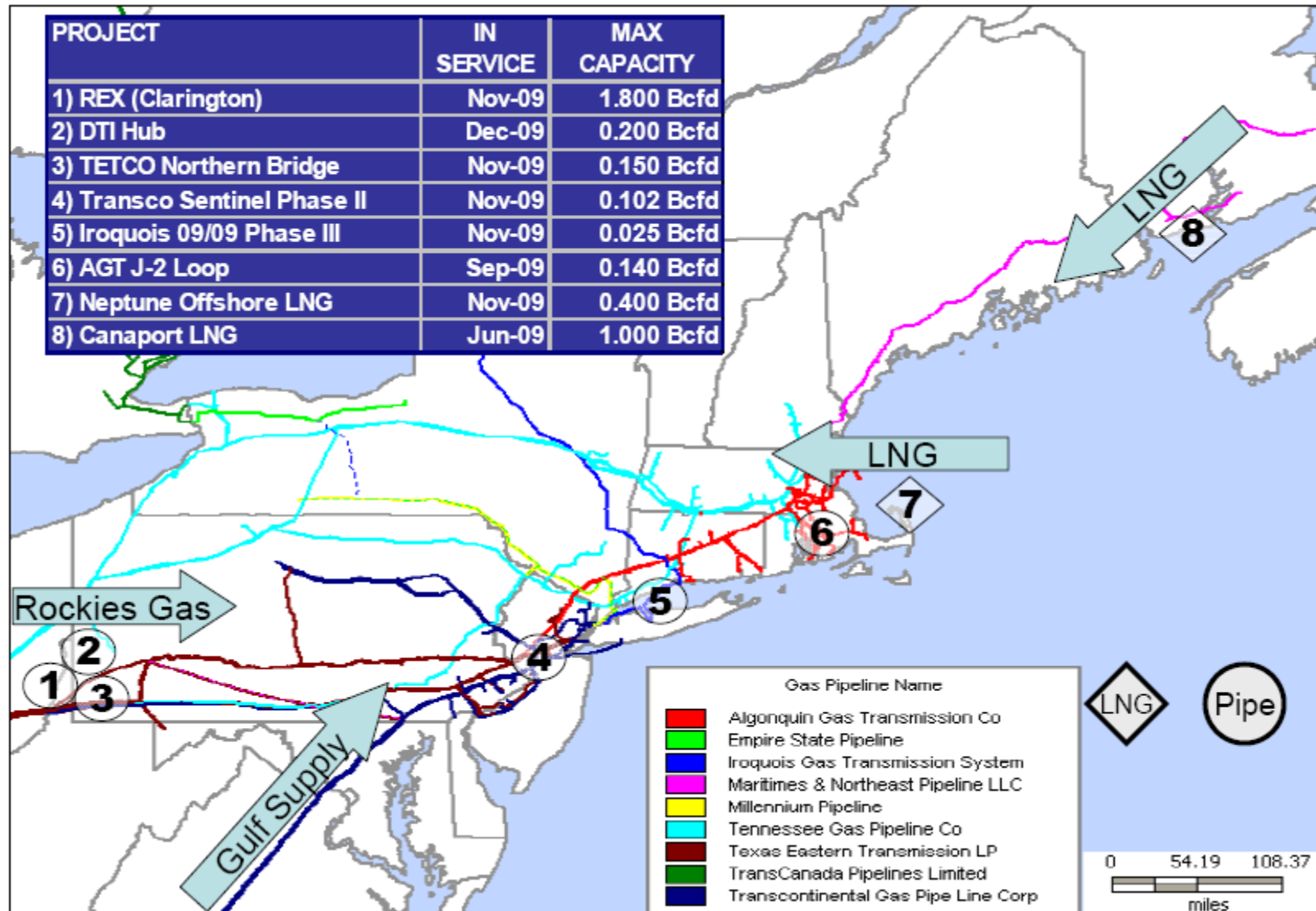
Sources: "An Emerging Giant: Prospects and Economic Impacts of Developing the Marcellus Shale Natural Gas Play." T. Considine, R. Watson, R. Entler, J. Sparks, The Pennsylvania State University, College of Earth & Mineral Sciences, Department of Energy and Mineral Engineering. July 24, 2009.

Integrated Resource Plan for Connecticut. The Brattle Group. January 1, 2010. (Wood Mackenzie)

## What will be the benefit from diversified supplies?

- ◆ Greater intra-regional delivery flexibility than ever before
  - New sources of supply at new delivery points will improve gas flows and benefit end-users
- ◆ Decline of Sable Island offset by Canaport LNG via M&N
- ◆ LNG into Algonquin / M&N injecting diversity benefits across system especially for serving peak demands
- ◆ Tennessee well-positioned for increased market share with improved flows from M&N and from the Marcellus fields

# Natural Gas Infrastructure Additions



Source: Northeast Gas Association

# A Few Clouds for a Sunny Outlook

- ◆ Marcellus Production
  - Possible hydraulic fracturing restrictions
  - High water consumption
  - Long-term economics look good but it is early in the life of this gas resource play
    - Short well production history
- ◆ LNG capacity glut could disappear after 2015
  - Current low prices delaying new liquefaction facilities
  - Return to global economic growth will increase the demand for LNG supplies
- ◆ Ultimately U.S. carbon emissions regulations are likely to result in a significant shift from coal to gas-fired electricity generation