

OE ENERGY MARKET SNAPSHOT

Northeast States Version – November 2009 Data

- **Special Report: Form 552**
- **Natural Gas and Fuel Markets**
- **Electricity Markets**

Office of Enforcement
Federal Energy Regulatory Commission
December 2009



Special Report:

Lessons Learned from the First Form 552 Submissions

The Road Map to Form 552

- **California energy crisis.**
- **False reporting of indices and ensuing criminal prosecutions by the Department of Justice and the Commodities Futures Trading Commission.**
- **Establishment of the Office of Market Oversight and Investigations (now the Office of Enforcement).**
- **Issuance of the Policy Statement of 2003.**
- **Transparency provisions of EPOA 2005.**
- **OE research on “size of market” and physical basis use.**

What Form 552 is

- **Provide guidance on the size of the physical natural gas market.**
- **Inform market participants about the extent of index use in price formation.**
- **Detail how much fixed price gas contributes to indices.**
- **Highlight potential changes needed for FERC policies.**

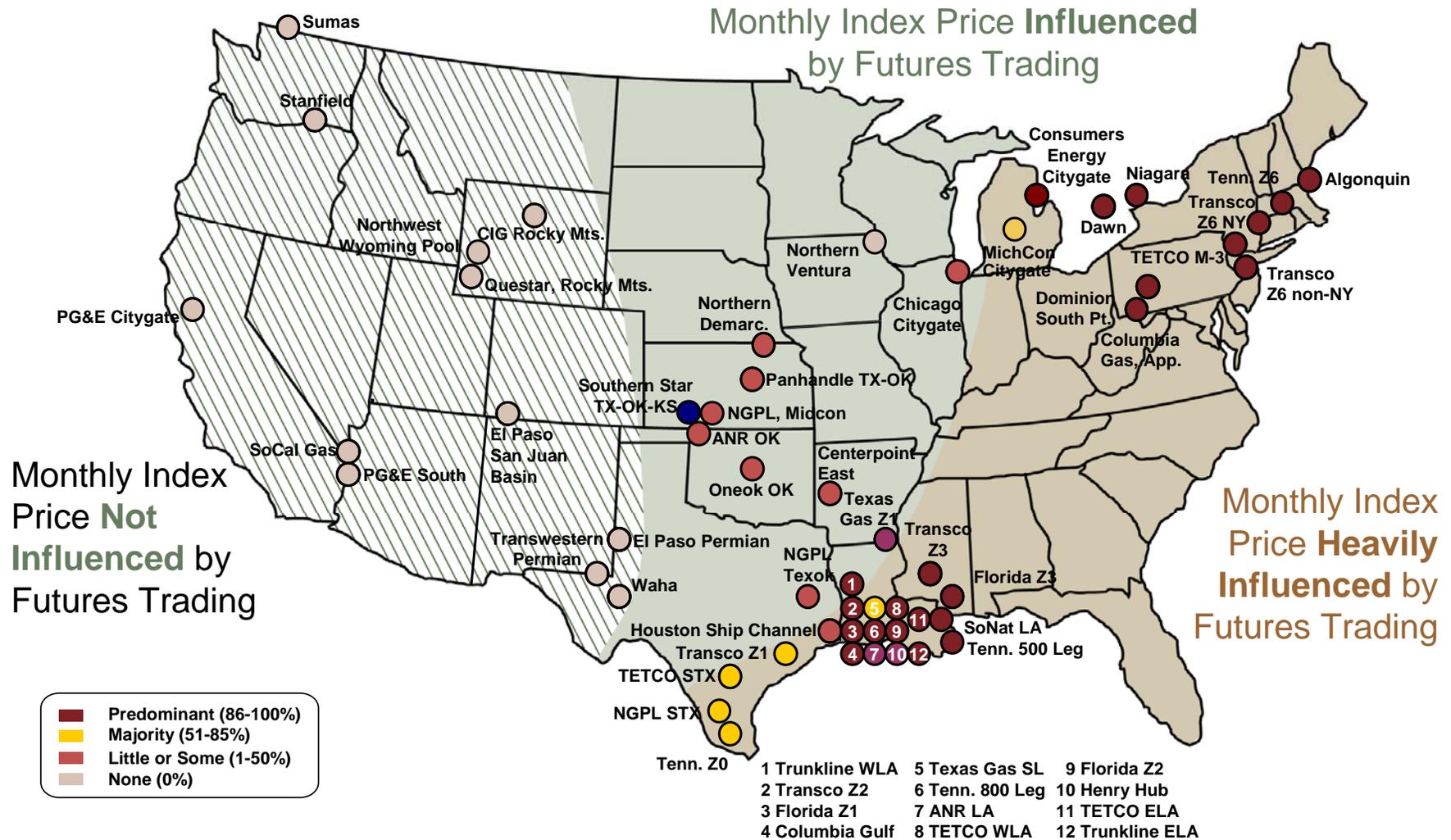
... and What Form 552 Isn't

- **Attempt to catalog ALL possible kinds of physical market transactions.**
- **Way to gauge the size of the entire physical market for gas.**
- **Tool to uncover confidential commercial information.**

Why We Care About Index?

- **Index use is the largest component of physical gas purchases.**
- **Link between physical index use and the financial market (NYMEX).**
- **Indices can be volatile and result in marked changes in consumer costs.**

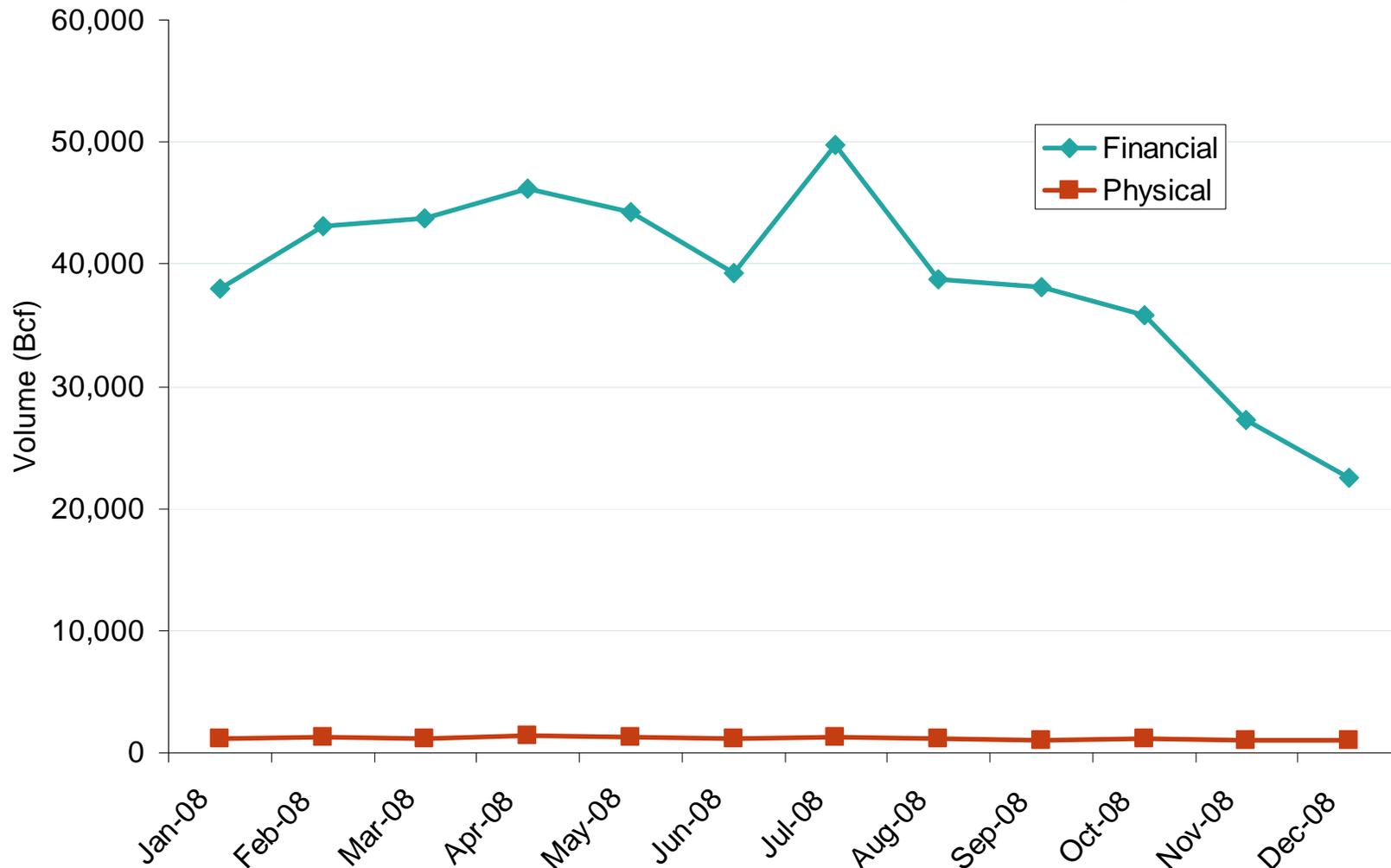
Use of Physical Basis in Natural Gas Price Indices at Major Trading Points, 2009



Source: Derived from *Platts* data for January through June 2009 indices.

Natural Gas Financial Markets Dwarf Estimated Physical Market

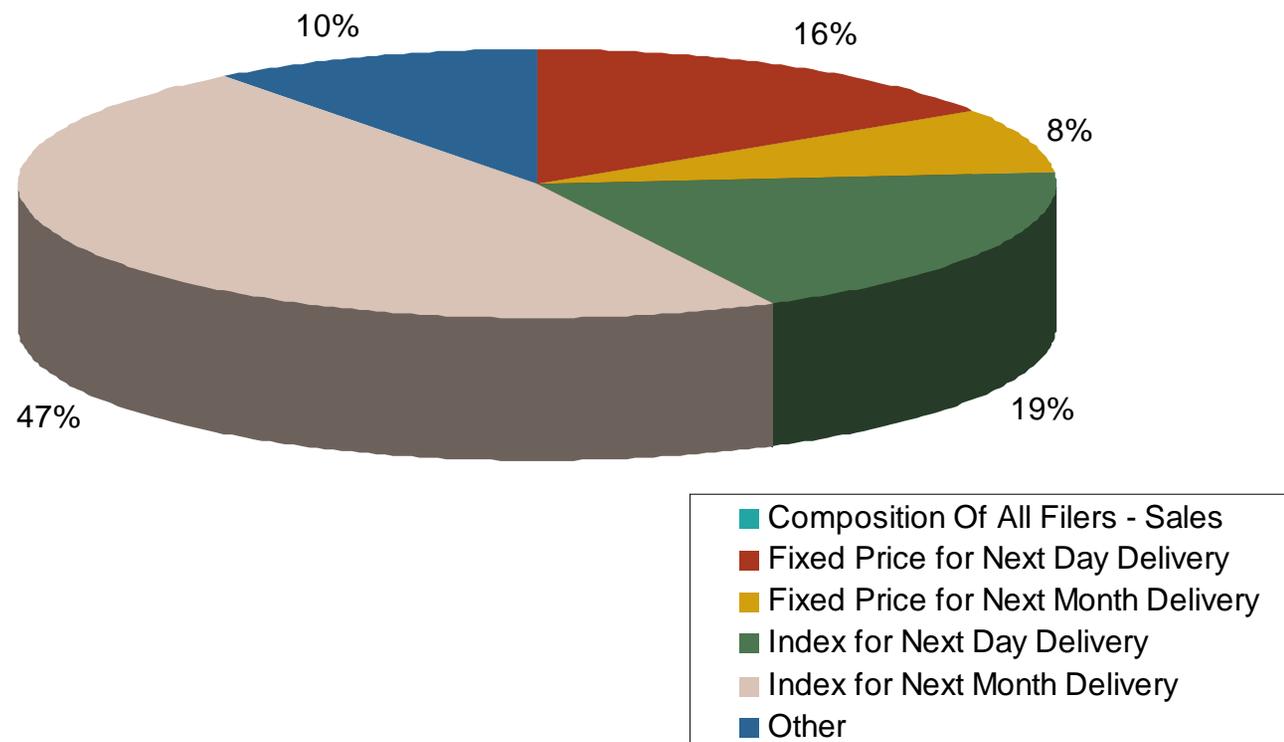
Monthly Trade Volumes for Natural Gas on Intercontinental Exchange



Source: ICE and FERC Staff

Results Underscore Reliance on Index Deals

Composition of All Filers (Sales)



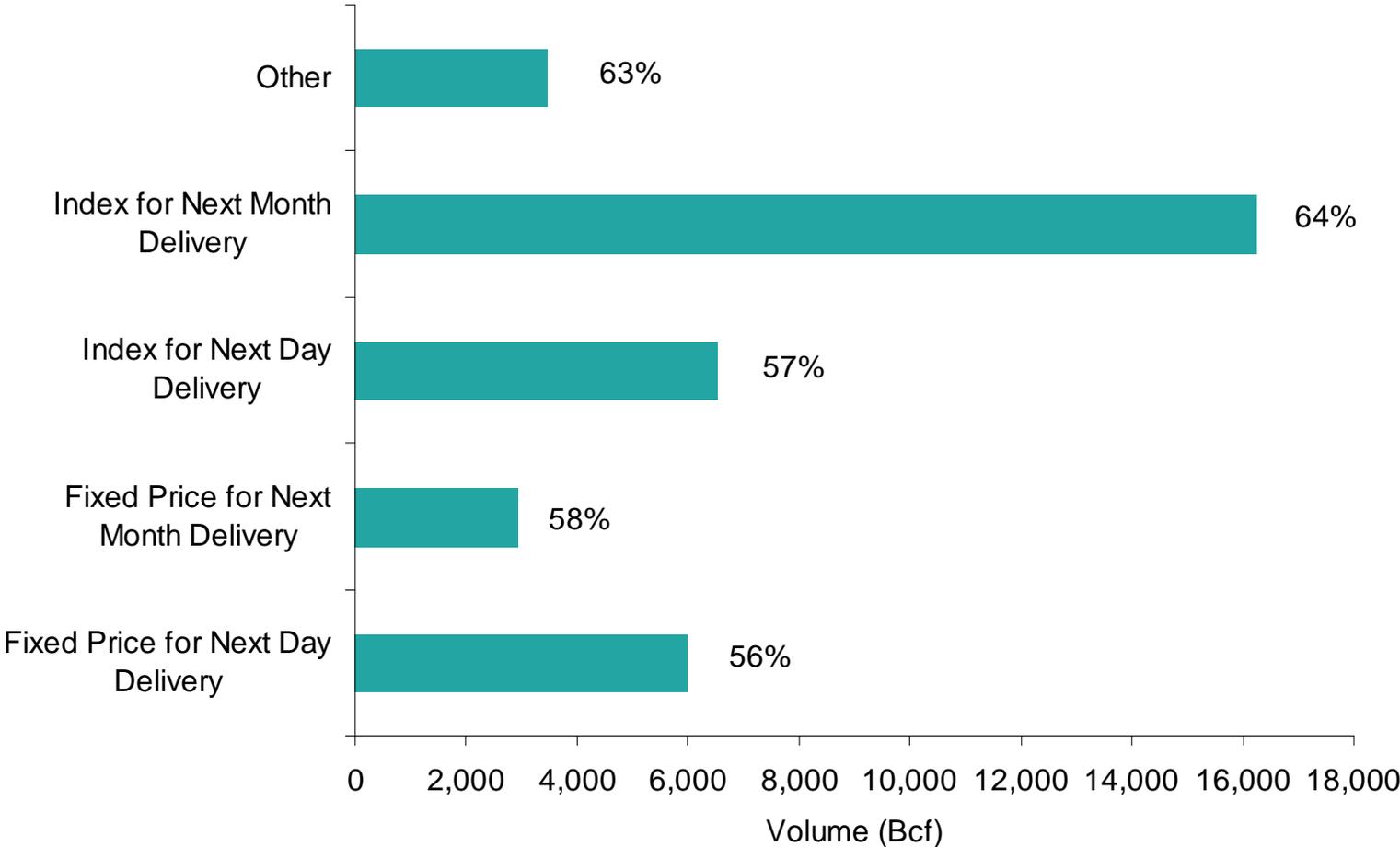
•Fixed price deals for next-day and next-month gas, together, accounted for less than 24% of total sales or purchases.

Sample Size Observations

- **The total physical gas market, as defined by Order Nos. 704-A and 704-B, in 2008 drawing upon queries from out 552 data base was nearly 62 Tcf or almost three times (21.4 Tcf) domestic marketed production in 2008.**
- **1,097 respondents or holding companies filed as of October 10th, 2009.**
- **Respondents reflected entire spectrum of the gas industry.**

Reporting to Index Publishers

Volume by Filers Who Reported Transactions to Publishers and % of Total Sales

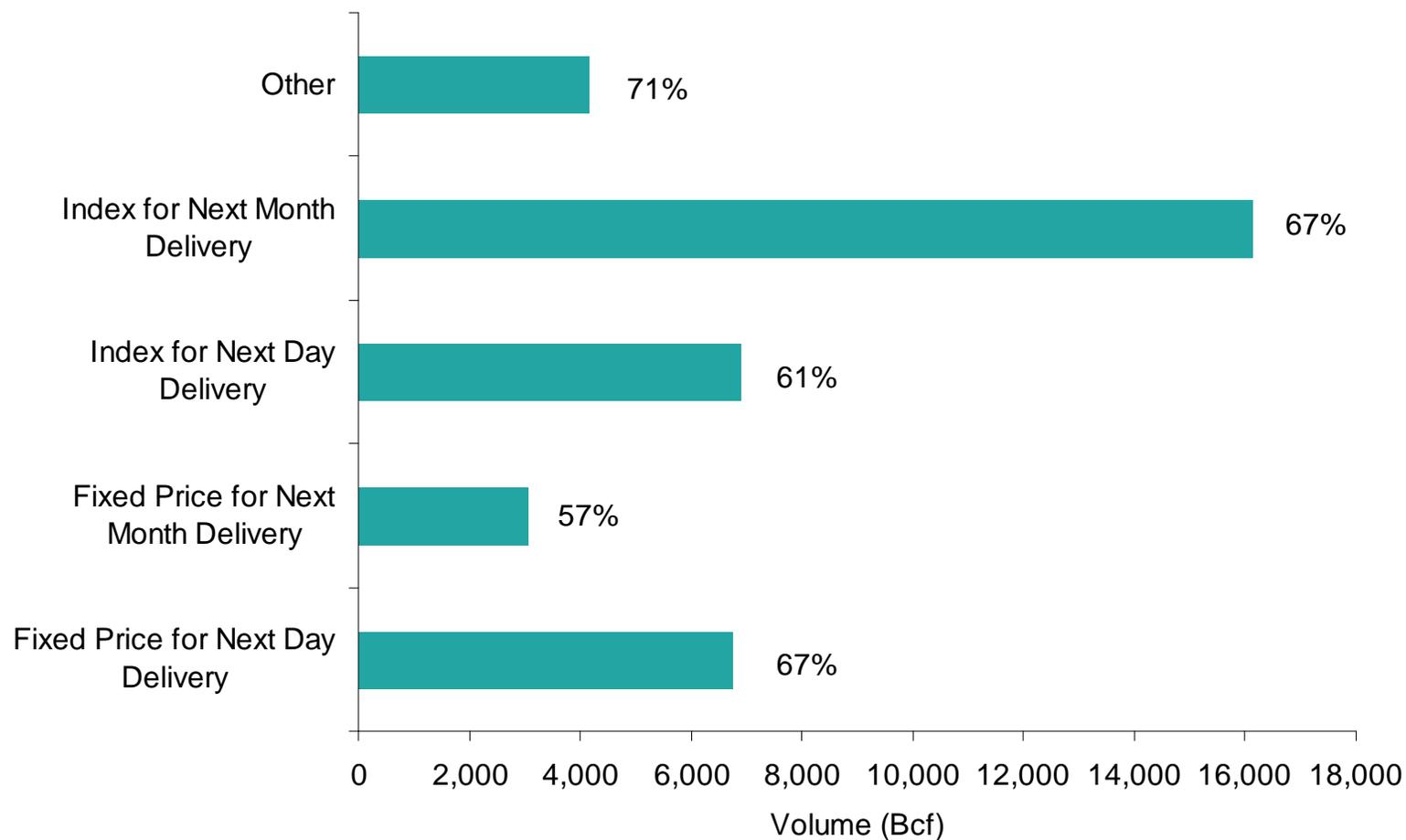


Source: Form No. 552 and FERC staff
December 2009 Northeast Snapshot Report

Updated December 7, 2009

Top 50 Dominate the Physical Gas Market

Volume by Top 50 Filers and % of Total Sales



Comparative Results

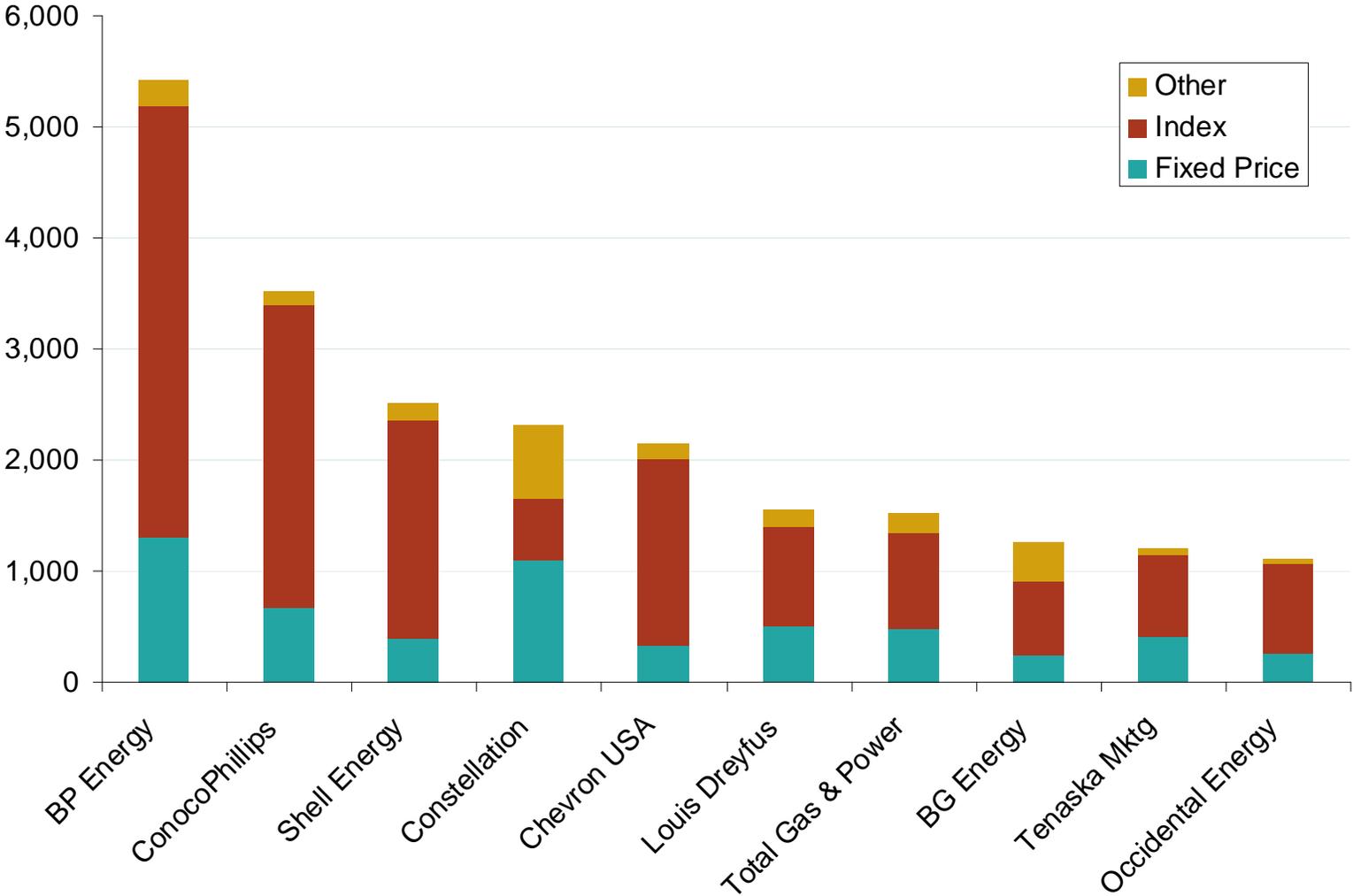
Ordinal Ranking of Top Gas Sellers: Gas Daily vs Form No. 552

Ordinal Rank	Gas Daily Marketer Survey	Ordinal Rank	Form 552
1	BP	1	BP
2	ConocoPhillips	2	ConocoPhillips
3	Shell Energy	3	Shell Energy
4	Macquarie Cook Energy	4	Macquarie Cook Energy
5	Louis Dreyfus Energy Services	5	Chevron
6	Chevron	6	Louis Dreyfus Energy Services
7	RBS Sempra	7	Total Gas & Power
8	Tenaska	8	BG
9	Nexen	9	Tenaska
10	EnCana	10	Occidental Energy

Sources: Derived from Gas Daily on September 9, 2009 and FERC Form No. 552.

Note: draws upon Gas Daily's second quarter 2008 survey results for top North American gas marketers.

Top Ten Sellers of Physical Gas Comprise 61% of Overall Physical Gas Sales of which 2/3 is at Index

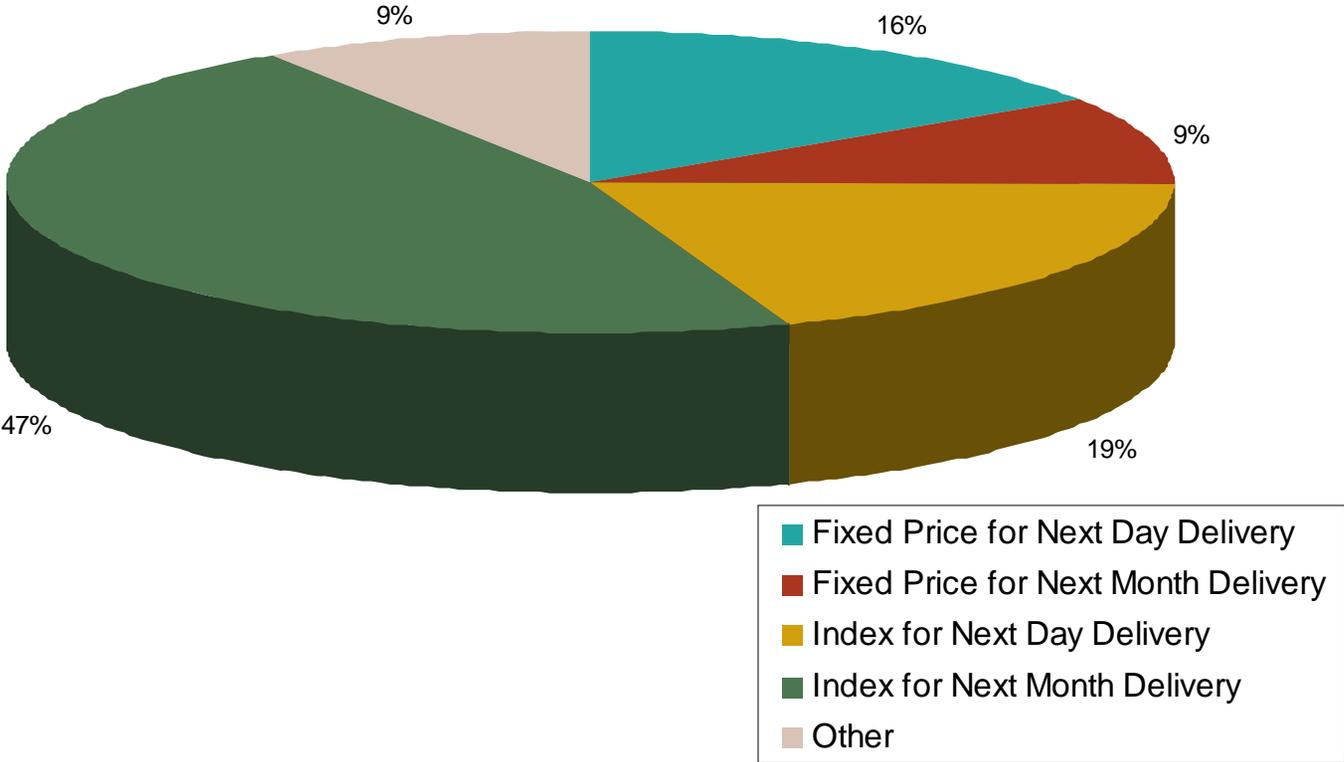


Source: Form No. 552 and FERC Staff
December 2009 Northeast Snapshot Report

Updated October 29, 2009

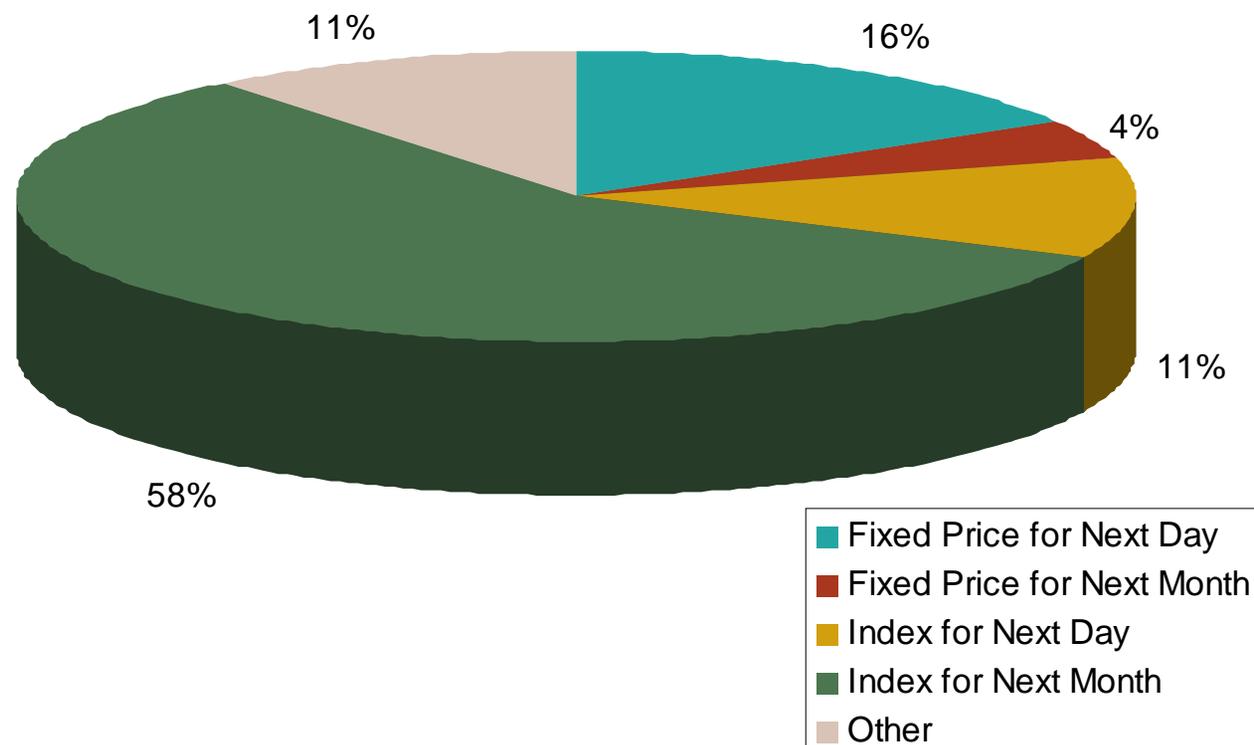
Monthly and Next-day Index Sales Predominate Amongst Biggest Sellers of Gas

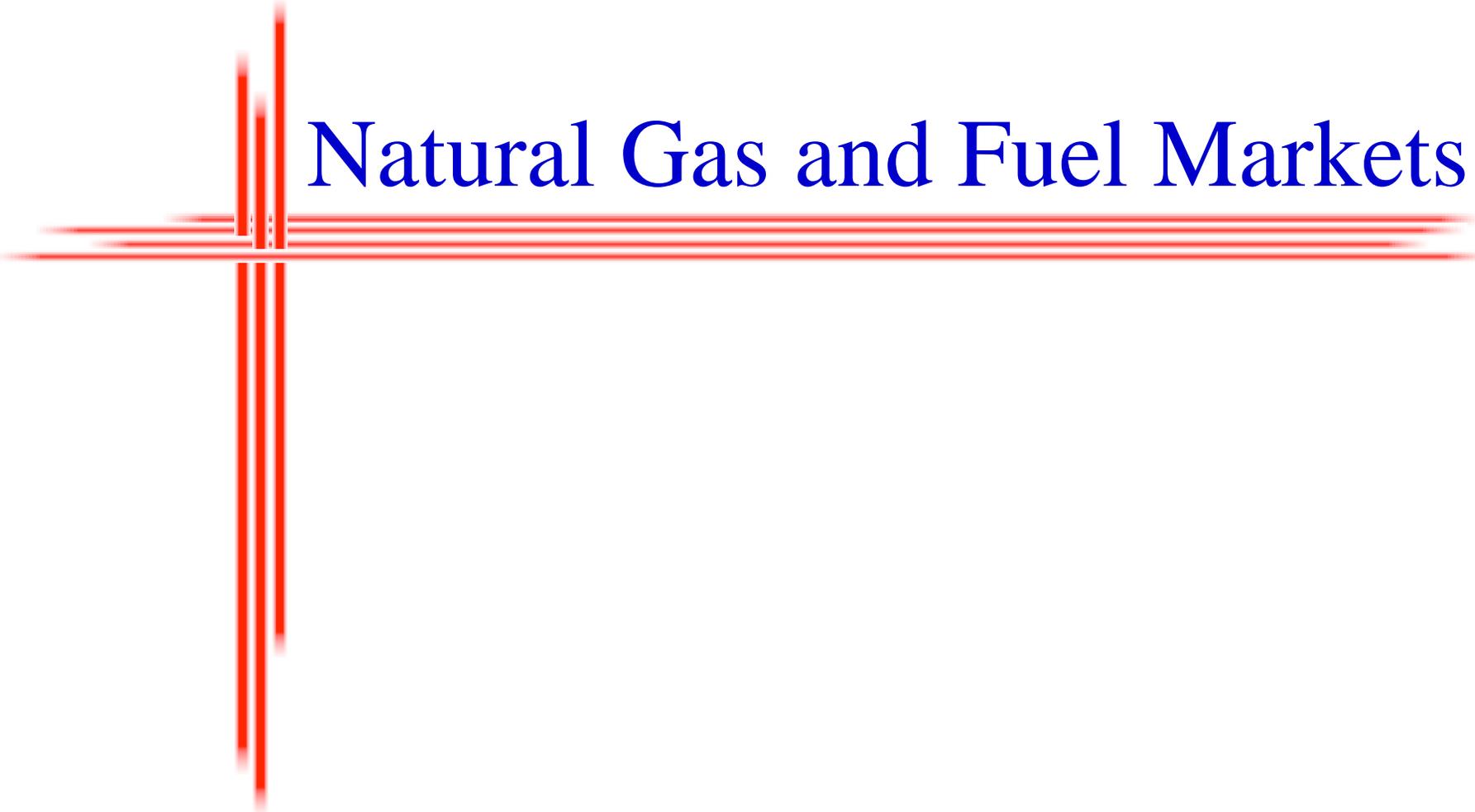
Composition of Transactions Amongst Top Ten Filers by Volume (Sales)



Leading Gas-Only Investor-Owned LDCs are Somewhat More Dependent on Index Deals

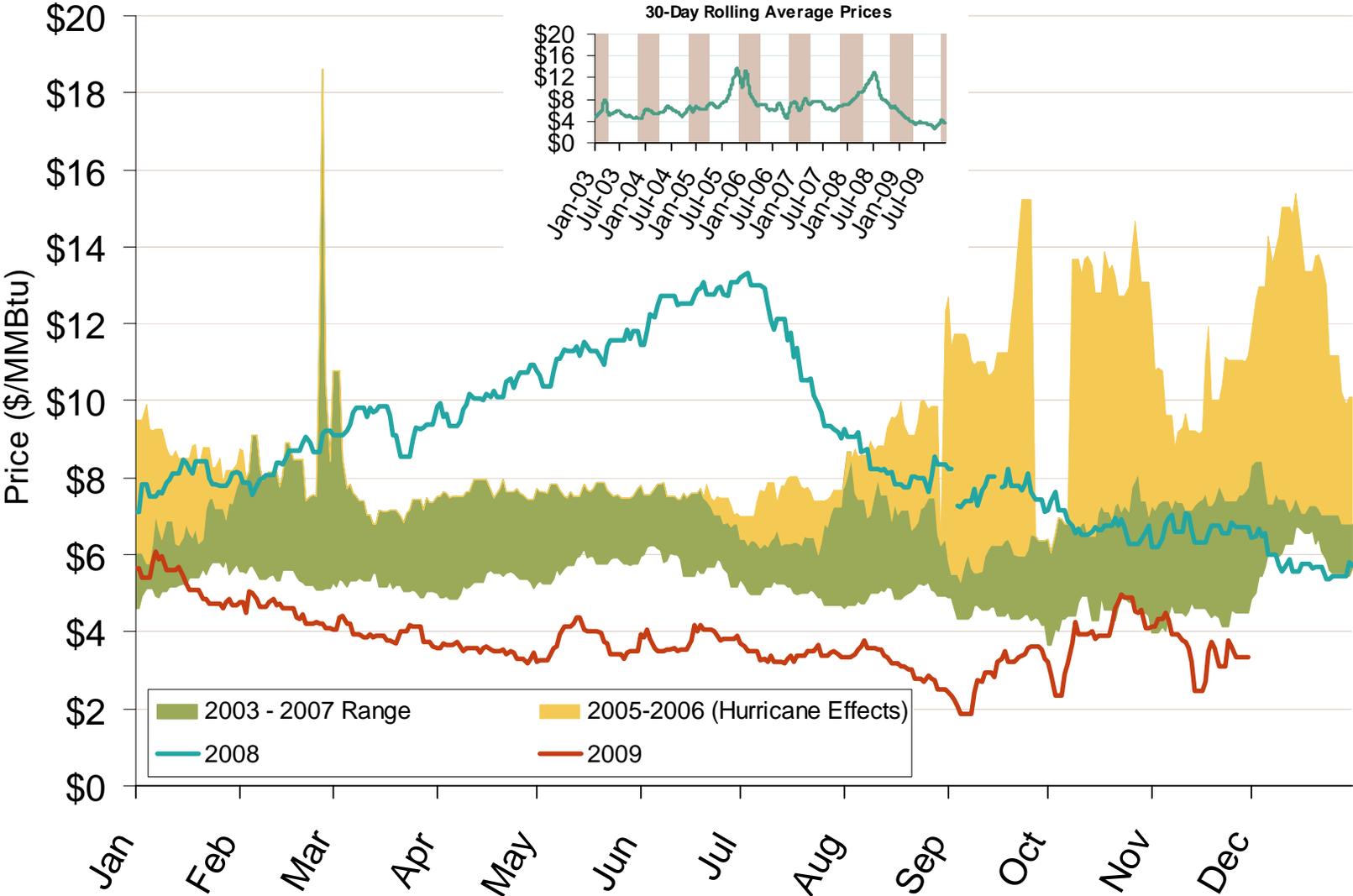
Composition of Transactions Amongst Largest Natural Gas-only Consuming Investor-owned LDCS (Purchases)





Natural Gas and Fuel Markets

Henry Hub Natural Gas Daily Spot Prices 2008, 2009 and 2003-2007 Range



Source: Derived from Platts data.
December 2009 Northeast Snapshot Report

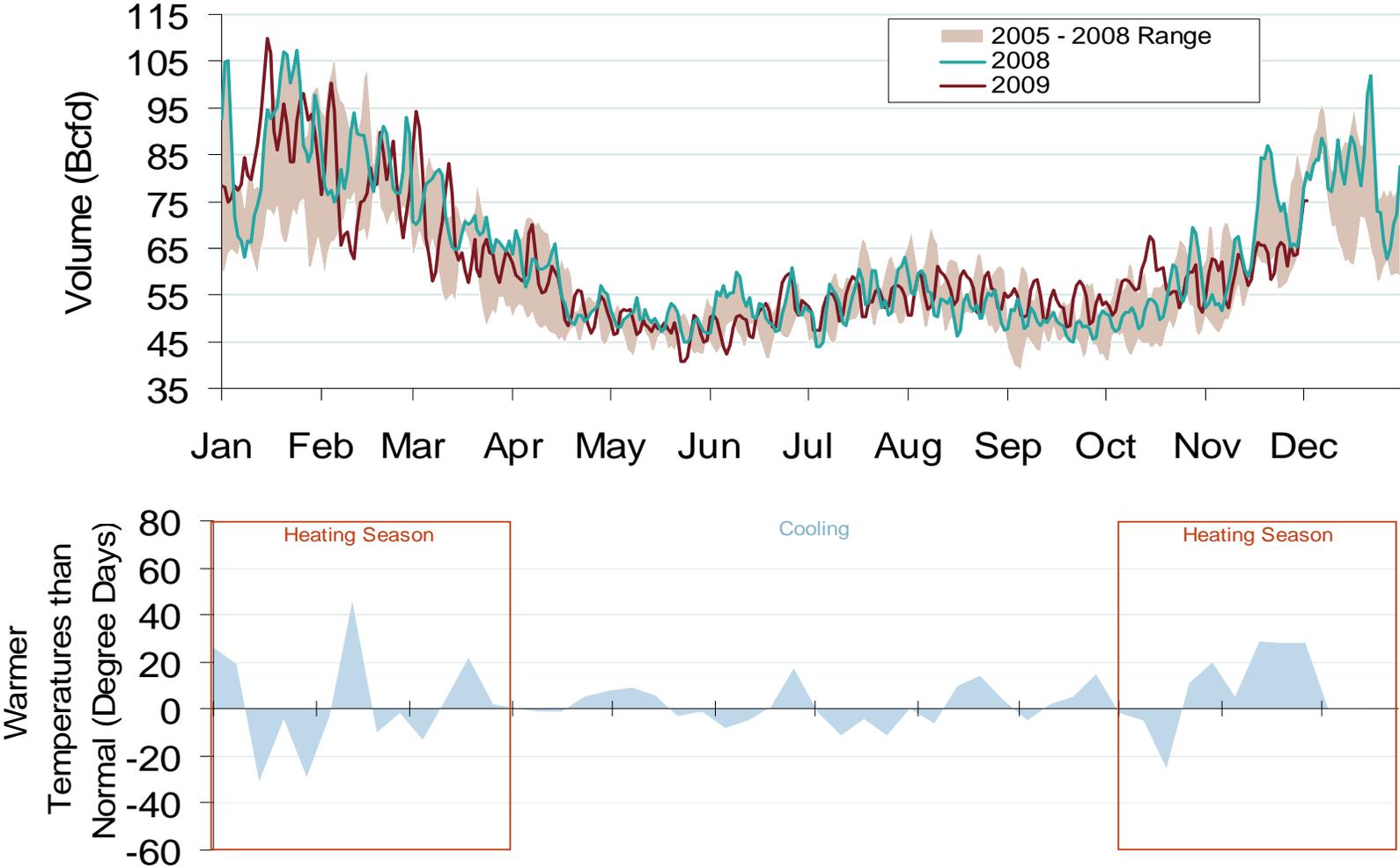
Position Limits on Contracts & Swaps

- ICE position limit of 1,000 NG equivalent contracts per firm is applicable to trading the last three days before the close of the Feb 2010 LD1 contract and those LD1 contracts traded thereafter.
- CME-NYMEX position limits of 1,000 NG (4,000 NN) contracts were set on November 19 and also apply to the Feb 2010 contract (and all thereafter).
- Both ICE and CME-NYMEX may grant exemptions to these limits upon showing by the market participant that the position represents:
 - (1) Bona fide hedging;
 - (2) Risk management;
 - (3) Spread/arbitrage positions;
 - (4) Aggregation of independently controlled positions, or
 - (5) A purely financial position wherein the participant has no physical position in the physical NG contract (NYMEX requires records for a compliance review; position limit is then set to 5,000 NG equivalents)
- CME-NYMEX also set equivalent position limits on Last Day Futures (HH) and Last Day Financial Options (E7)

December Bidweek Results Portend Higher Natural Gas Prices Nationwide

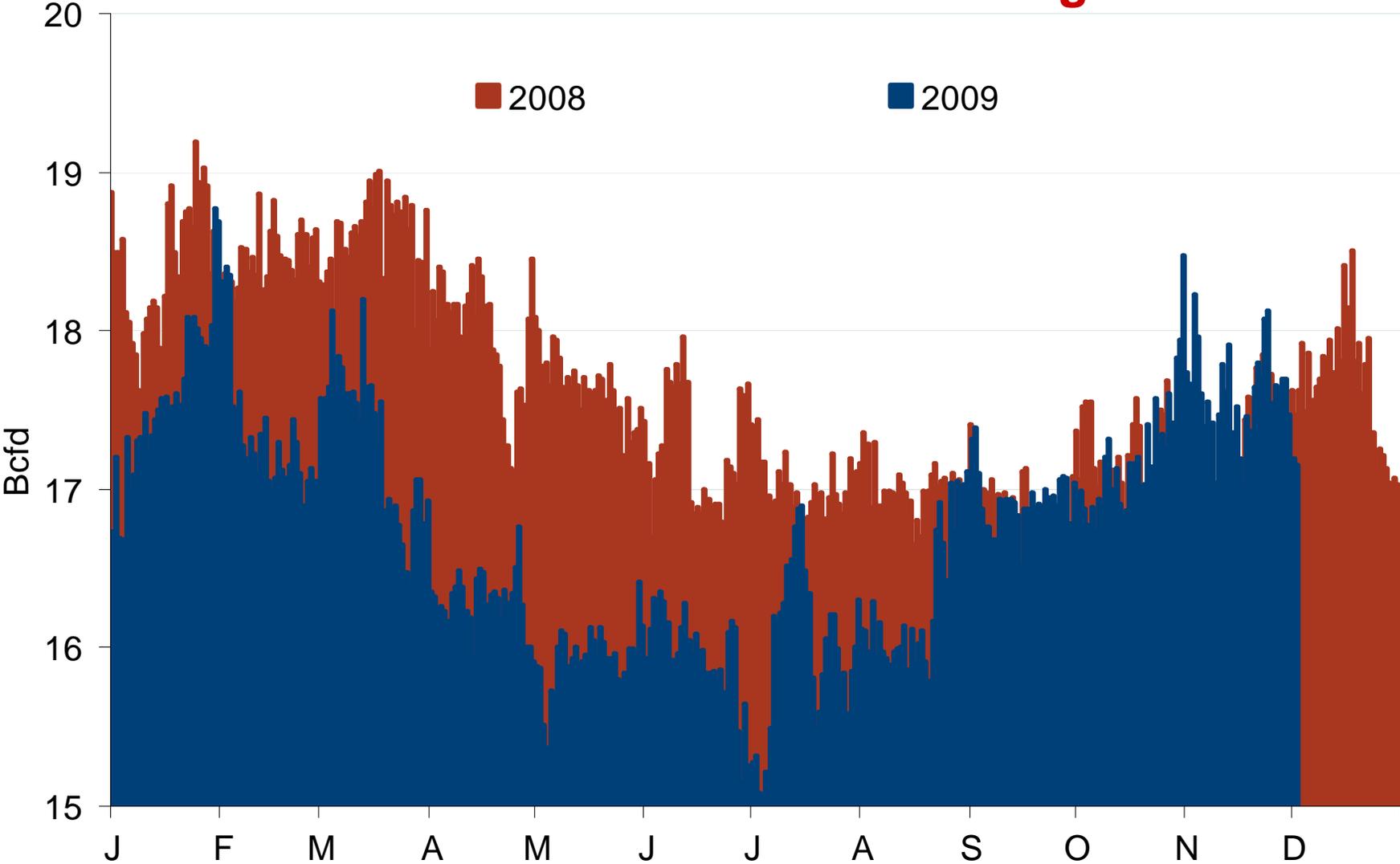
- Bidweek prices at **12 hubs topped \$5/MMBtu**, with the highest prices in the nation in **NYC at \$6.02/MMBtu** and Northwest prices of **\$5.52/MMBtu surpassing the previous months most expensive point, PG&E, by 40 cents.**
- Last month, **only two points exceeded \$5.**
- Only **55 cents** separated prices between **Wyoming and Pennsylvania.**
- In unusual activity, **Houston Ship Channel and Texas Gas Zone SL saw 62% and 79%** of their respective purchases made on the **fourth day of Bidweek.** This was the **3rd largest** amount of gas purchased at Houston Ship Channel and the largest at Texas Gas Zone SL to occur at that point **on the fourth day of bidweek.** This moved their respective prices up by **11 and 18 cents** from day 3 to day 4.

Total U.S. Natural Gas Demand (All Sectors) and Temperatures



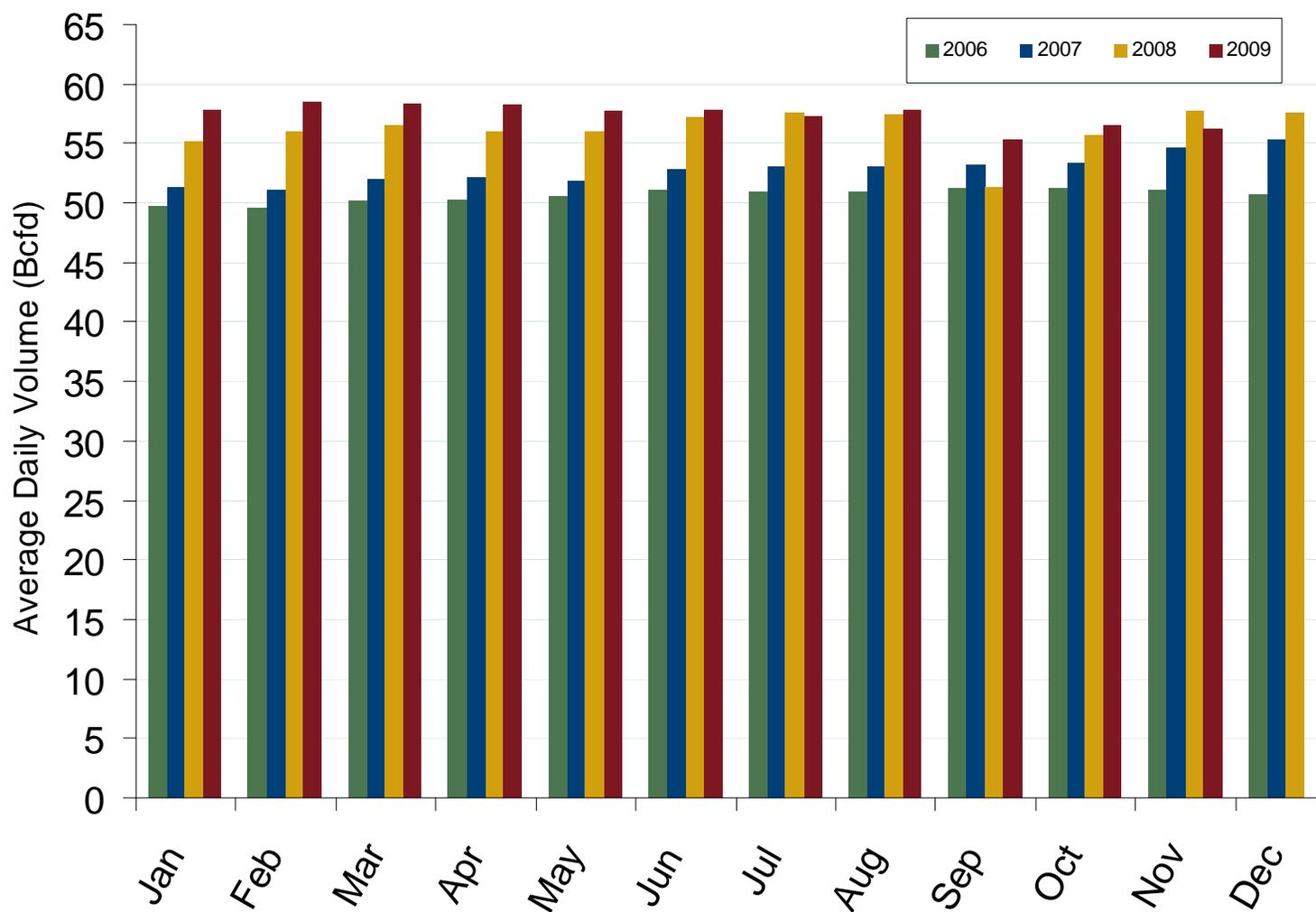
Source: Derived from *Bentek Energy* data.
December 2009 Northeast Snapshot Report

Industrial Gas Use Gains Strength

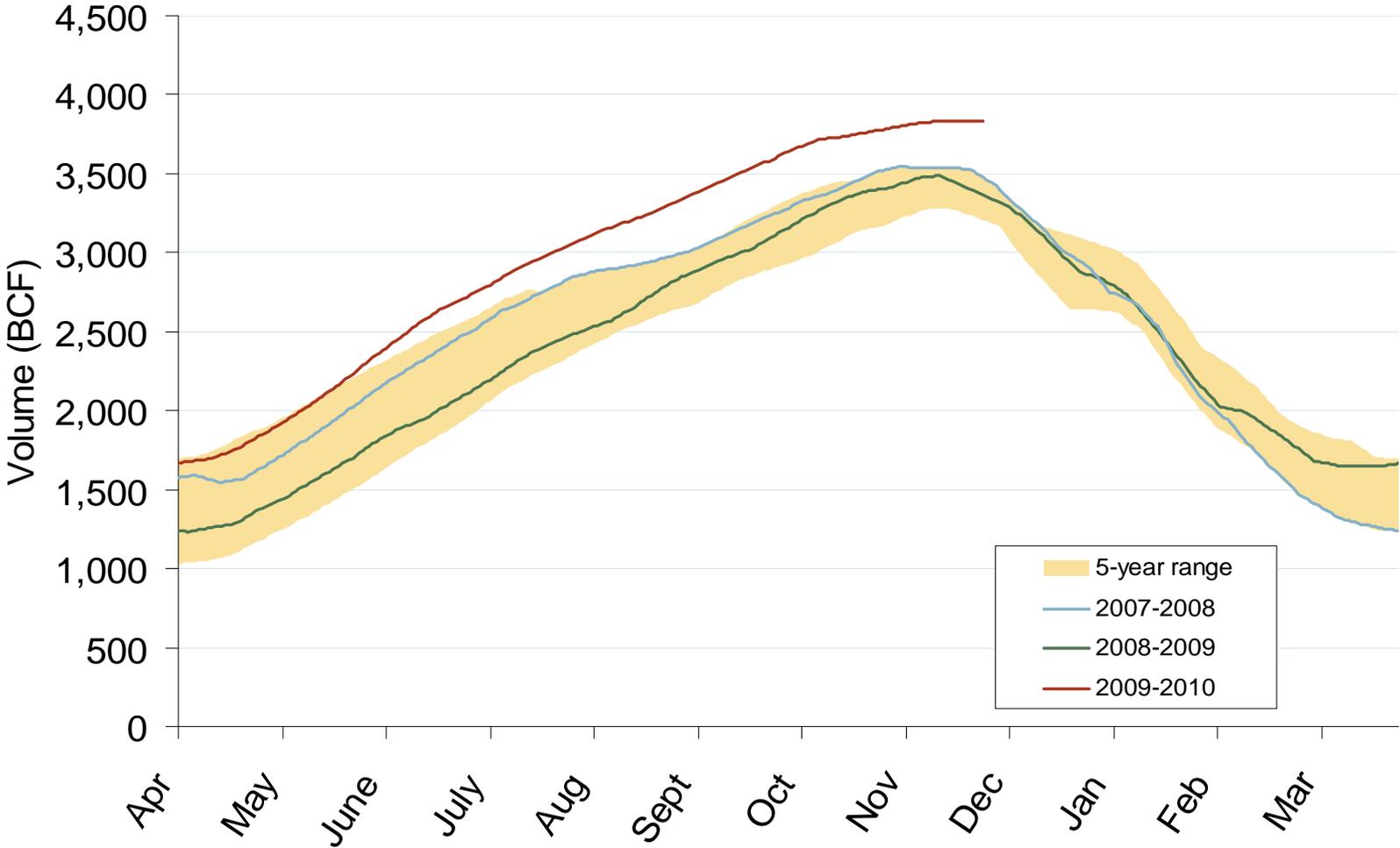


Source: Derived from Bentek data.

U.S. Dry Gas Production



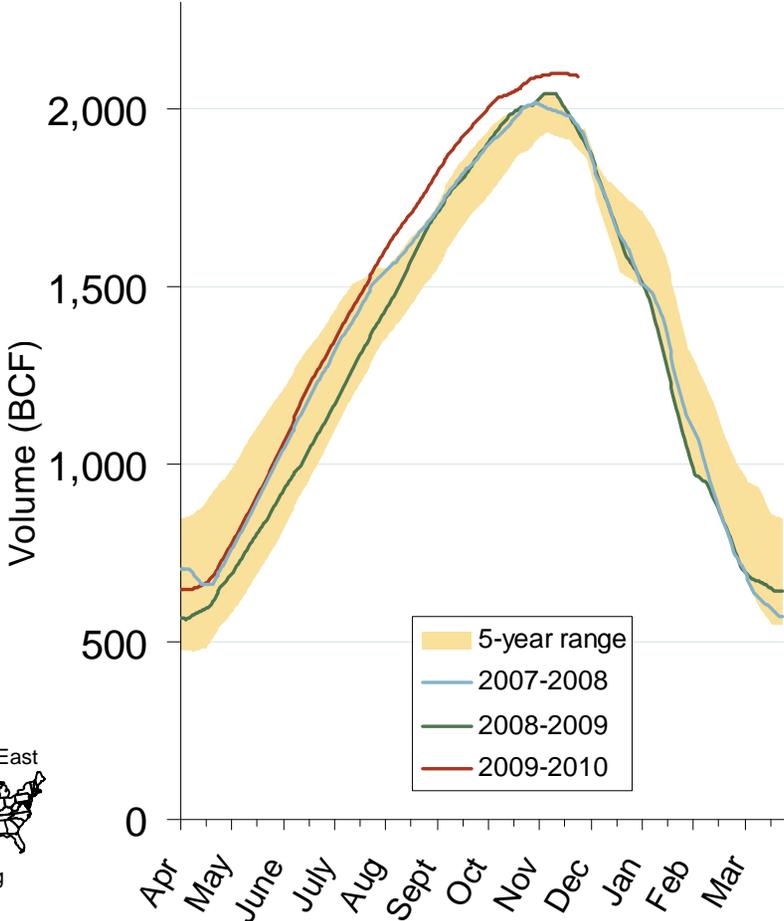
Total U.S. Working Gas in Storage



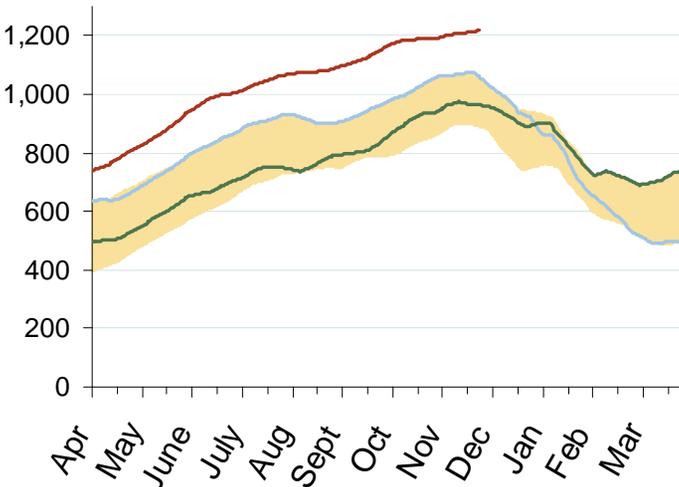
Source: Derived from EIA data.
December 2009 Northeast Snapshot Report

Regional Totals of Working Gas in Storage

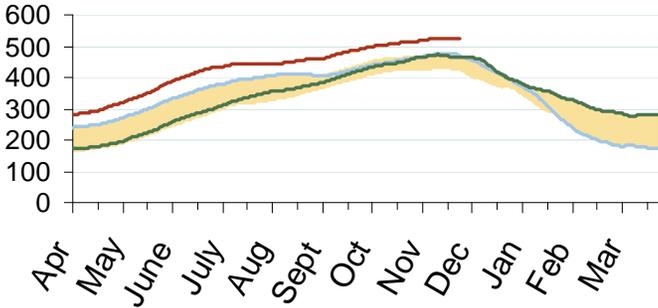
Eastern Consuming Region



Producing Region

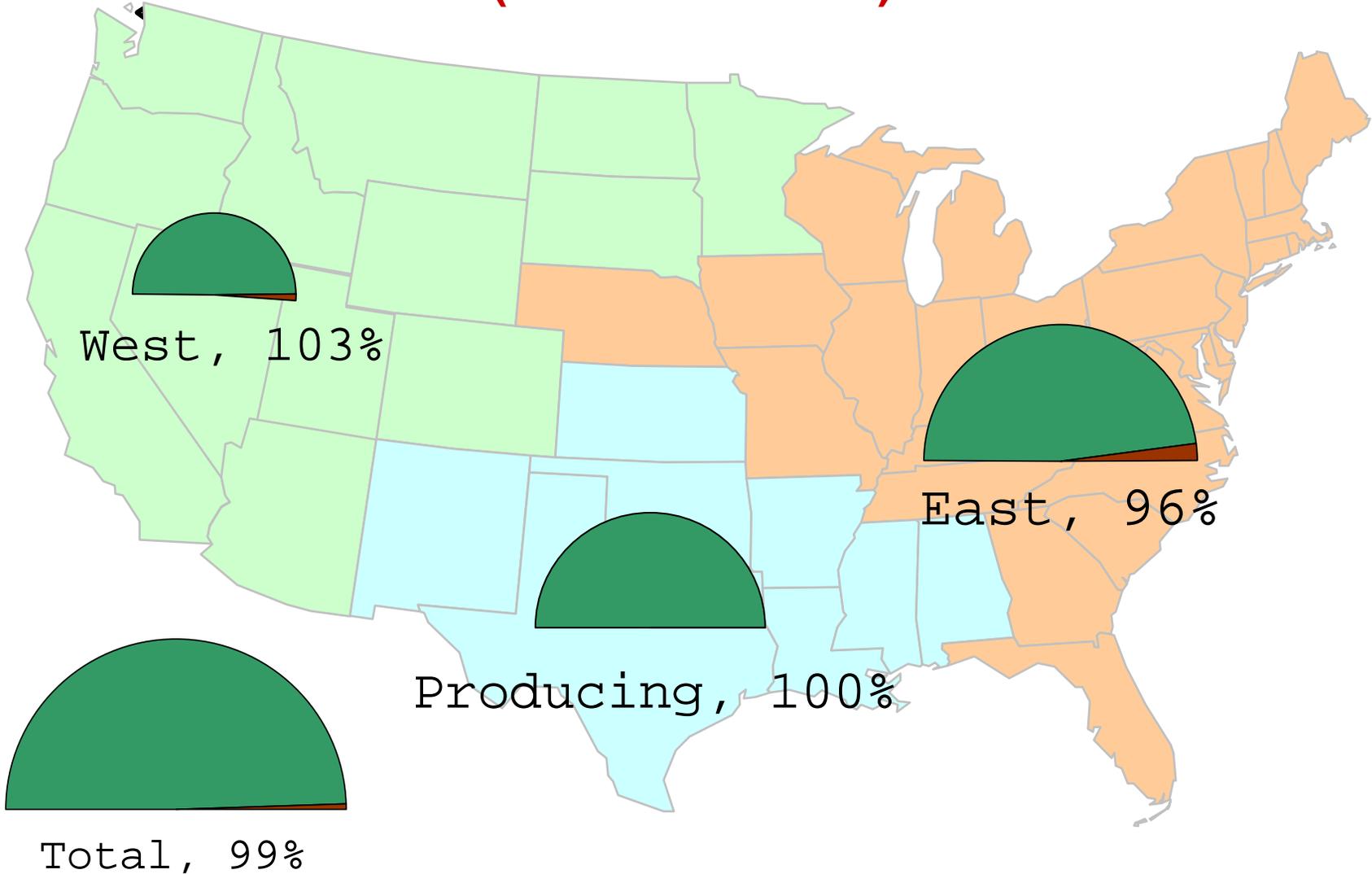


Western Consuming Region



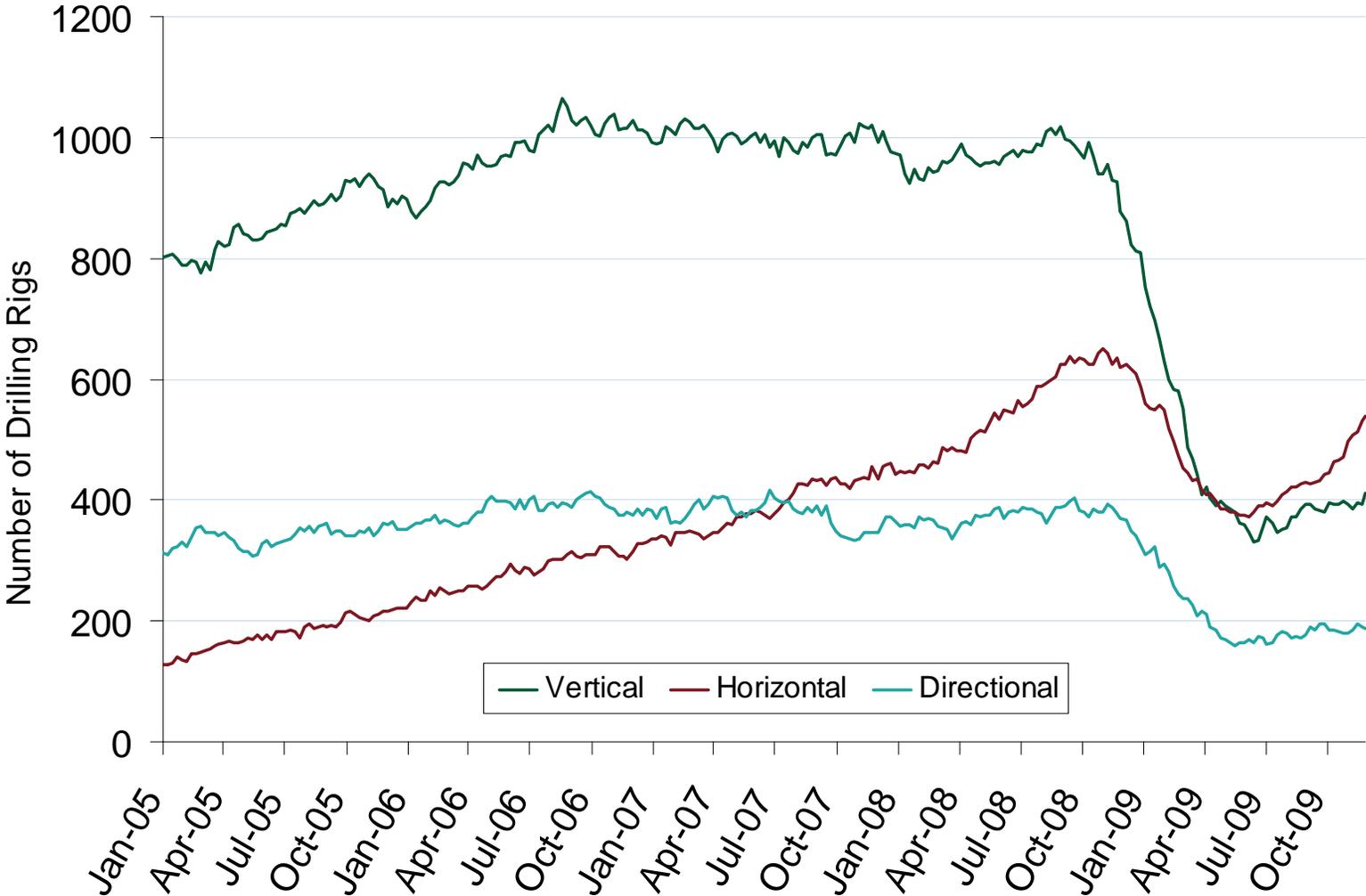
Source: Derived from EIA data.

Unprecedented Natural Gas Storage Inventories (As of 11/27/2009)



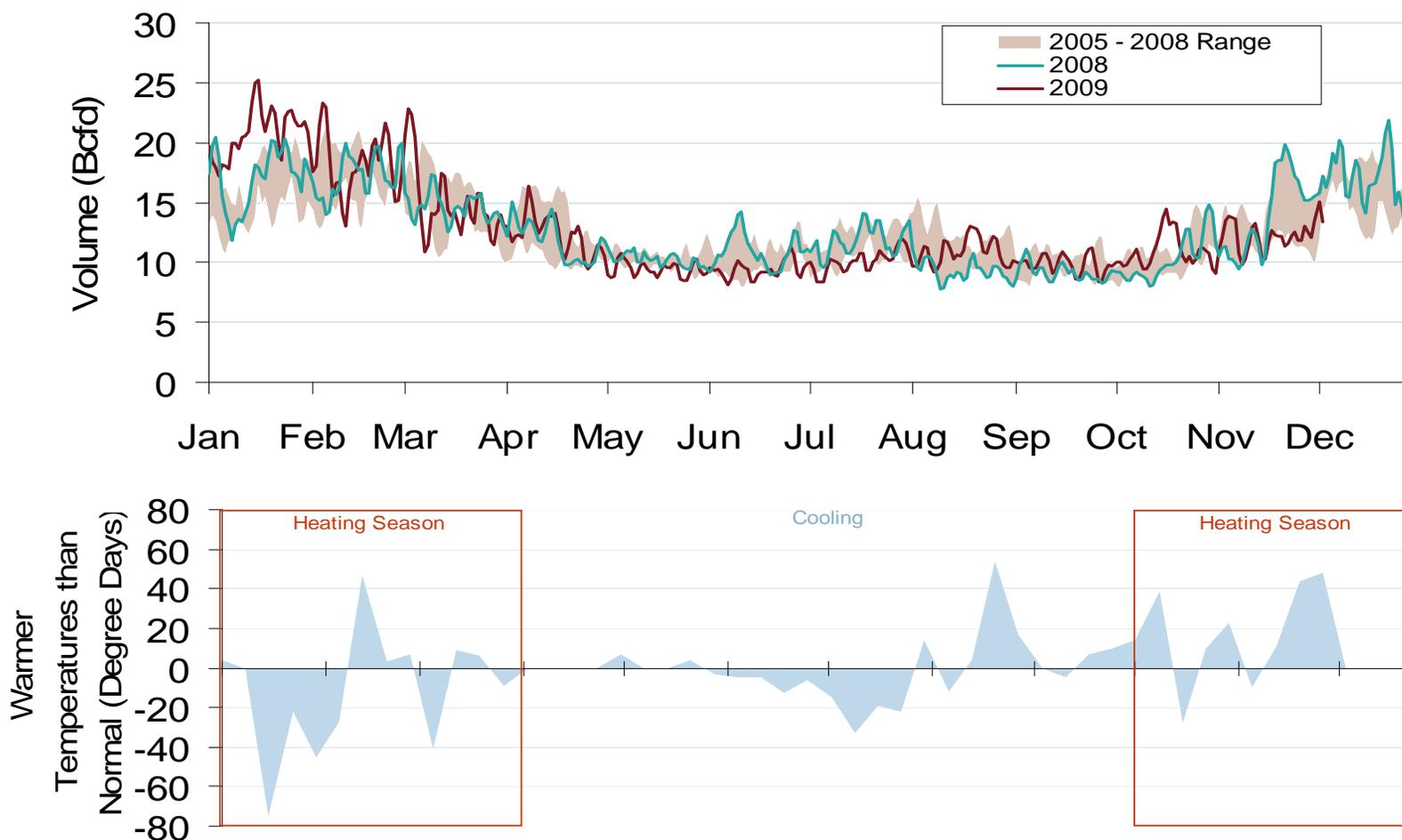
Source: Derived from EIA data.
December 2009 Northeast Snapshot Report

U.S. Oil and Natural Gas Drilling Rig Count by Type

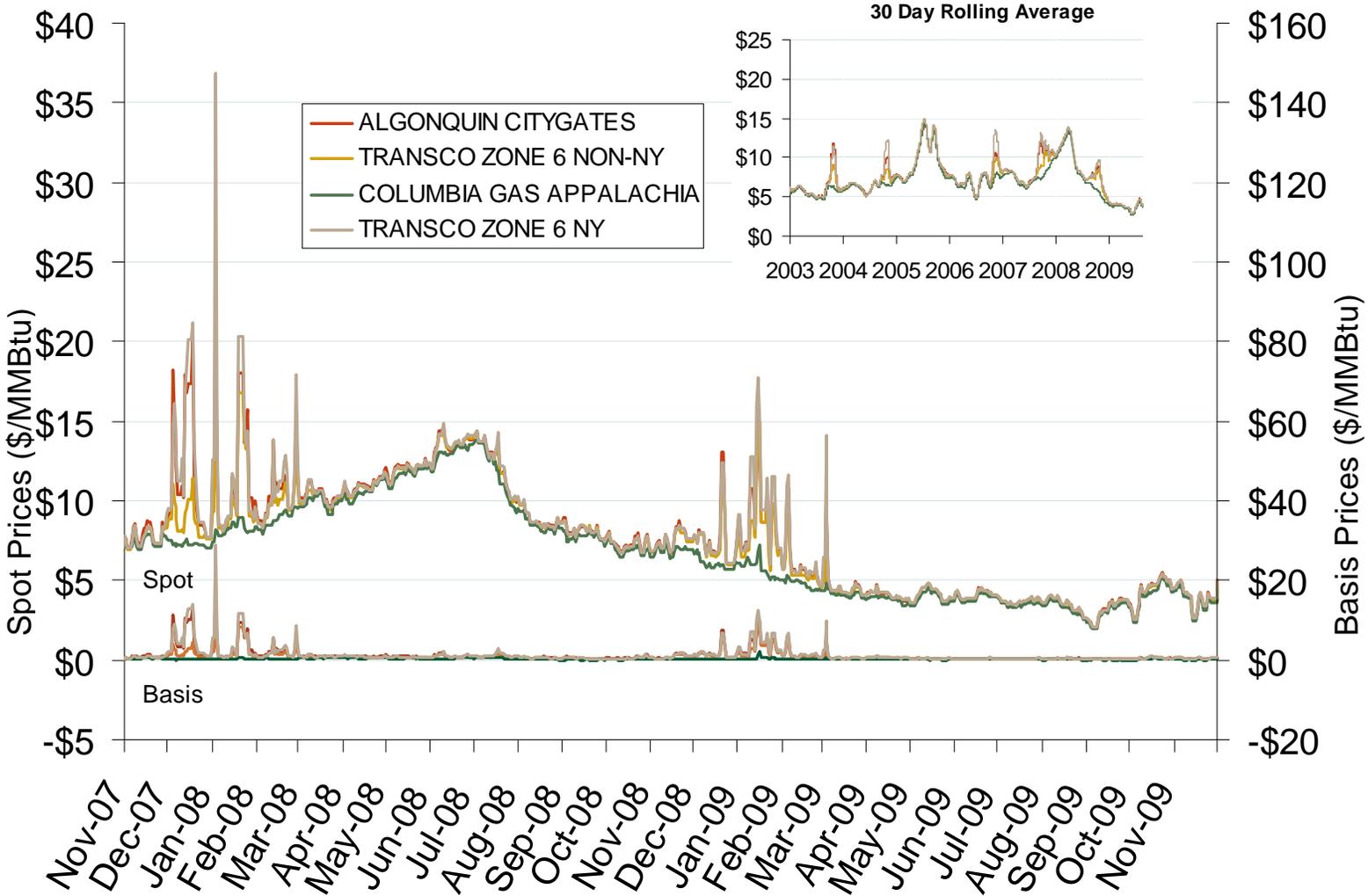


Source: Derived from *Platts* and *Baker Hughes* data.
December 2009 Northeast Snapshot Report

Daily Northeast Natural Gas Demand All Sectors

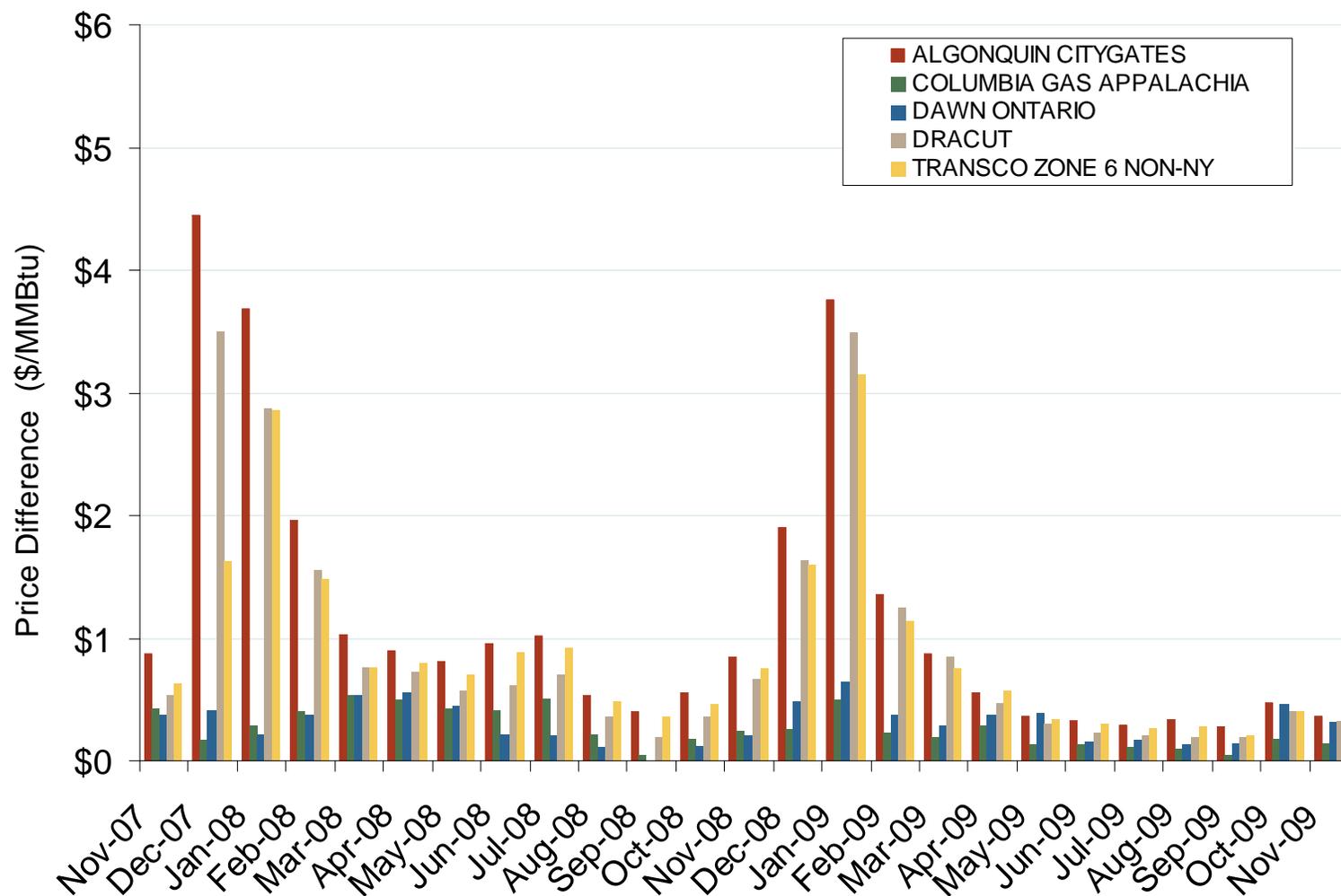


Northeastern Spot Prices and Basis



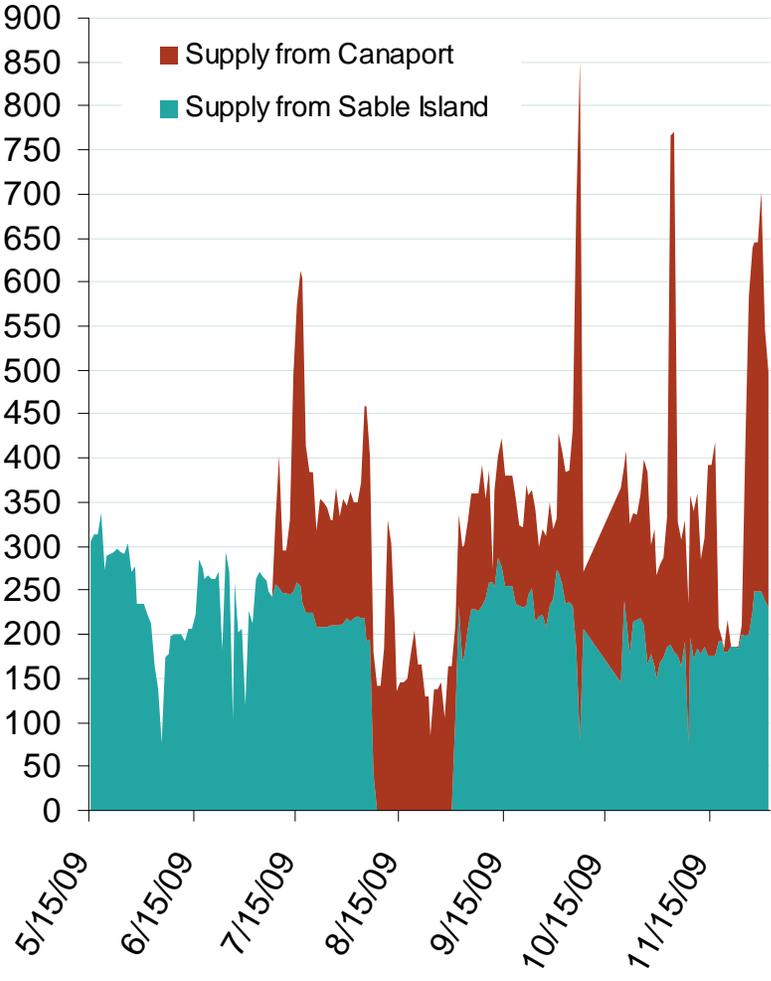
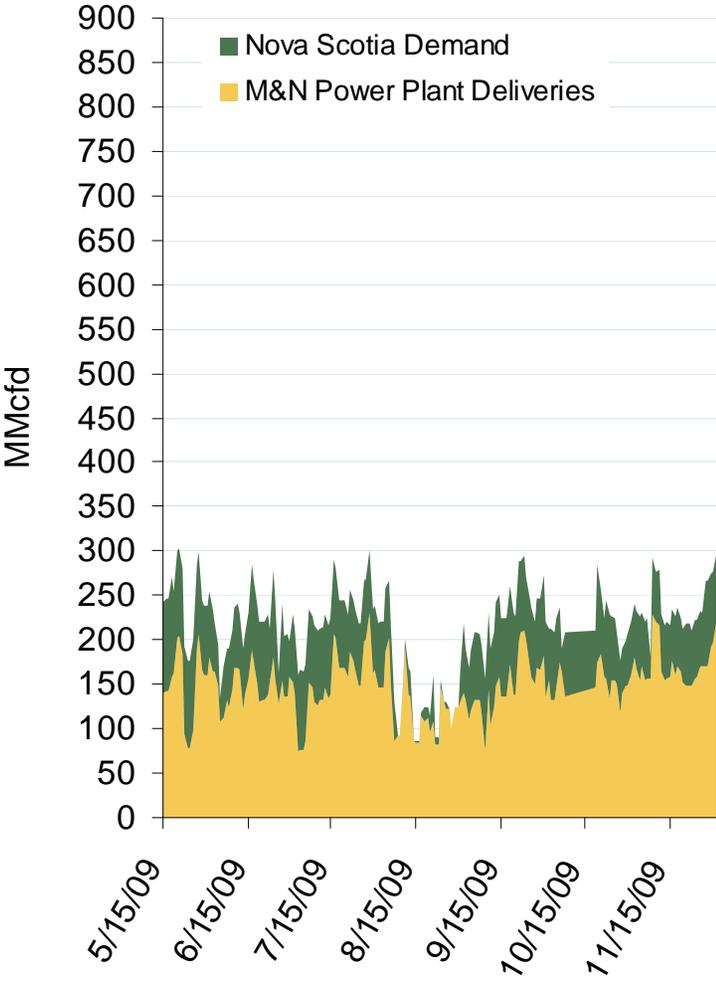
Source: Derived from *Platts* data.
December 2009 Northeast Snapshot Report

Northeastern Monthly Average Basis Value to Henry Hub



Source: Derived from *Platts* data.
December 2009 Northeast Snapshot Report

Maritimes Pipeline Flows

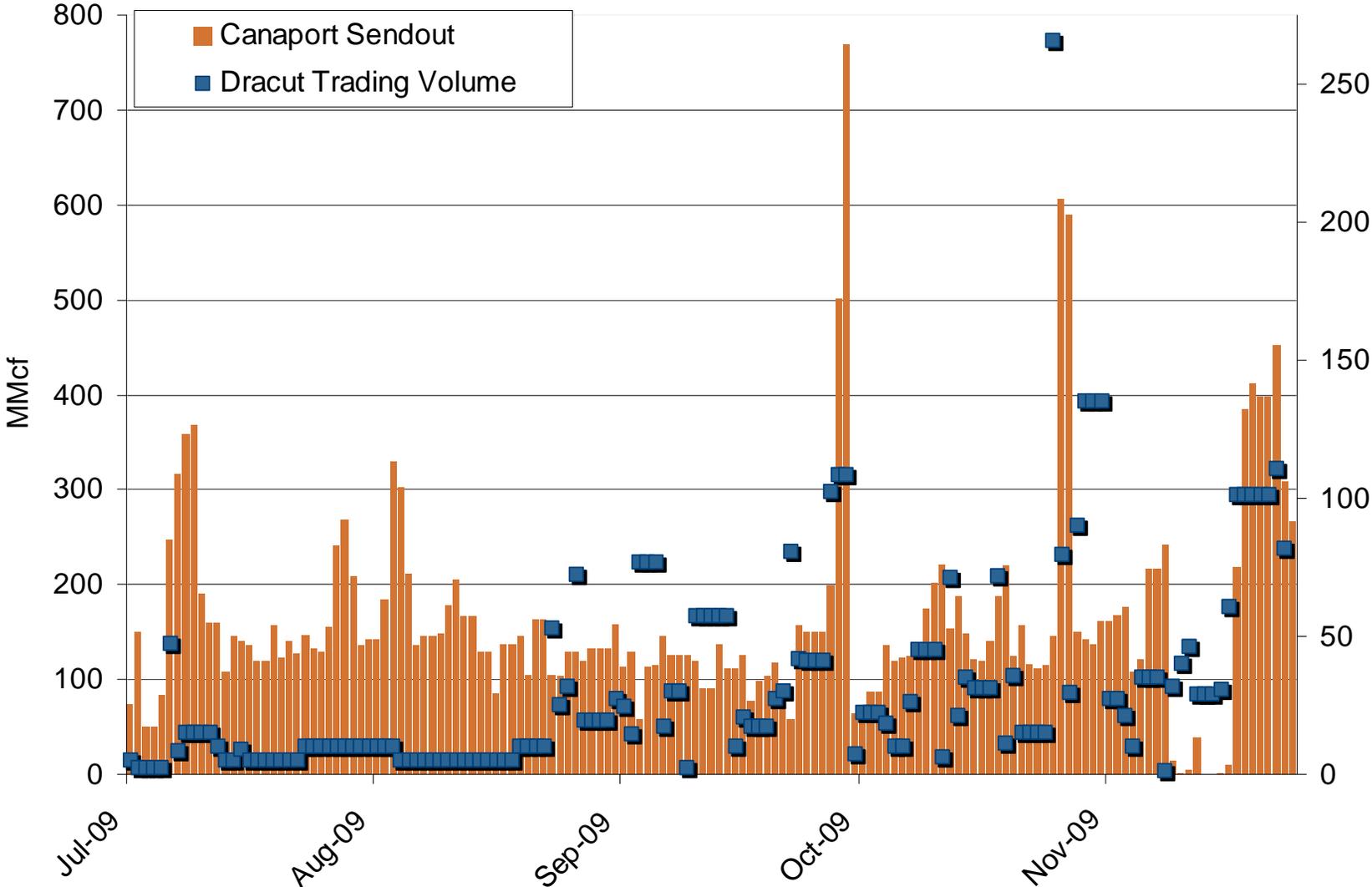


Source: Derived from *Bentek* data.
December 2009 Northeast Snapshot Report

Maritimes & Northeast Gas Quality Settlement (Docket No. RP08-374-000)

- Power Generators expressed concern in December when Canaport Developers urged M&N not to impose gas quality standards that could have shut off LNG supplies.
- Generators worried that regasified LNG and gas from nearby onshore shale reservoirs would damage their Low-Emissions gas turbines.
- Calpine was a major hold-out during negotiations and asked a US appeals court to review FERC's rulings over the course of the tariff proceeding.
- Calpine was concerned that a higher Wobbe limit proposed by the pipeline (1400) would raise nitrogen oxide emissions at Calpine's gas-fired power plant near Westbrook, Maine (537 MW plant) which sources gas from M&N and powers 500,000 homes in New England.
- To accommodate Calpine, the settlement caps the Wobbe Index at 1395 for two years or until 30 Bcf of regasified LNG comes onto the pipeline system.
- To accommodate M&N agreed to ensure that day-ahead noms for gas going to Westbrook will not exceed the Wobbe cap, unless regasified LNG constitutes all or almost all of the gas nominated to flow the next day.
- M&N also agreed to provide certain hourly data on a website and install data trackers near Westbrook so Calpine can better manage fuel variability.
- There will be a two year phase in period (moratorium) in the settlement which bars generators from returning to FERC to adjust the standards.

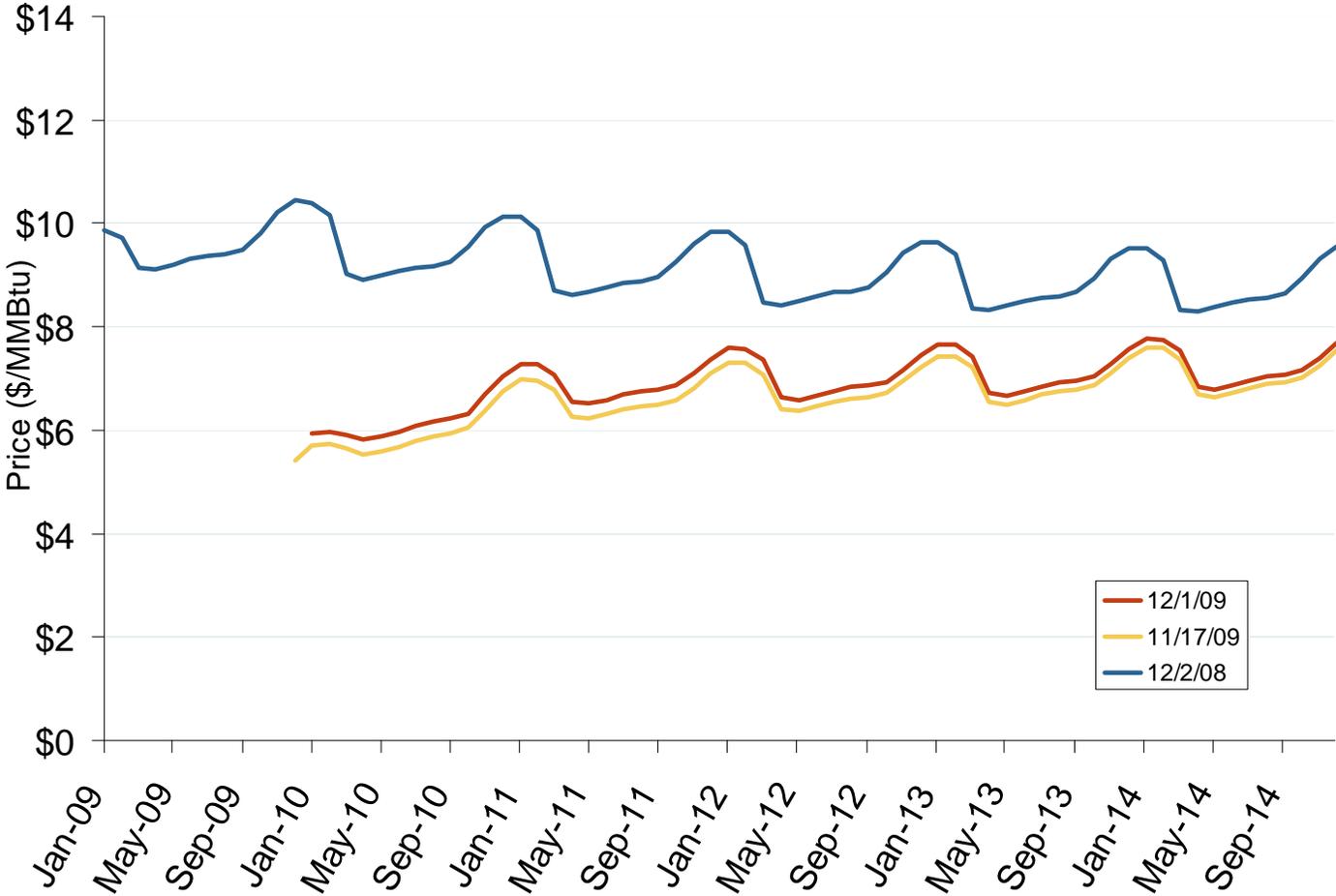
Canaport Sendout with Increased Trading at Dracut



Source: Derived from *Bentek* & *ICE* data.
December 2009 Northeast Snapshot Report

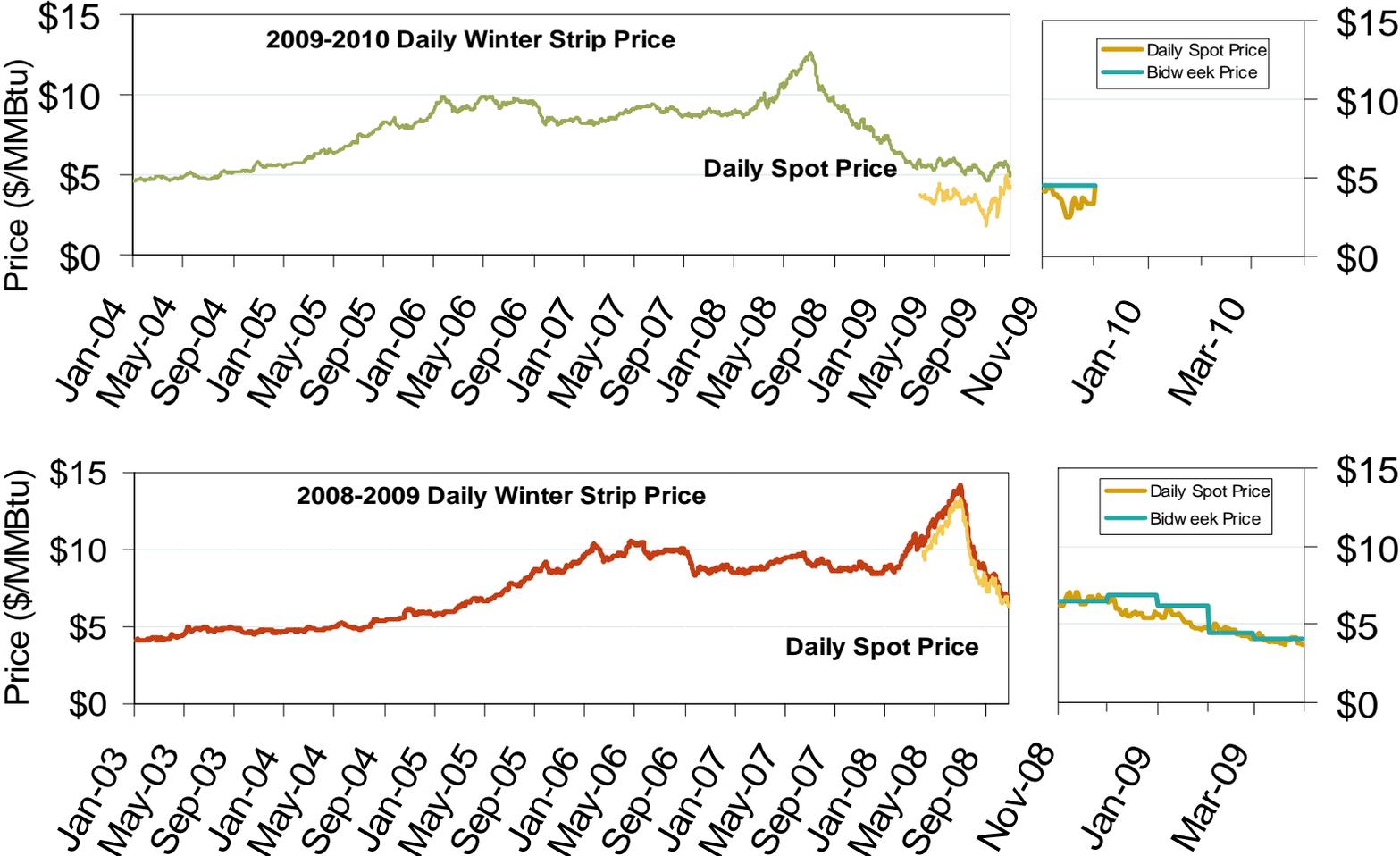
Updated December 2, 2009

NYMEX Natural Gas Forward Price Curve



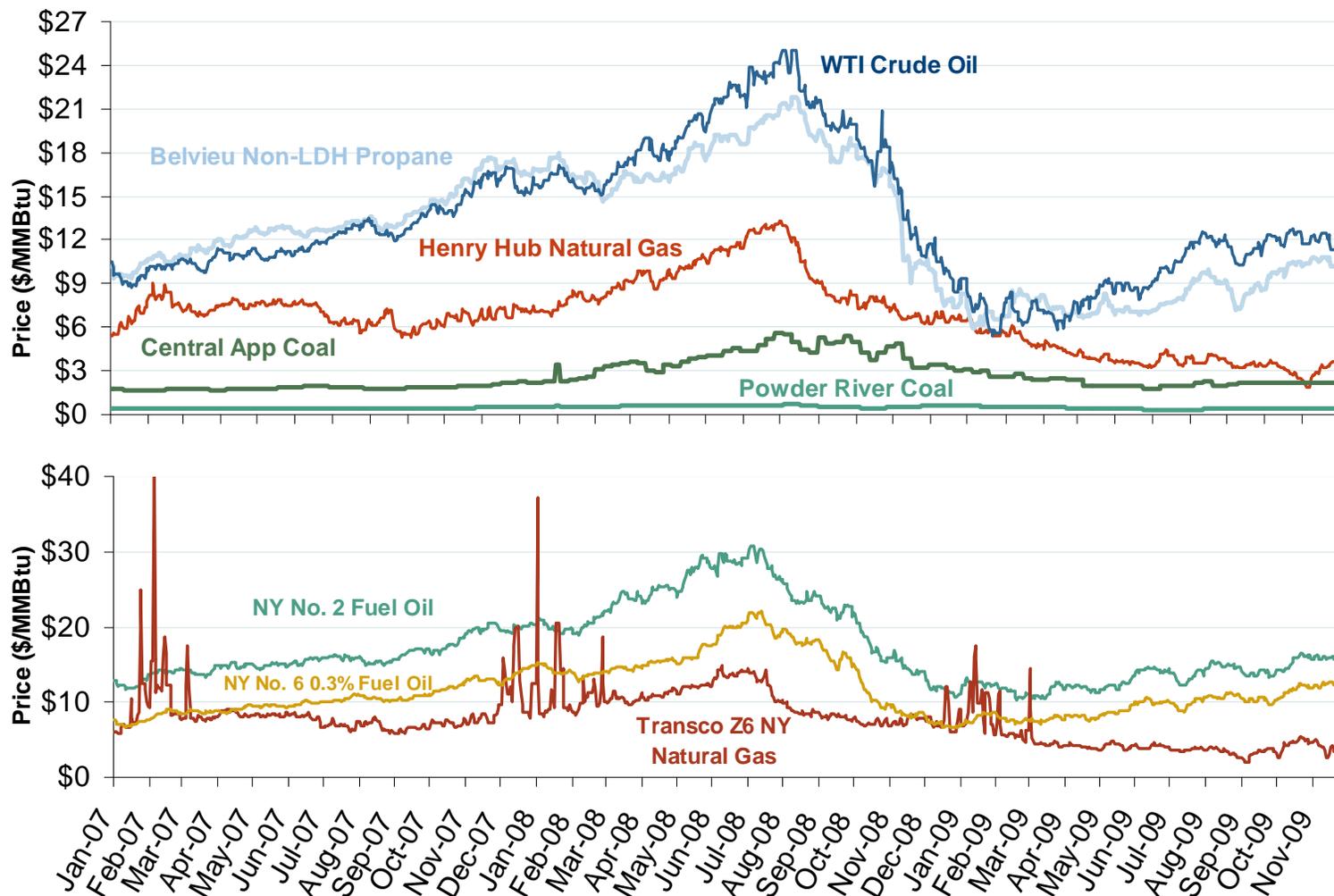
The NYMEX futures contract trades in 10,000 million Btu units. The blue series shows the forward price curve for these contracts 1-year ago. The red and yellow curves show prices for contracts traded on the current and previous months.

Natural Gas Winter Futures Strip and Daily Henry Hub Spot and Bidweek Prices



Source: Derived from *Platts* and *Nymex* data.

Oil, Coal, Natural Gas and Propane Daily Spot Prices

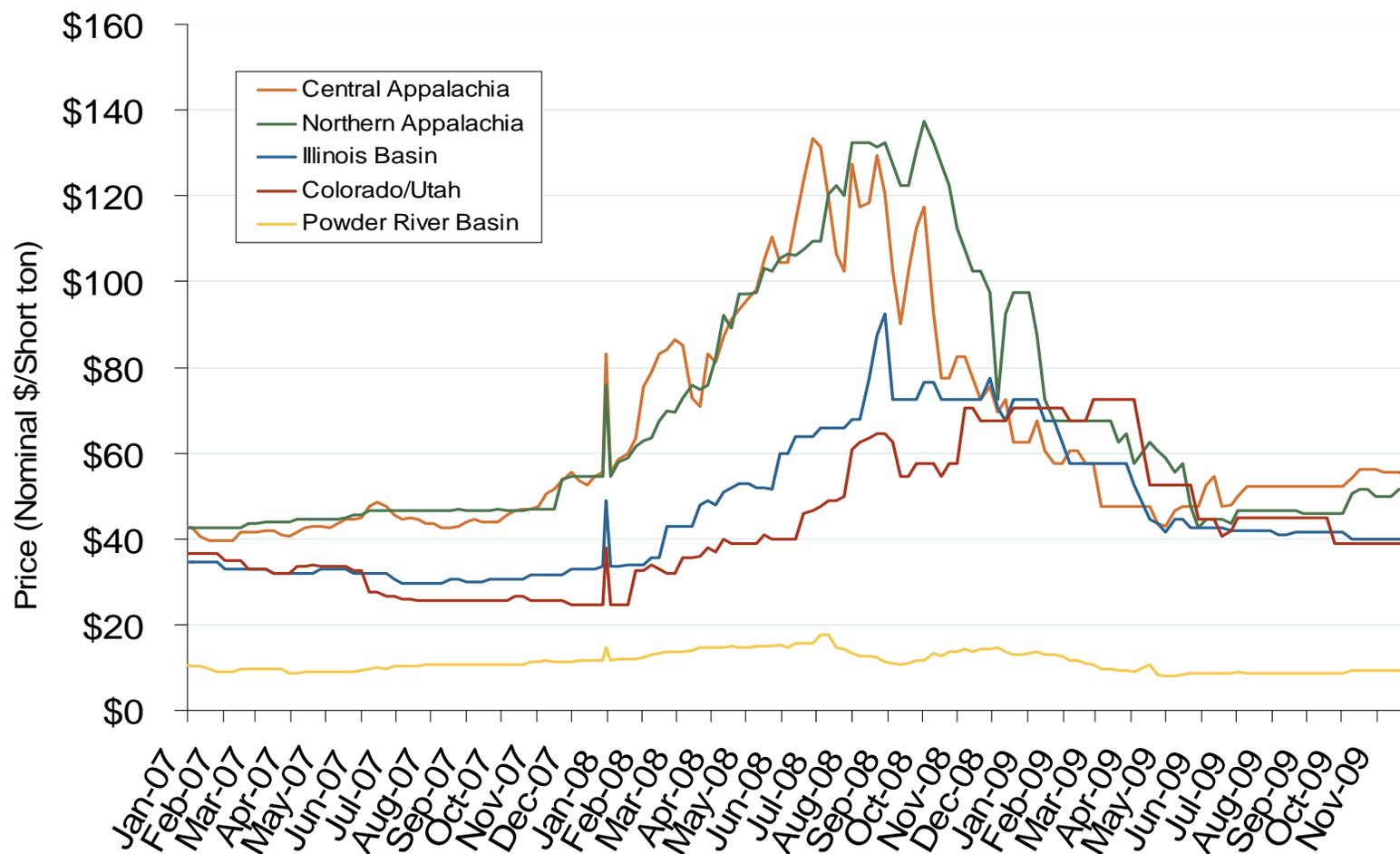


Source: Derived from *ICE* and *Bloomberg* data.

Note: Coal prices are quoted in \$/ton. Conversion factors to \$/MMBtu are based on contract specifications of 12,000 btus/pound for Central Appalachian coal and 8800 btus/pound for Powder River Basin coal.

Updated December 8, 2009

Regional Coal Spot Prices



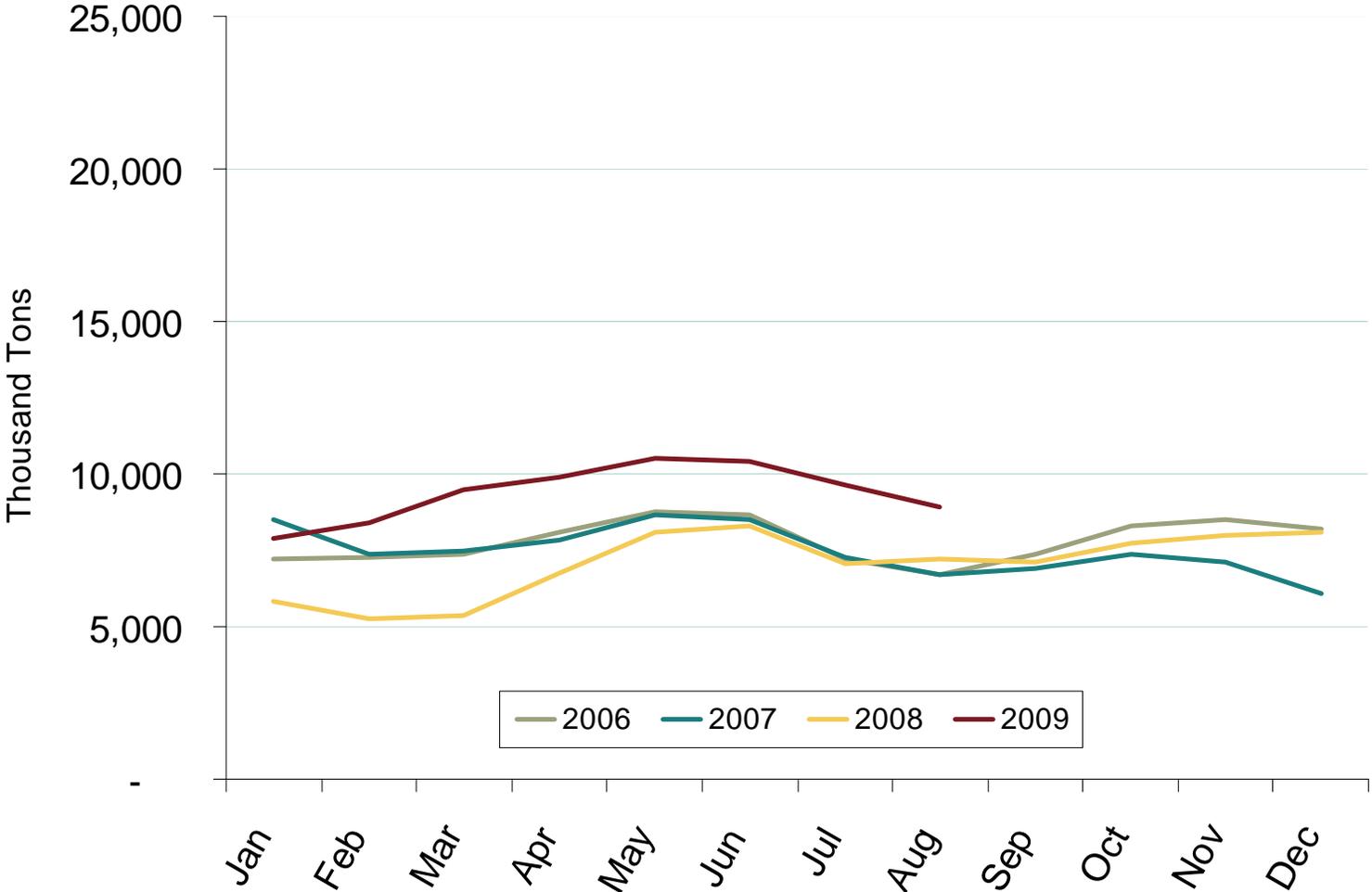
Note: the Central Appalachian (CAPP) coal is priced at Big Sandy. All others are mine mouth prices. Prices do not include transportation costs to a plant, as those can vary widely by contract specifications. Prices exclude incremental cost of emissions allowances.

Source: Derived from *Bloomberg* data.
December 2009 Northeast Snapshot Report

Updated December 8, 2009

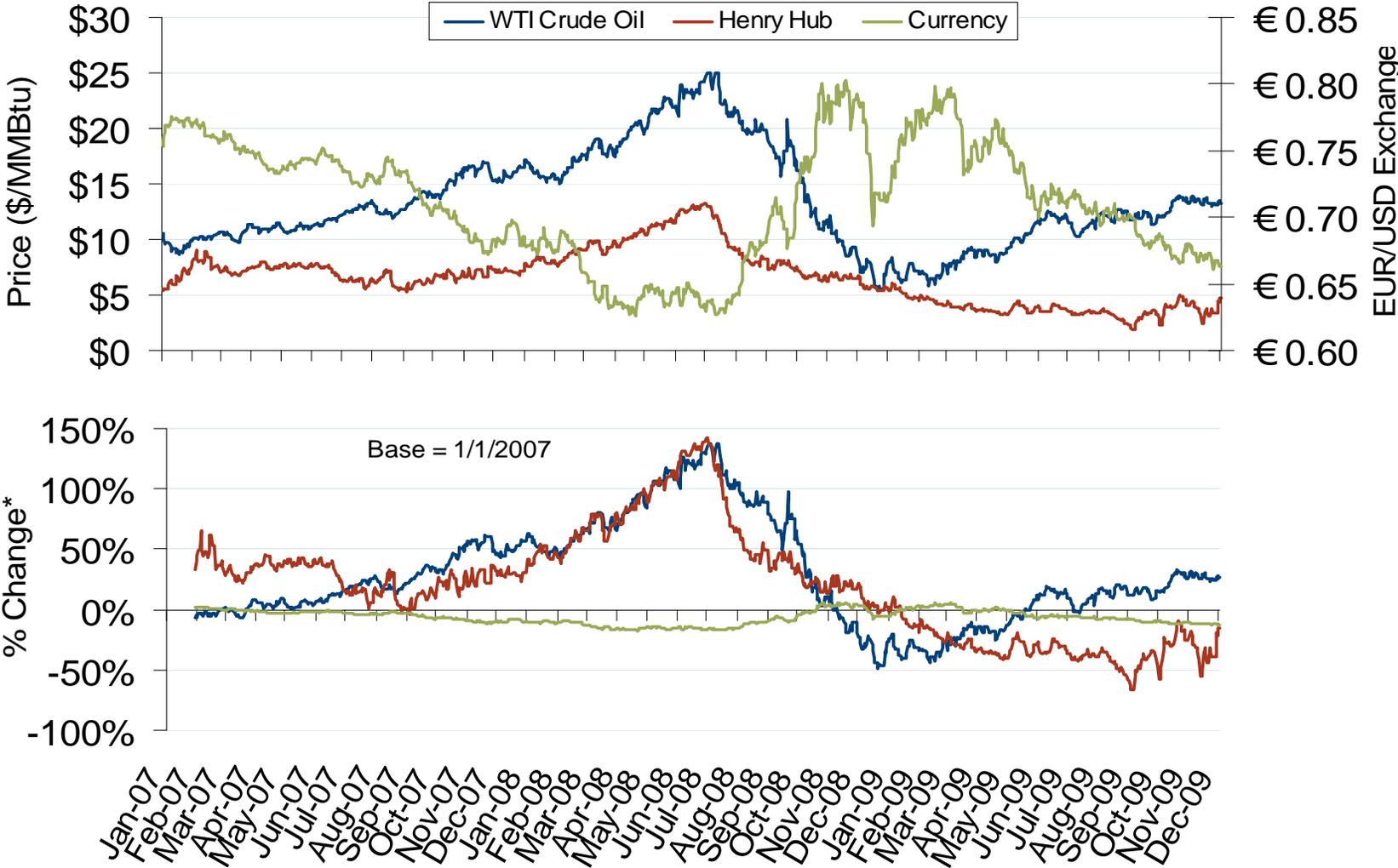
3002

Northeast Coal Stockpiles at Electric Power Generating Facilities



Source: Energy Information Administration. Excludes Industrial and Commercial Plants.
December 2009 Northeast Snapshot Report

Oil, Natural Gas and Currency Spot Prices

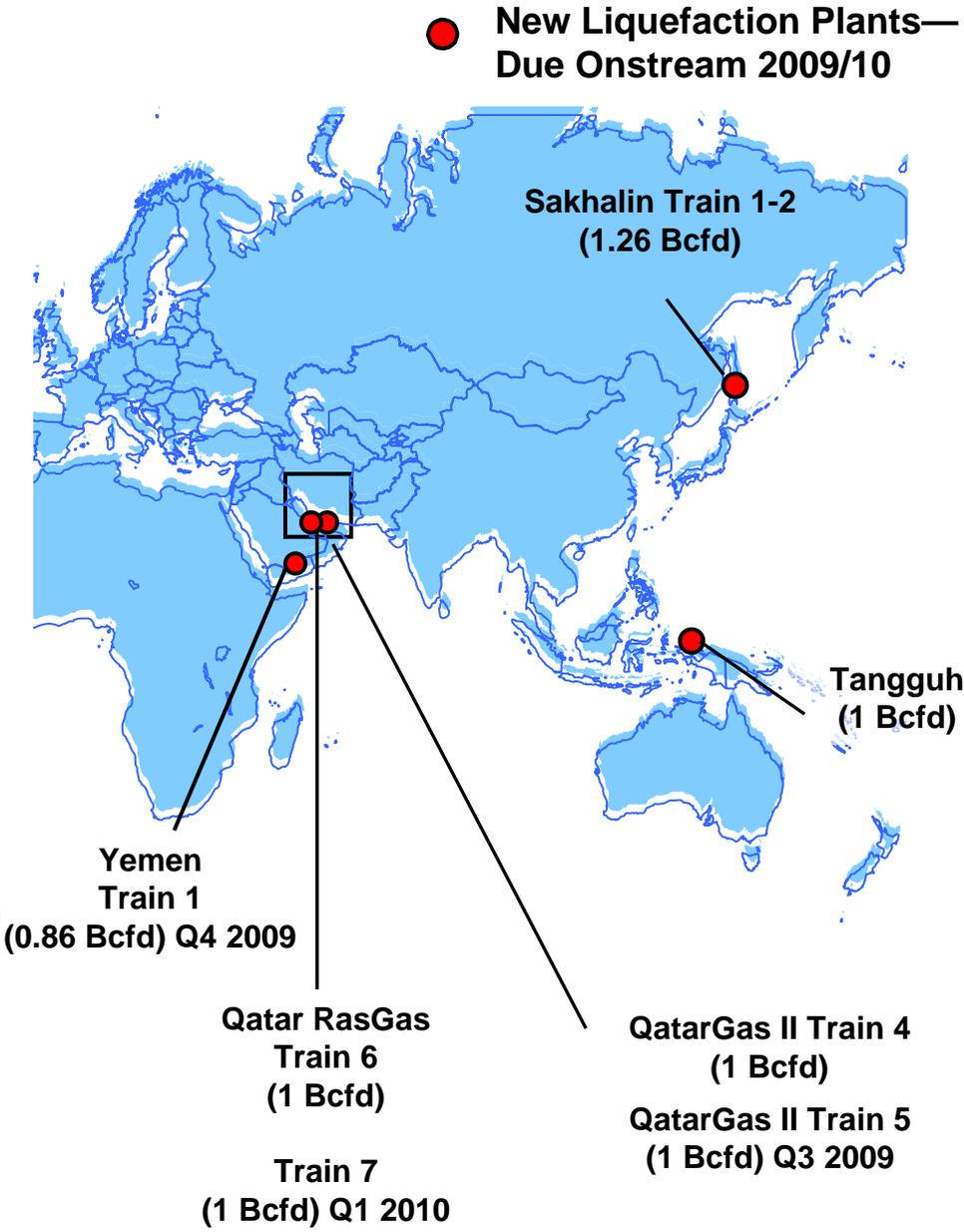
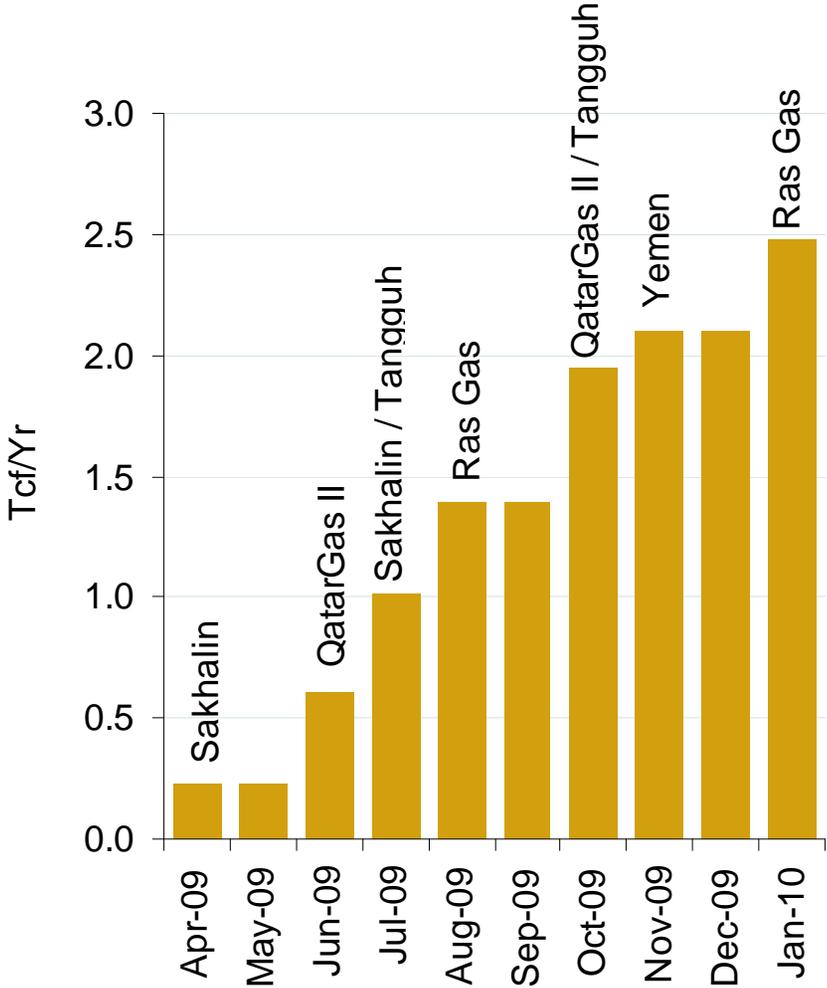


Source: Derived from *Bloomberg* data.

Natural Gas Market : Global LNG Supply Additions

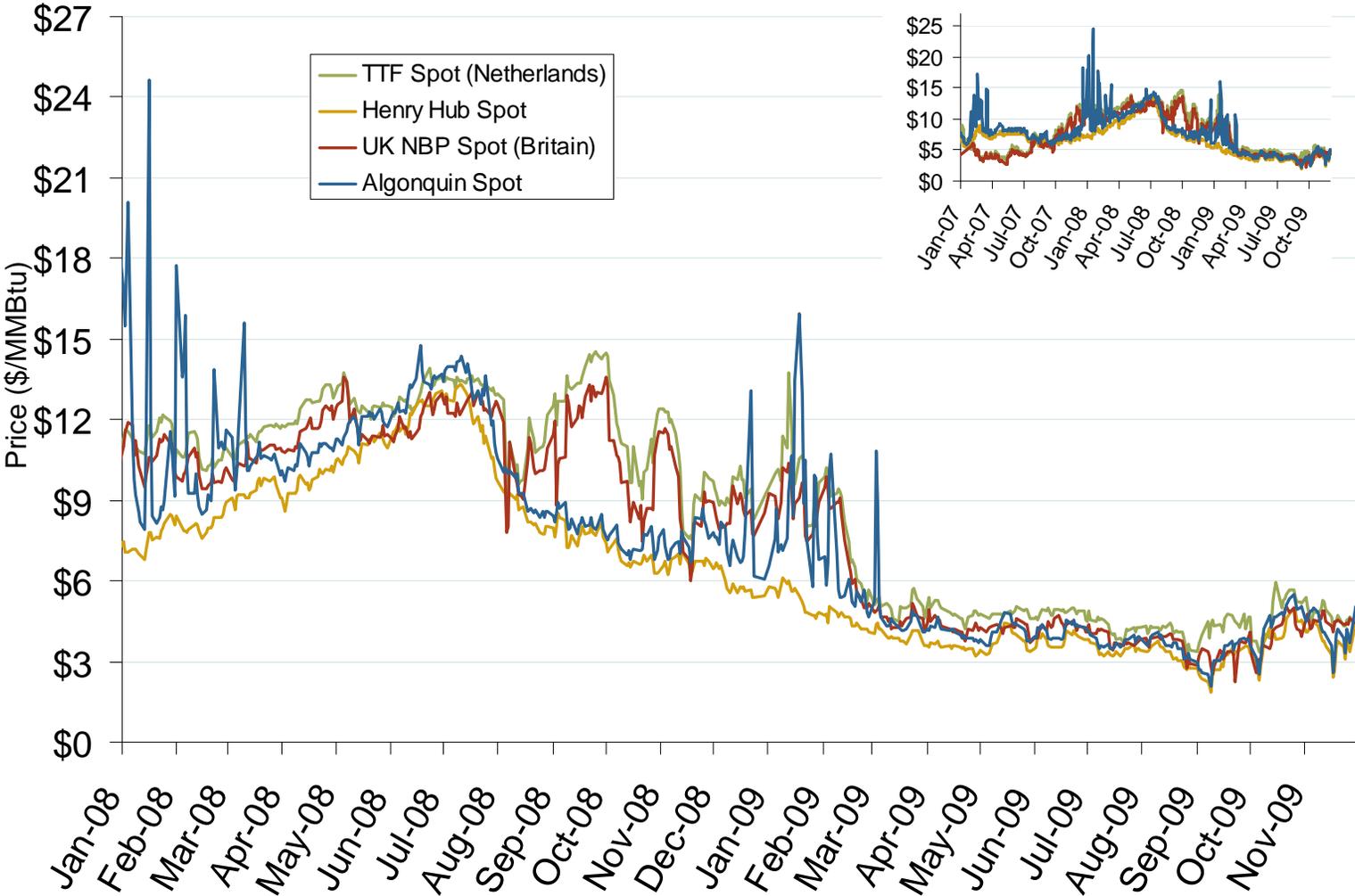
Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

2009 Cumulative Liquefaction Additions



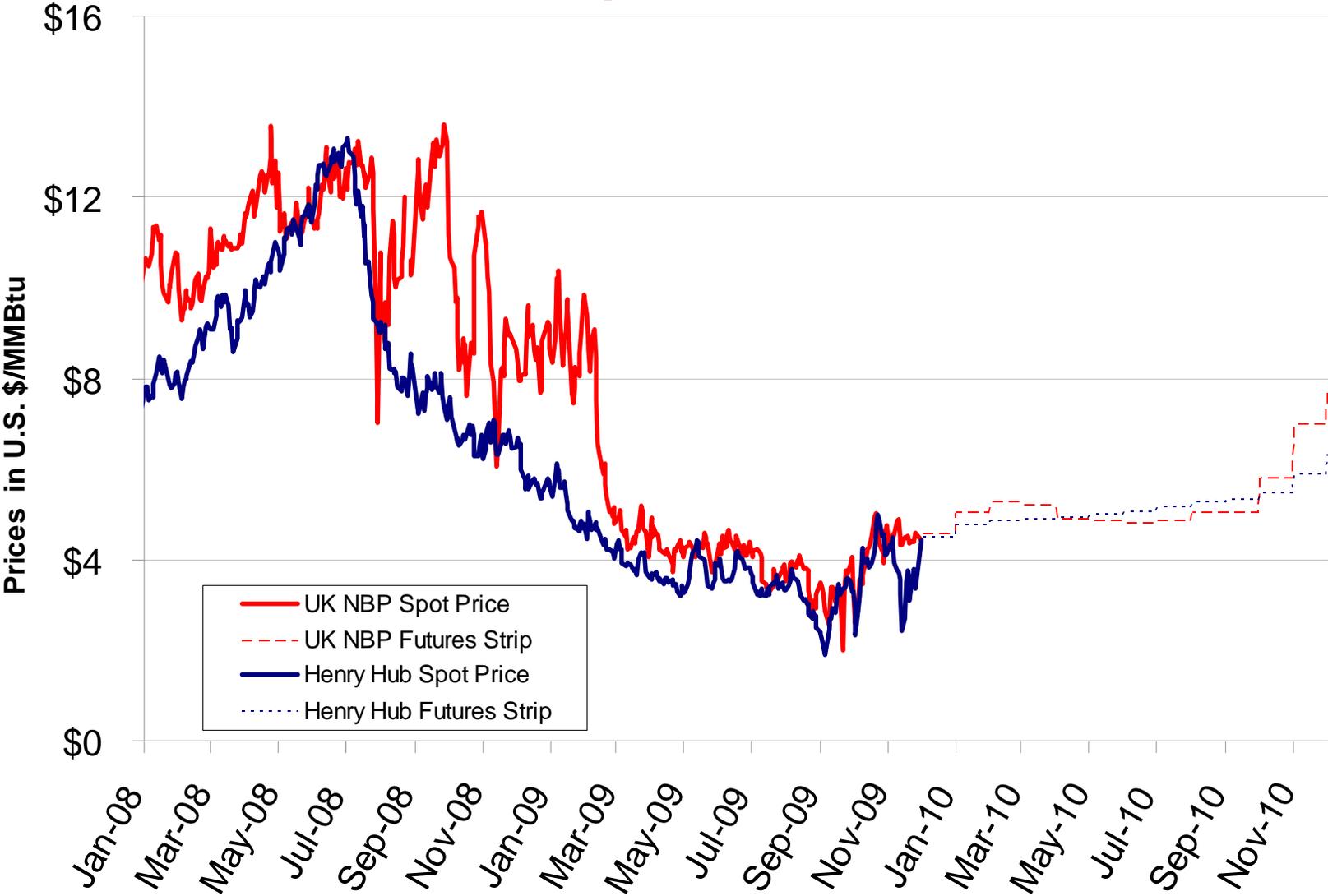
Source: Waterborne LNG
December 2009 Northeast Snapshot Report

Atlantic Basin European and US Spot Natural Gas Prices



Source: Derived from *Bloomberg* and *ICE* data.
December 2009 Northeast Snapshot Report

US and UK Gas Spot and Futures Prices

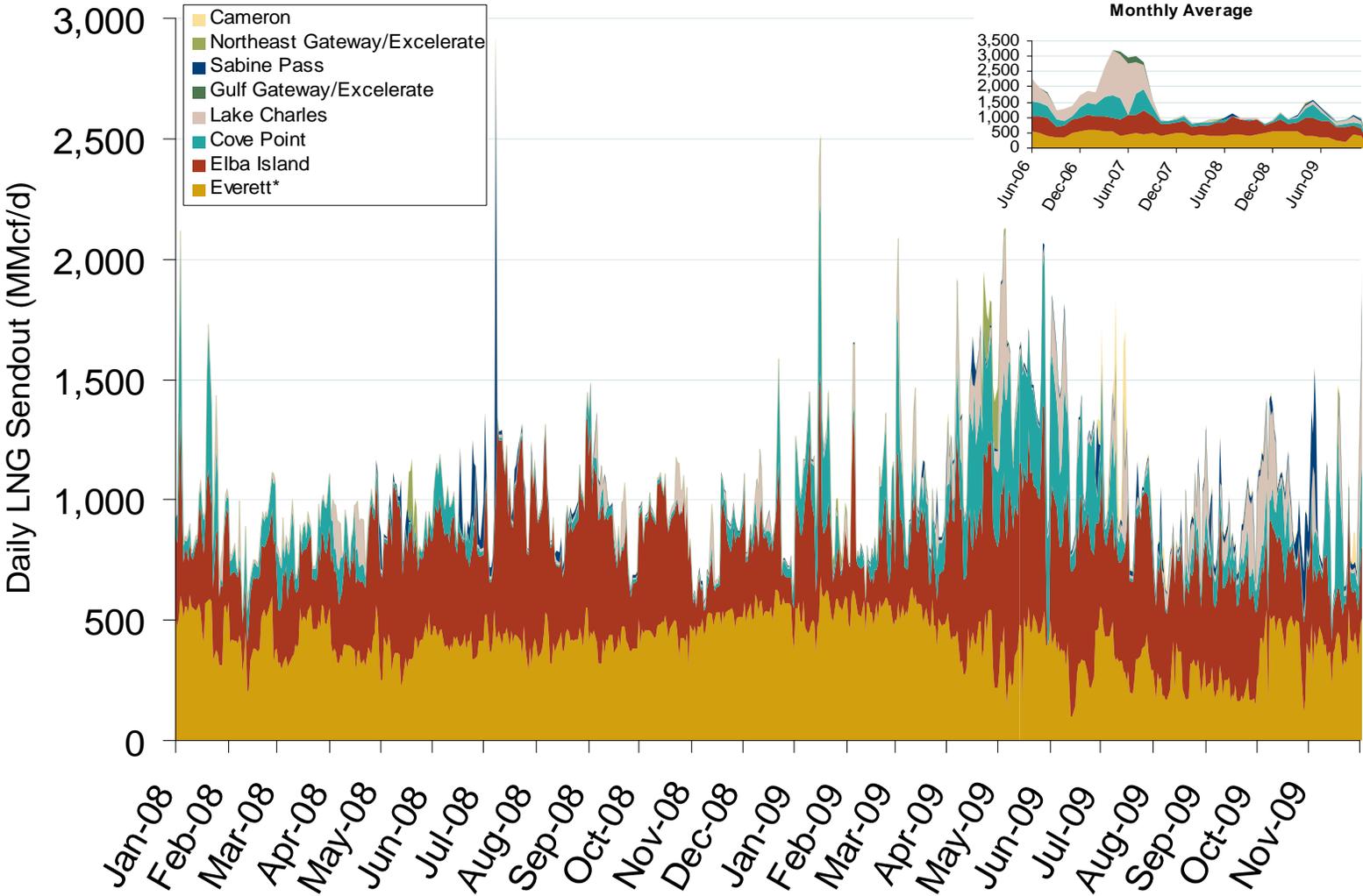


Source: Derived from NYMEX and ICE data.
December 2009 Northeast Snapshot Report

World LNG Estimated December 2009 Landed Prices



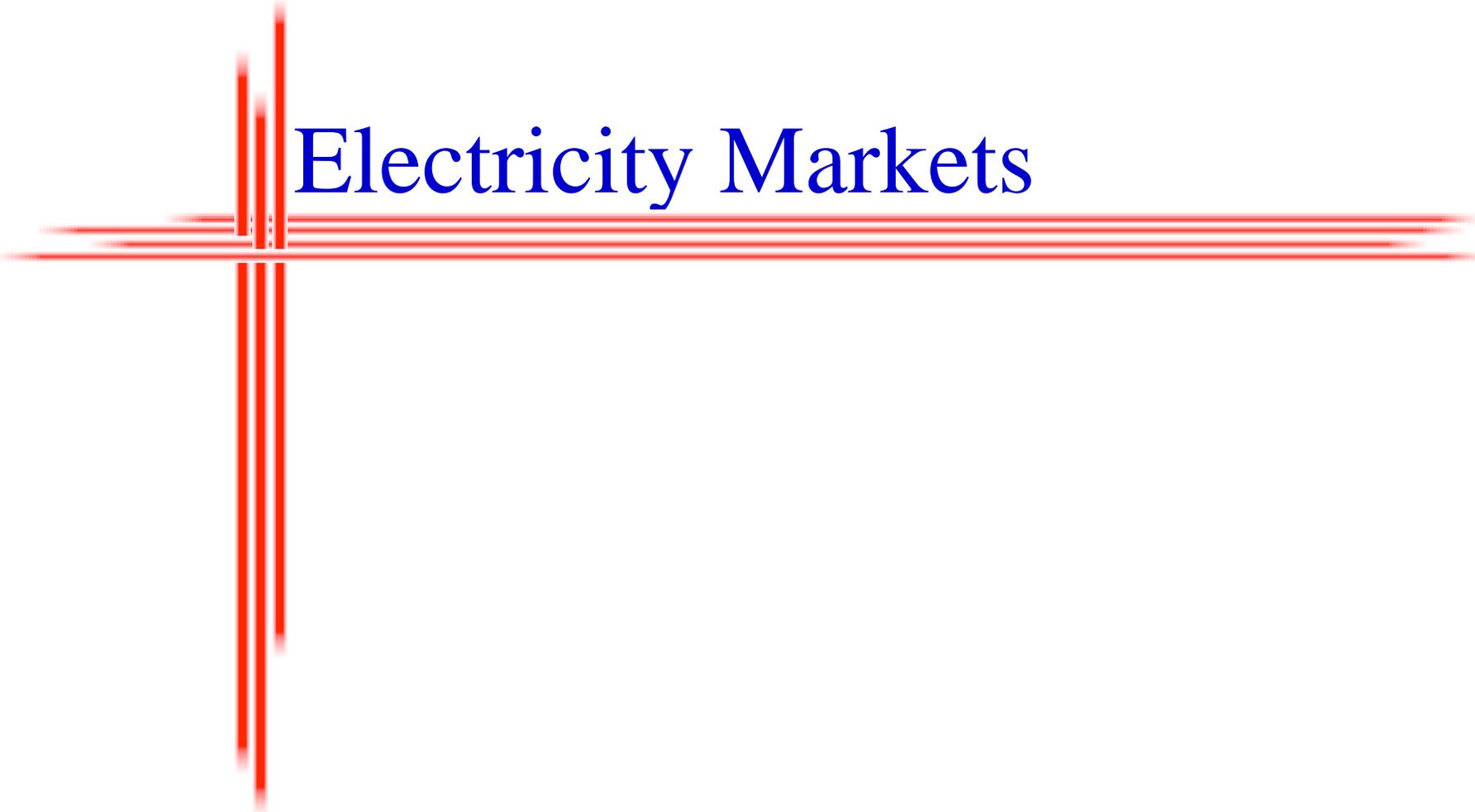
Daily Gas Sendout from Existing U.S. LNG Facilities



Source: Derived from Bentek data.

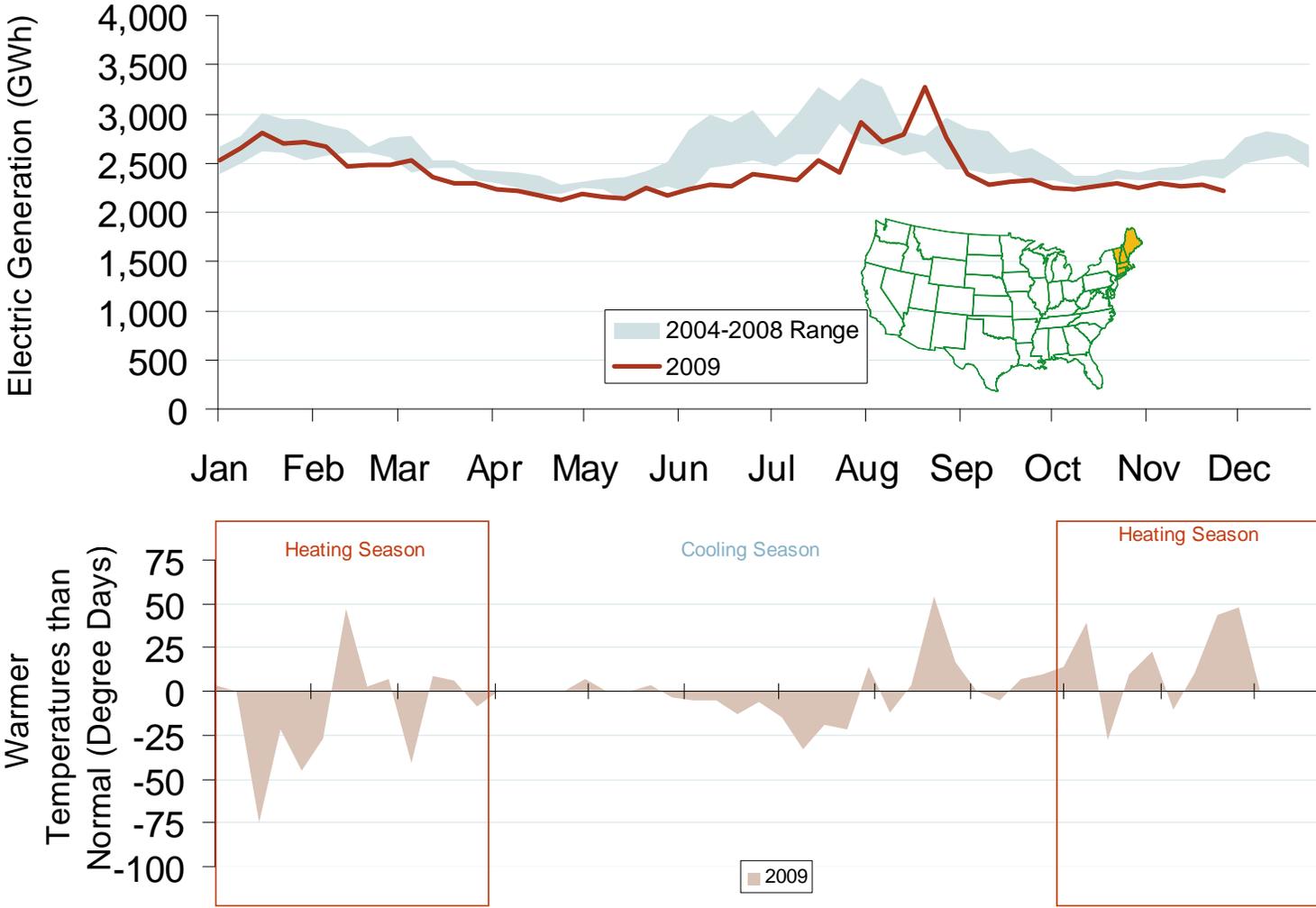
* Everett data includes flows onto the AGT and TGP interstate lines, plus estimates of flows to the Mystic 7 power plant, Keyspan Boston Gas, and LNG trucked out of the terminal. Excludes Freeport LNG which flows via intrastate pipelines.

Updated December 8, 2009



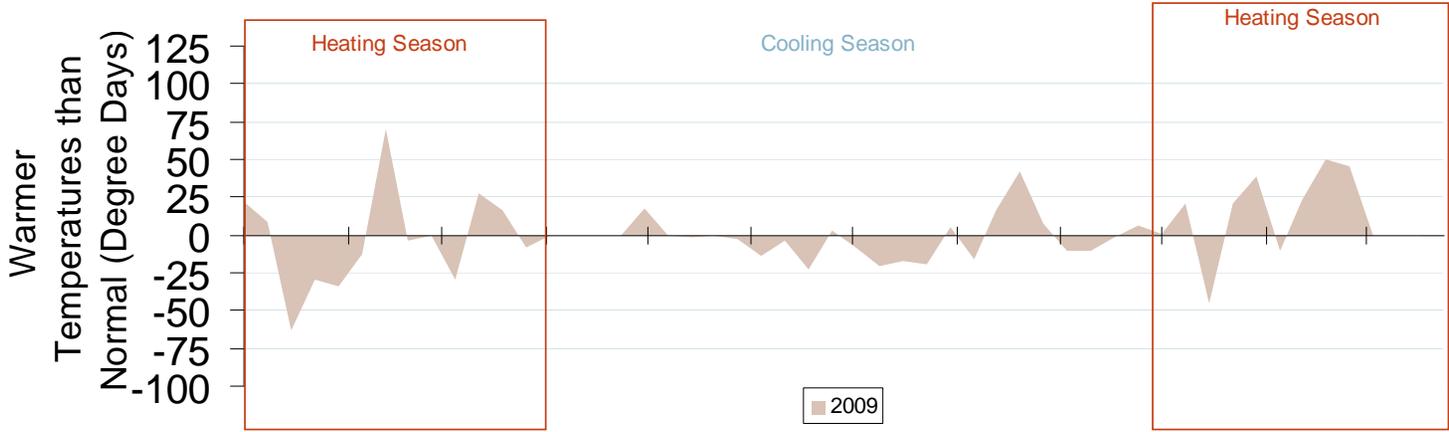
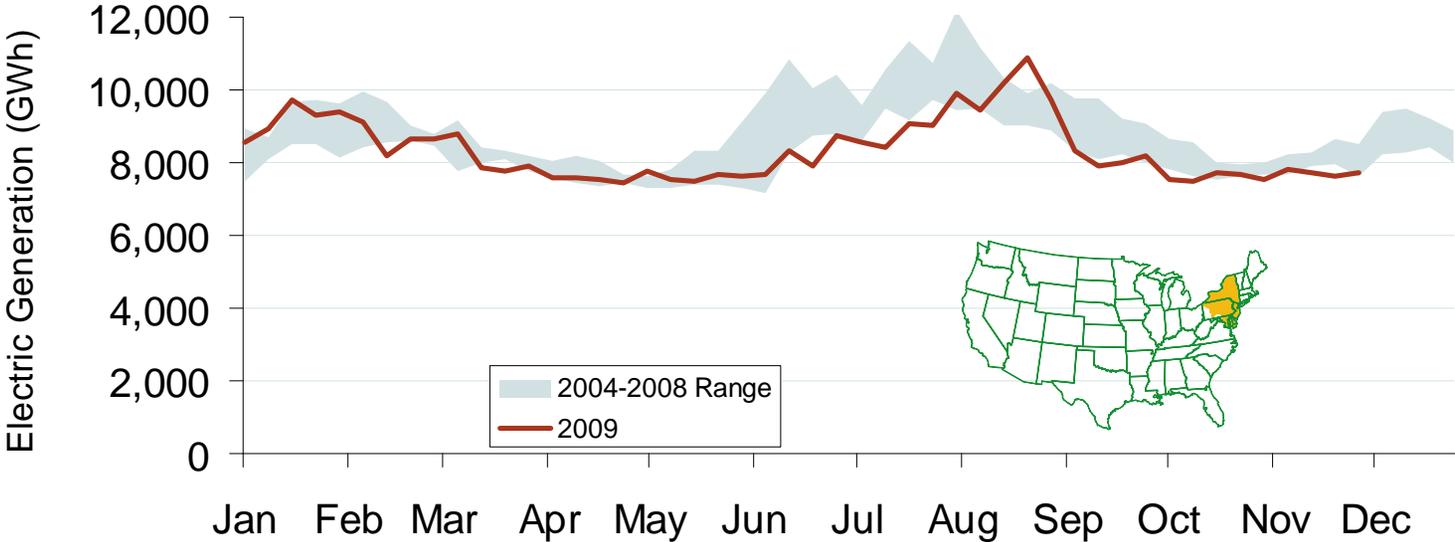
Electricity Markets

Weekly Electric Generation Output and Temperatures New England



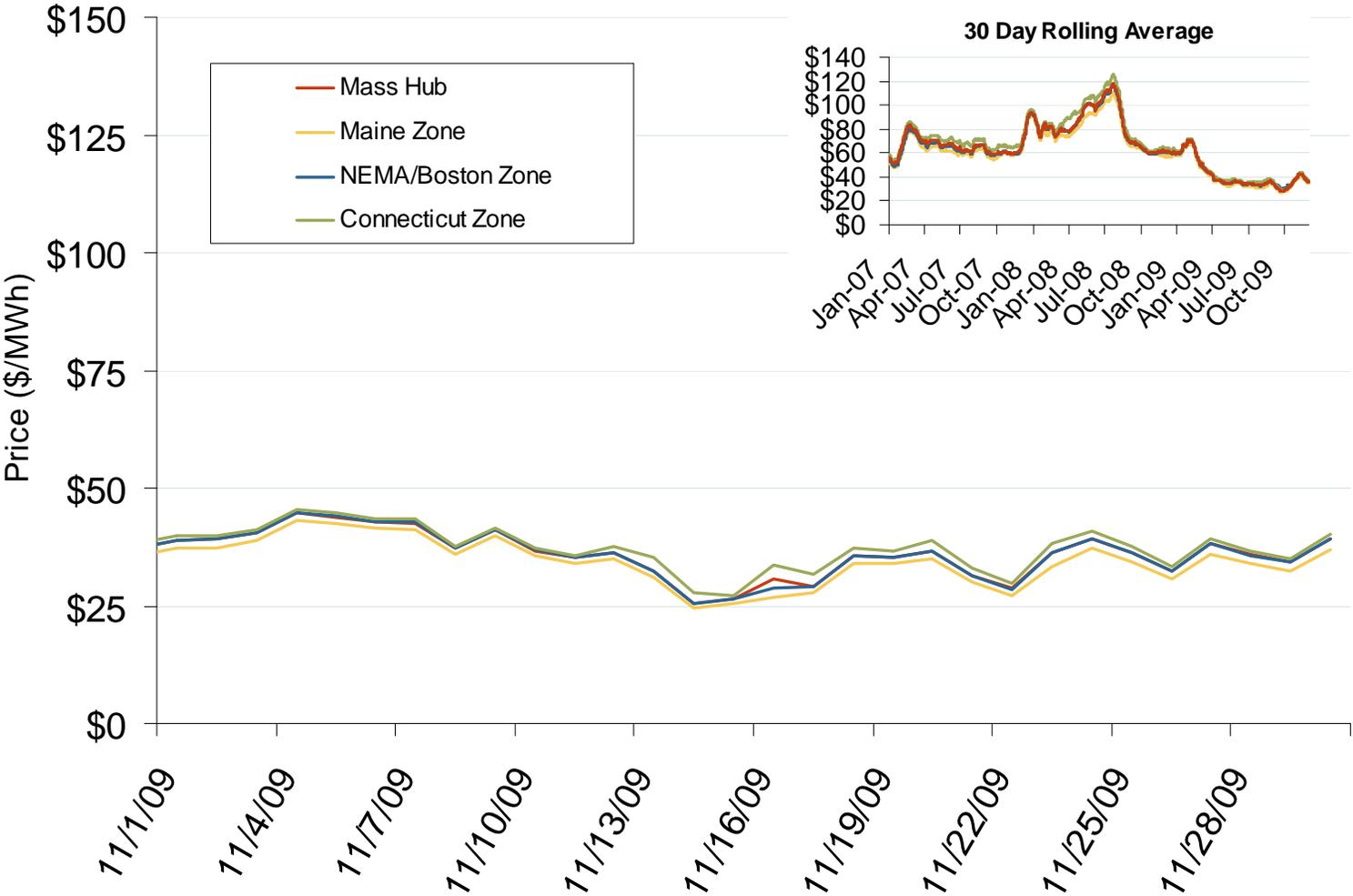
Source: Derived from *EI* and *NOAA* data.
December 2009 Northeast Snapshot Report

Weekly Electric Generation Output and Temperatures Mid Atlantic Region



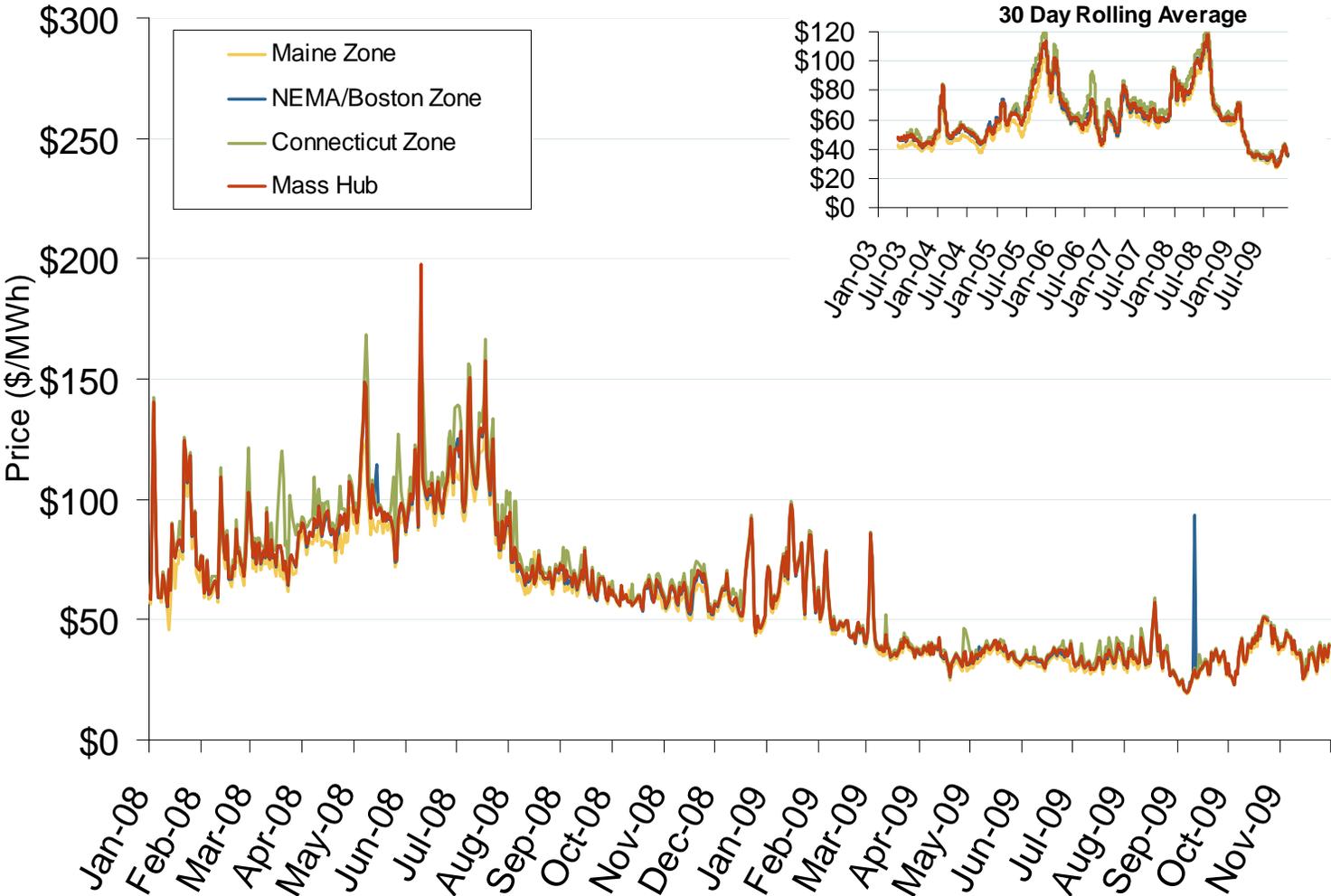
Source: Derived from EEI and NOAA data.
December 2009 Northeast Snapshot Report

Daily Average of ISO-NE Day-Ahead Prices - All Hours



Source: Derived by Bloomberg from ISO-NE data as reported by Bloomberg. December 2009 Northeast Snapshot Report

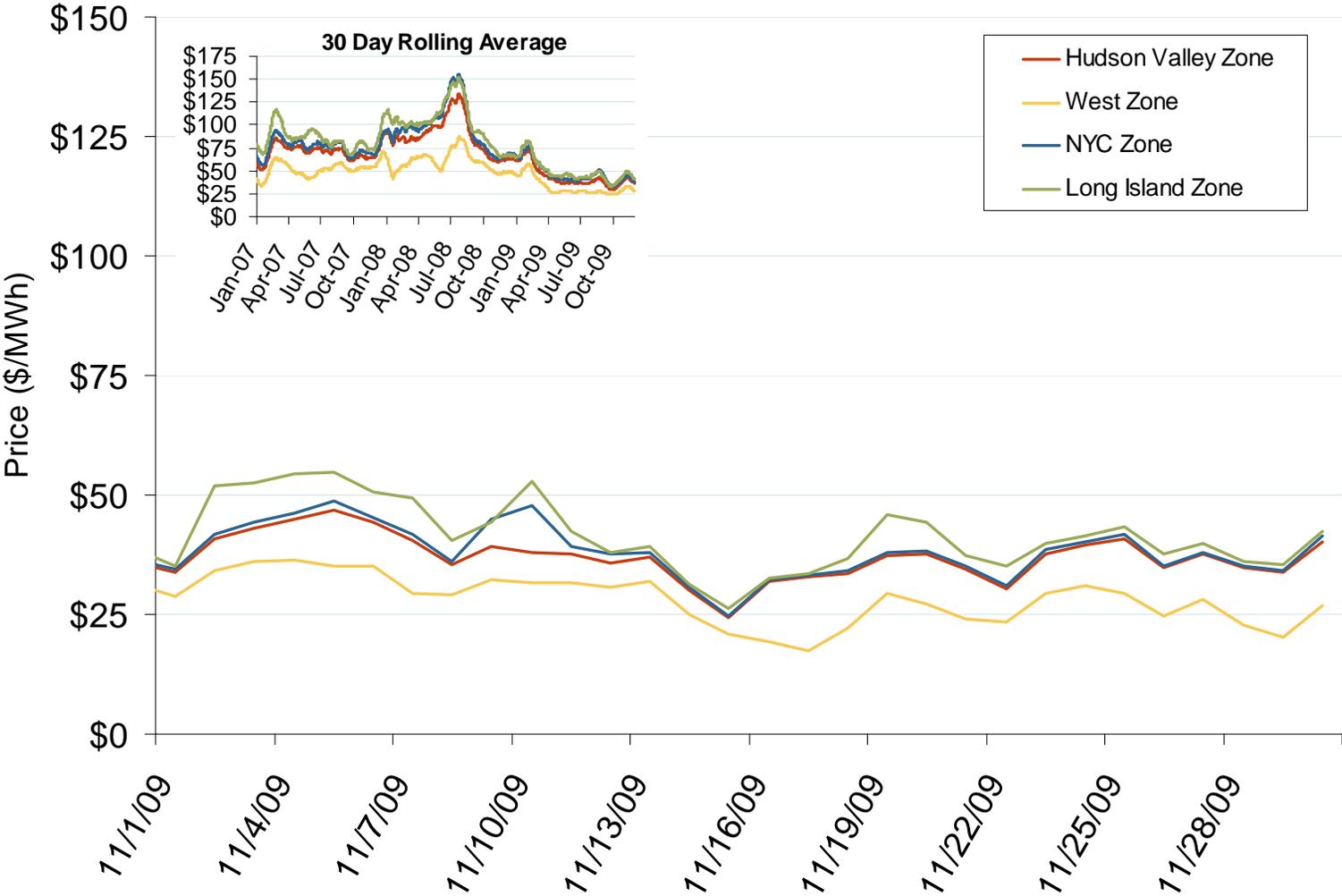
Daily Average of ISO-NE Day-Ahead Prices - All Hours



Source: Derived by Bloomberg from ISO-NE data as reported by Bloomberg.
December 2009 Northeast Snapshot Report

Updated December 8, 2009

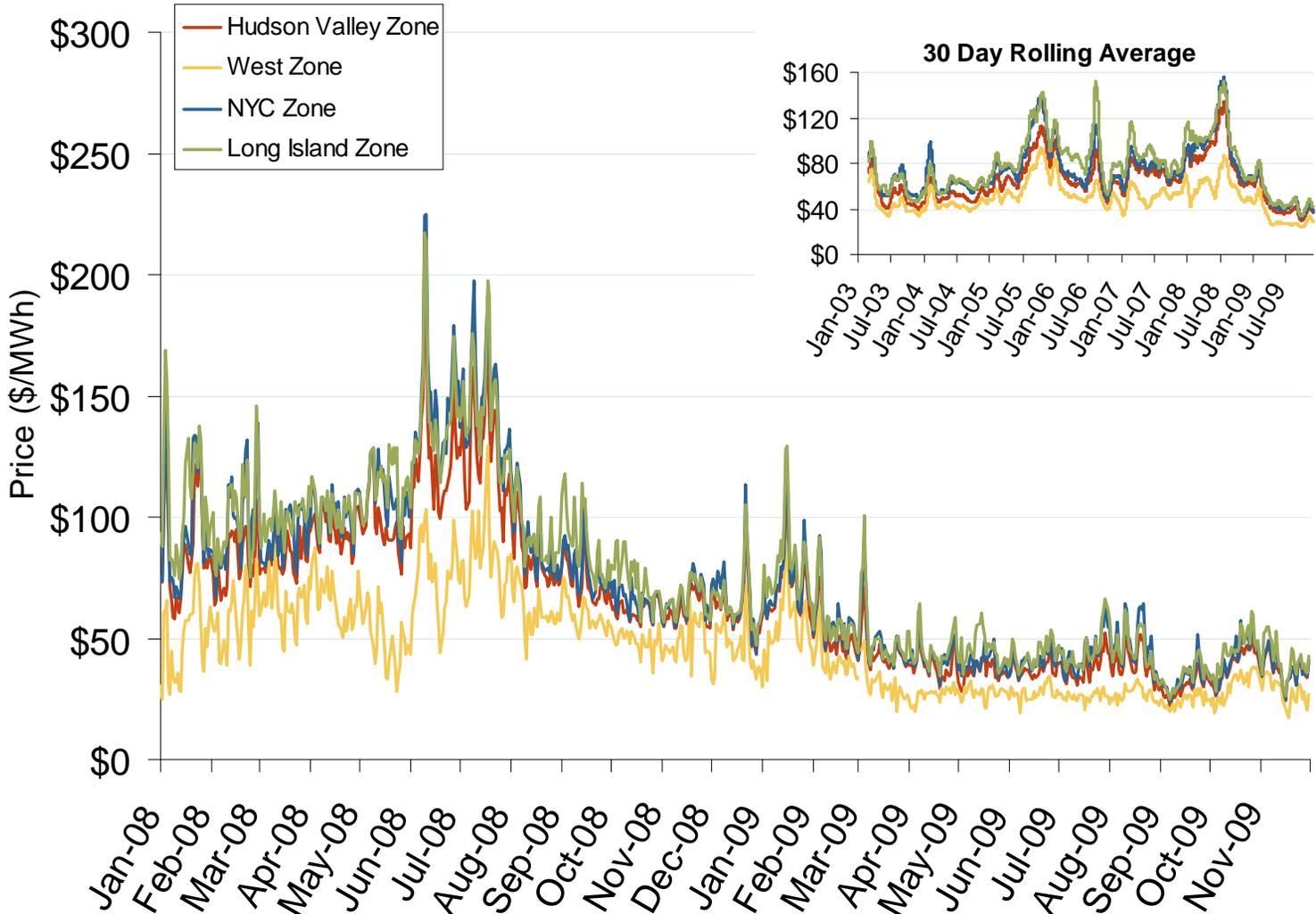
Daily Average of NYISO Day-Ahead Prices - All Hours



Source: Derived by Bloomberg from NYISO data as reported by Bloomberg. December 2009 Northeast Snapshot Report

Updated December 8, 2009

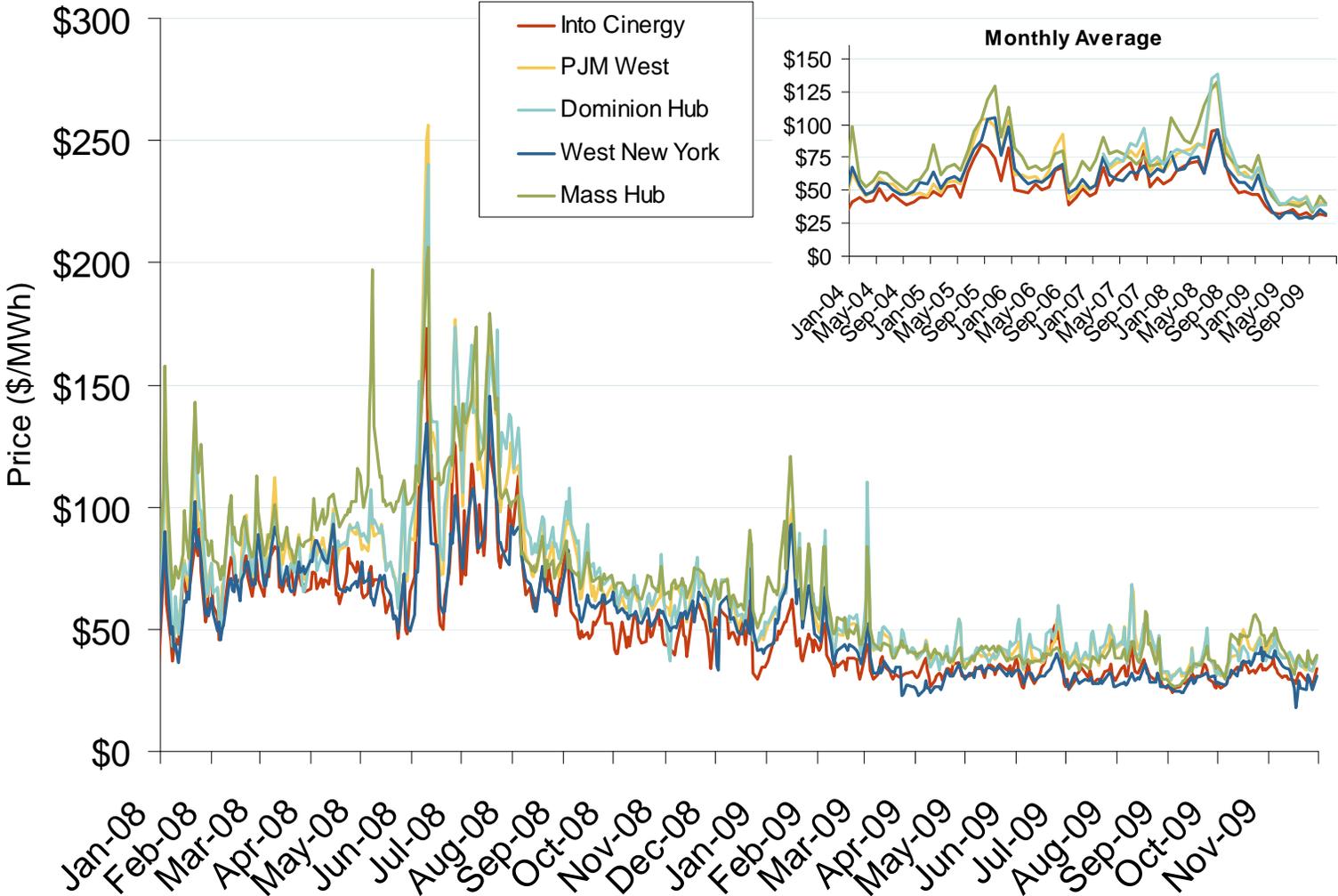
Daily Average of NYISO Day-Ahead Prices - All Hours



Source: Derived by Bloomberg from NYISO data as reported by Bloomberg.
December 2009 Northeast Snapshot Report

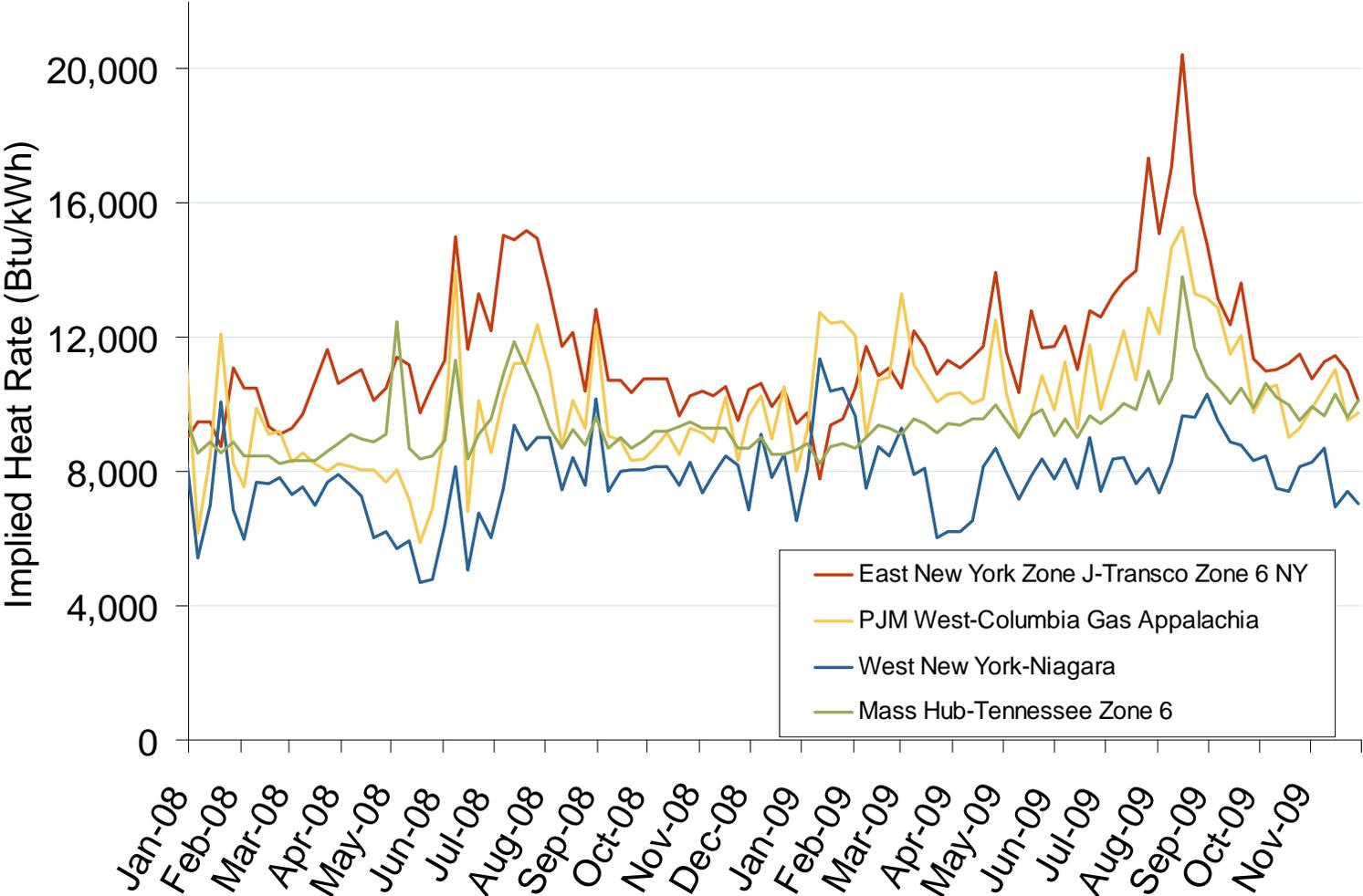
Updated December 8, 2009

Eastern Daily Bilateral Day-Ahead On-Peak Prices



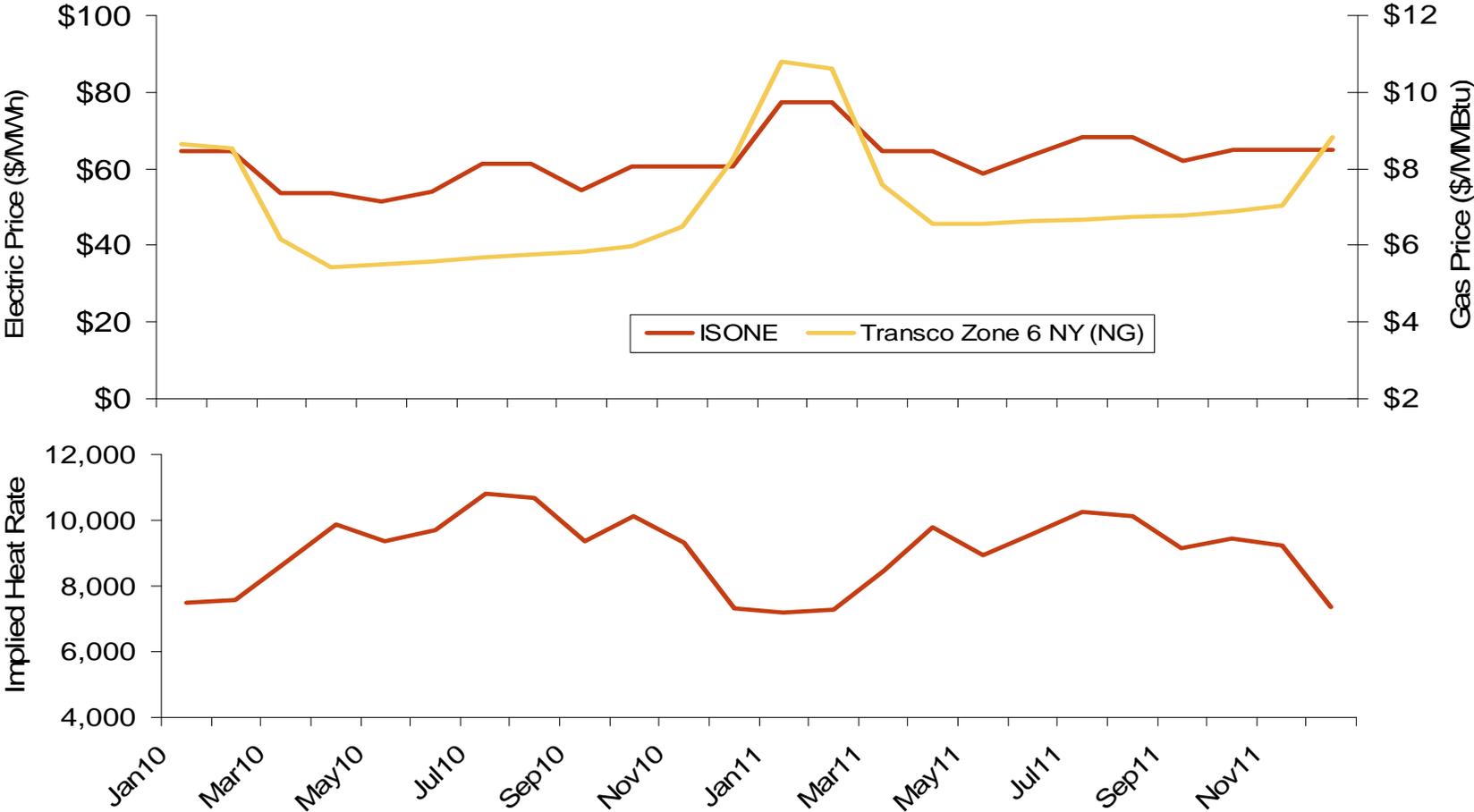
Source: Derived from *Platts* data.
December 2009 Northeast Snapshot Report

Implied Heat Rates at Eastern Trading Points Weekly Averages



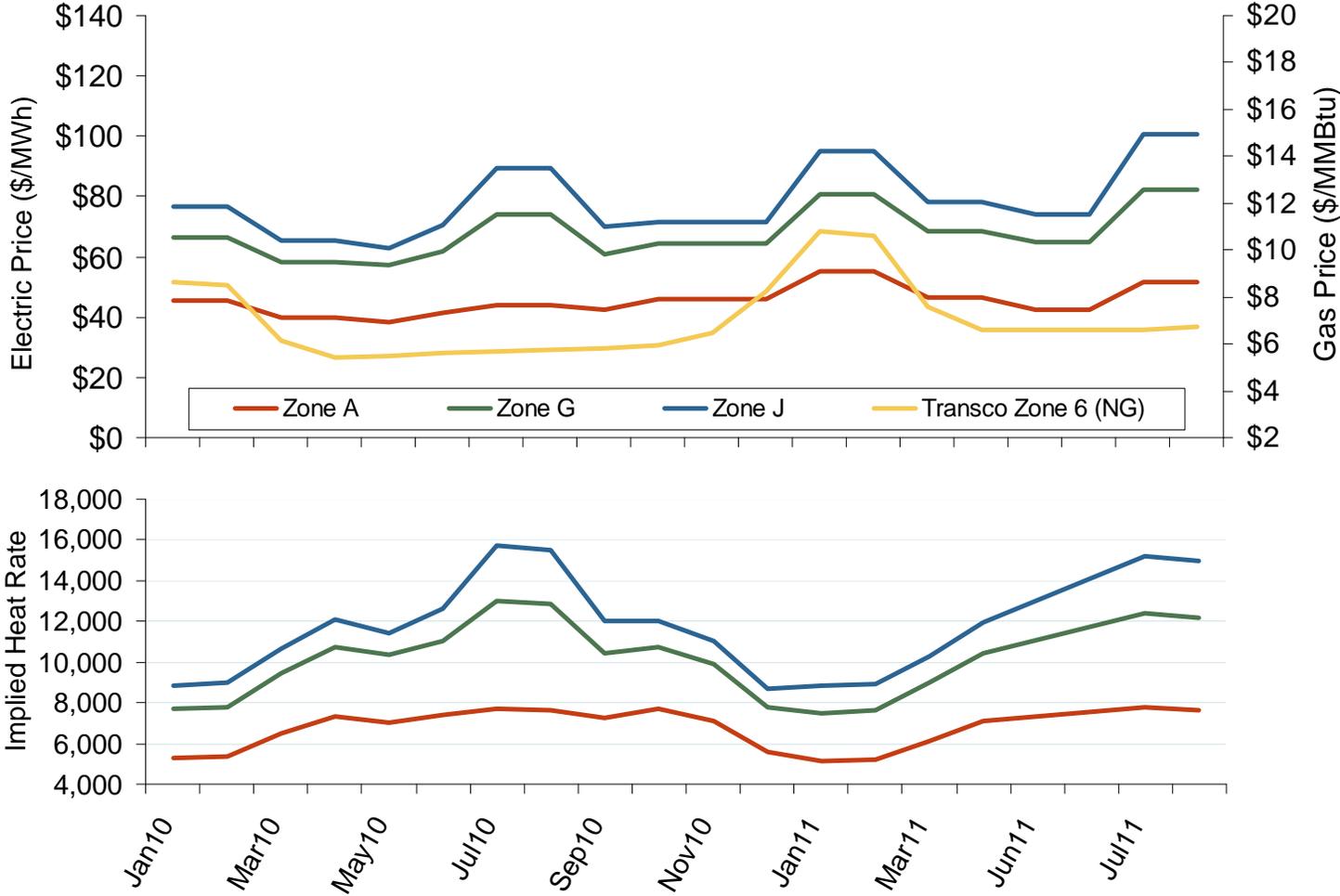
Source: Derived from *Platts* on-peak electric and natural gas price data.
December 2009 Northeast Snapshot Report

New England Electric Forward Price Curve and Implied Heat Rate



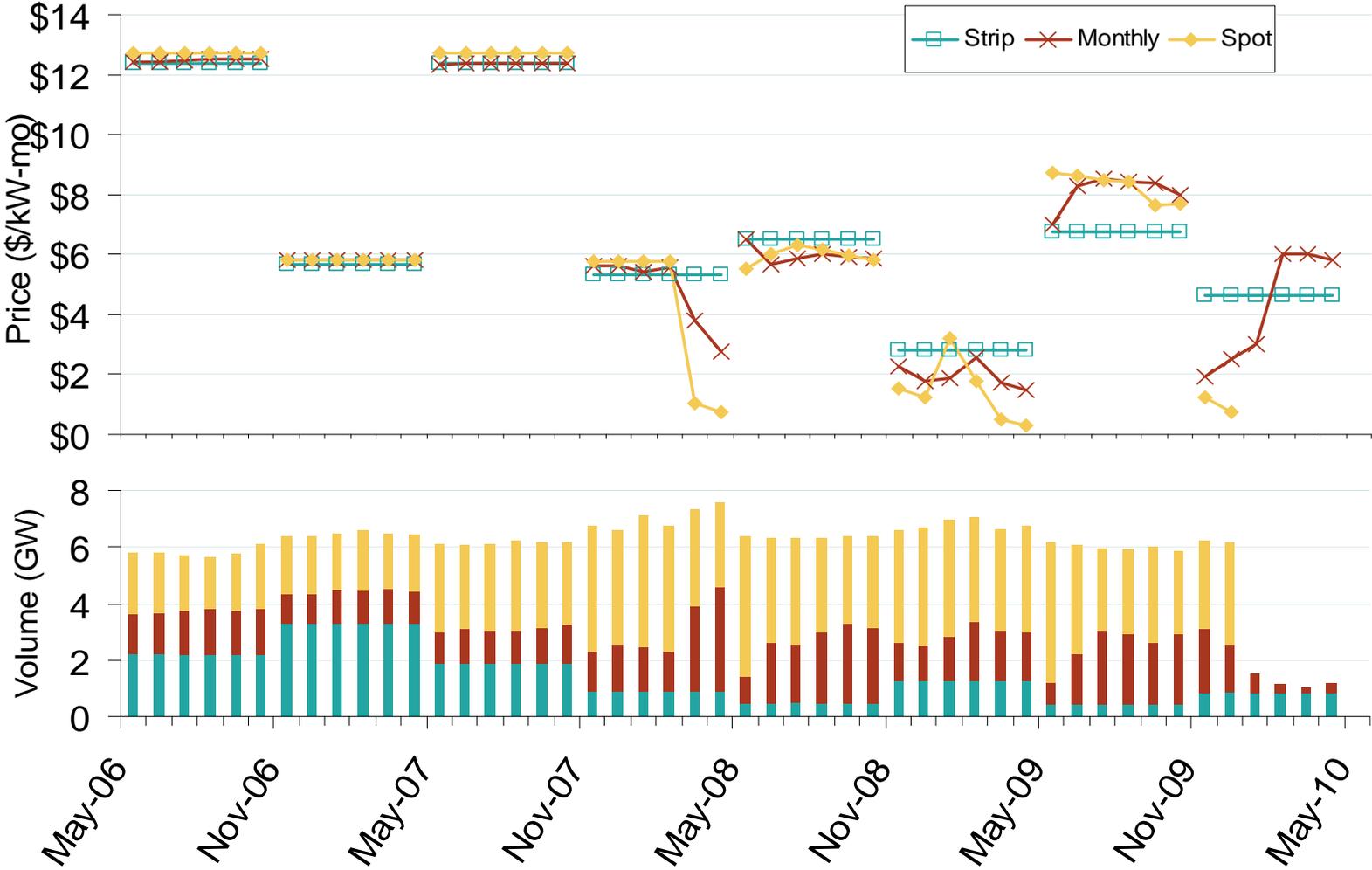
Source: Derived from Nymex data.
December 2009 Northeast Snapshot Report

New York Electric Forward Price Curves and Implied Heat Rates



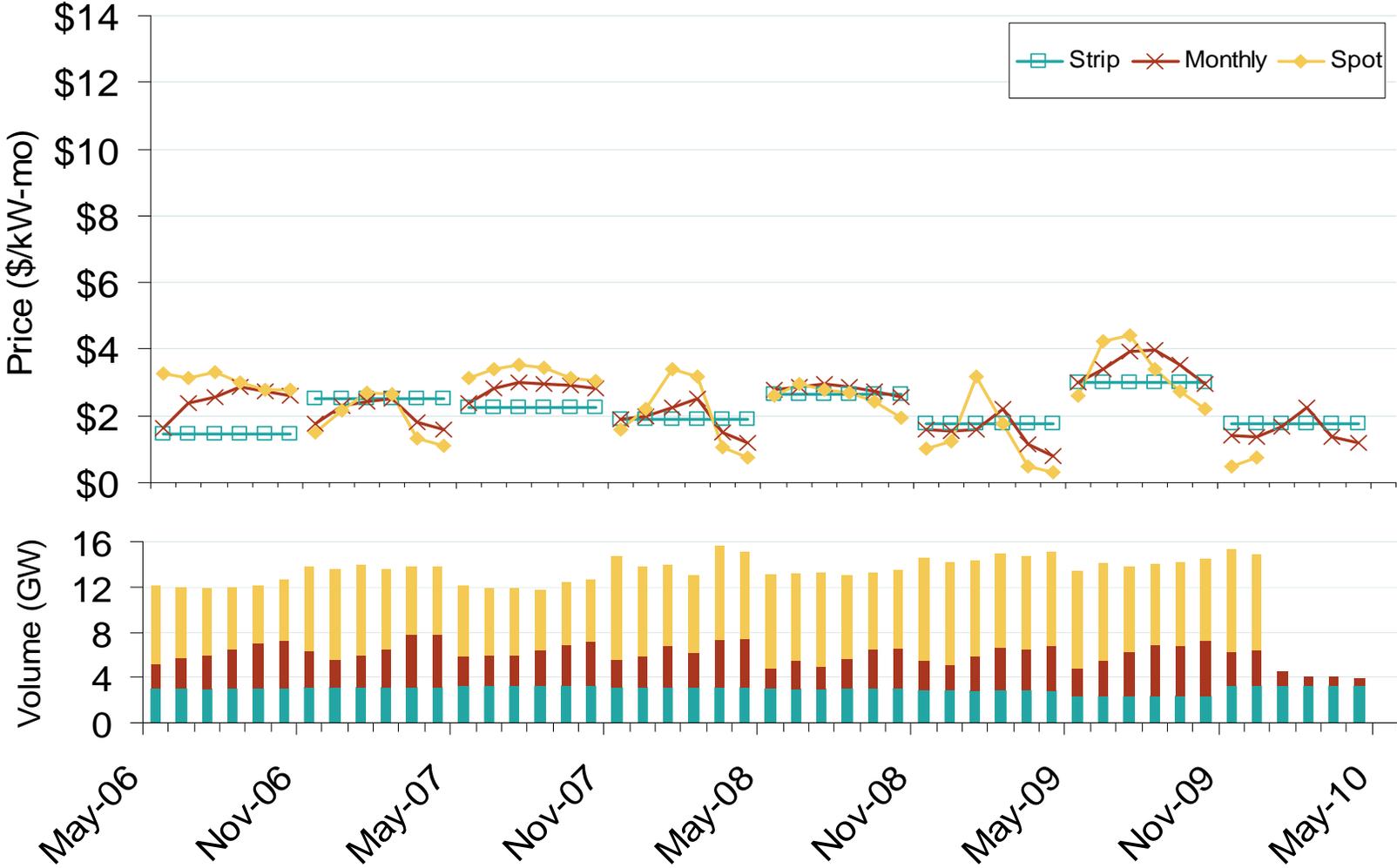
Source: Derived from Nymex data.
December 2009 Northeast Snapshot Report

Weighted Average ICAP Clearing Prices and Volumes: New York City



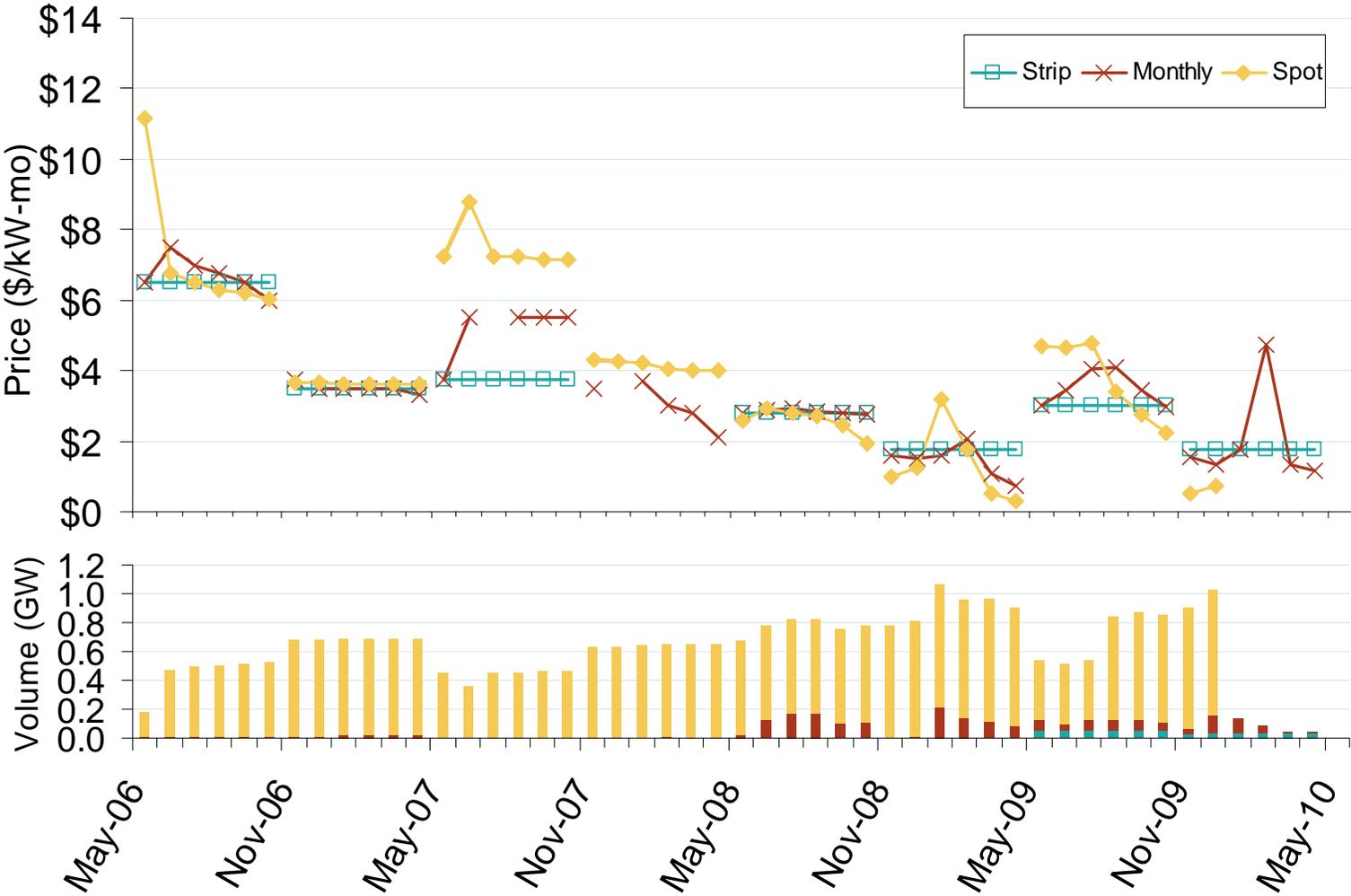
Source: Derived from NYISO data.
December 2009 Northeast Snapshot Report

Weighted Average ICAP Clearing Prices and Volumes: Rest of New York State



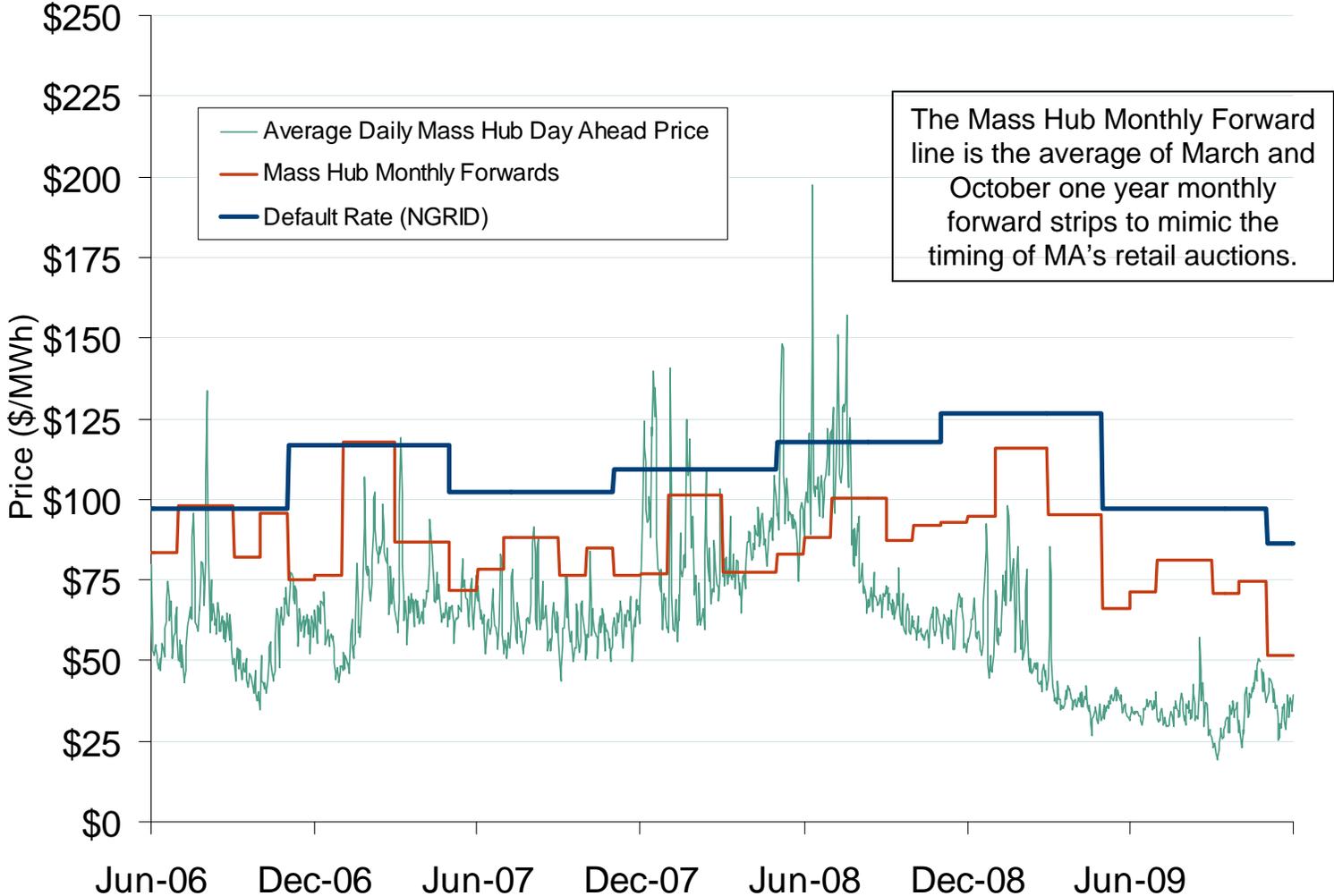
Source: Derived from NYISO data.
December 2009 Northeast Snapshot Report

Weighted Average ICAP Clearing Prices and Volumes: Long Island



Source: Derived from NYISO data.
December 2009 Northeast Snapshot Report

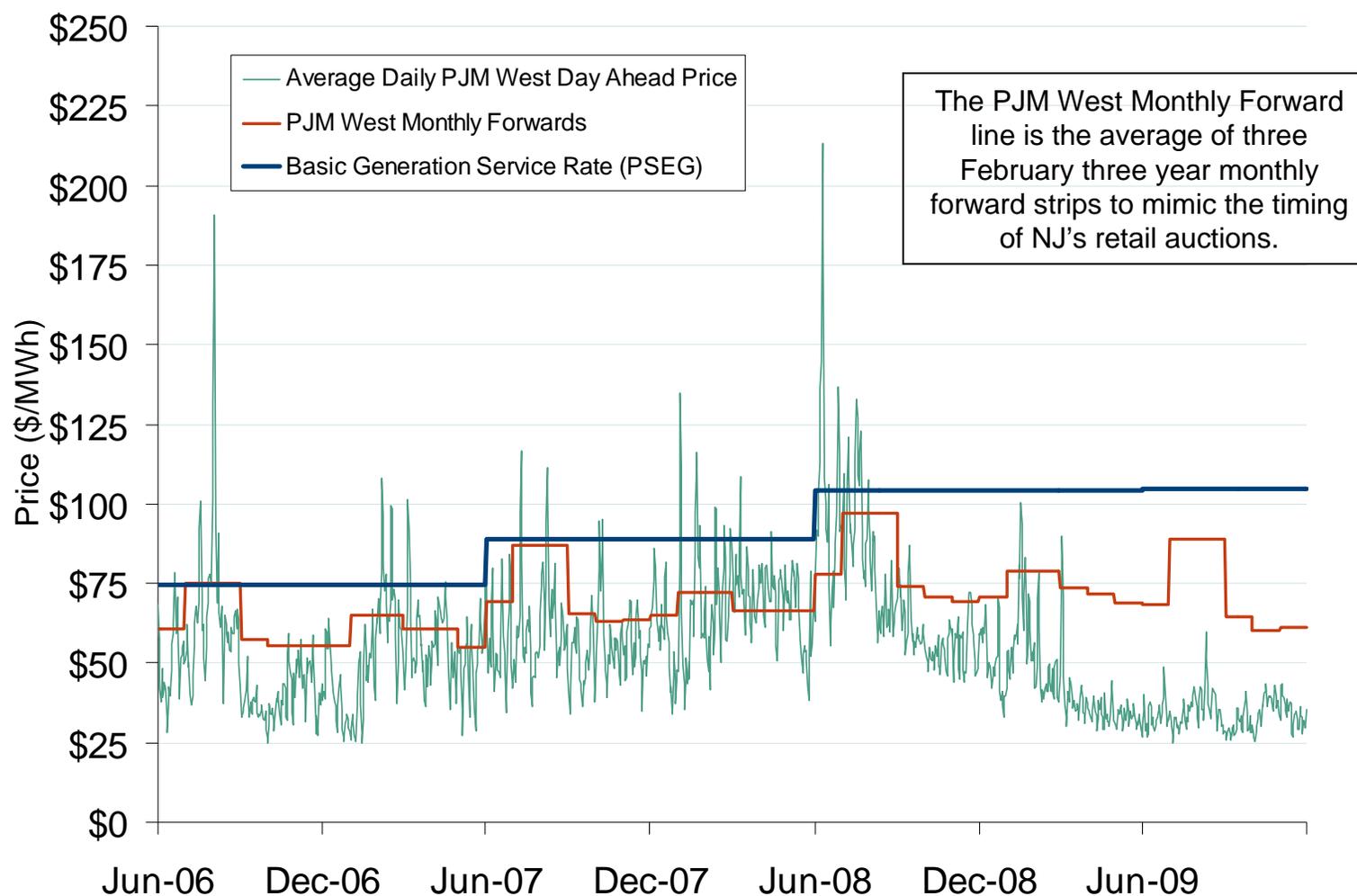
Massachusetts Default Rate and Mass Hub Wholesale Monthly Forward and Daily Spot Prices



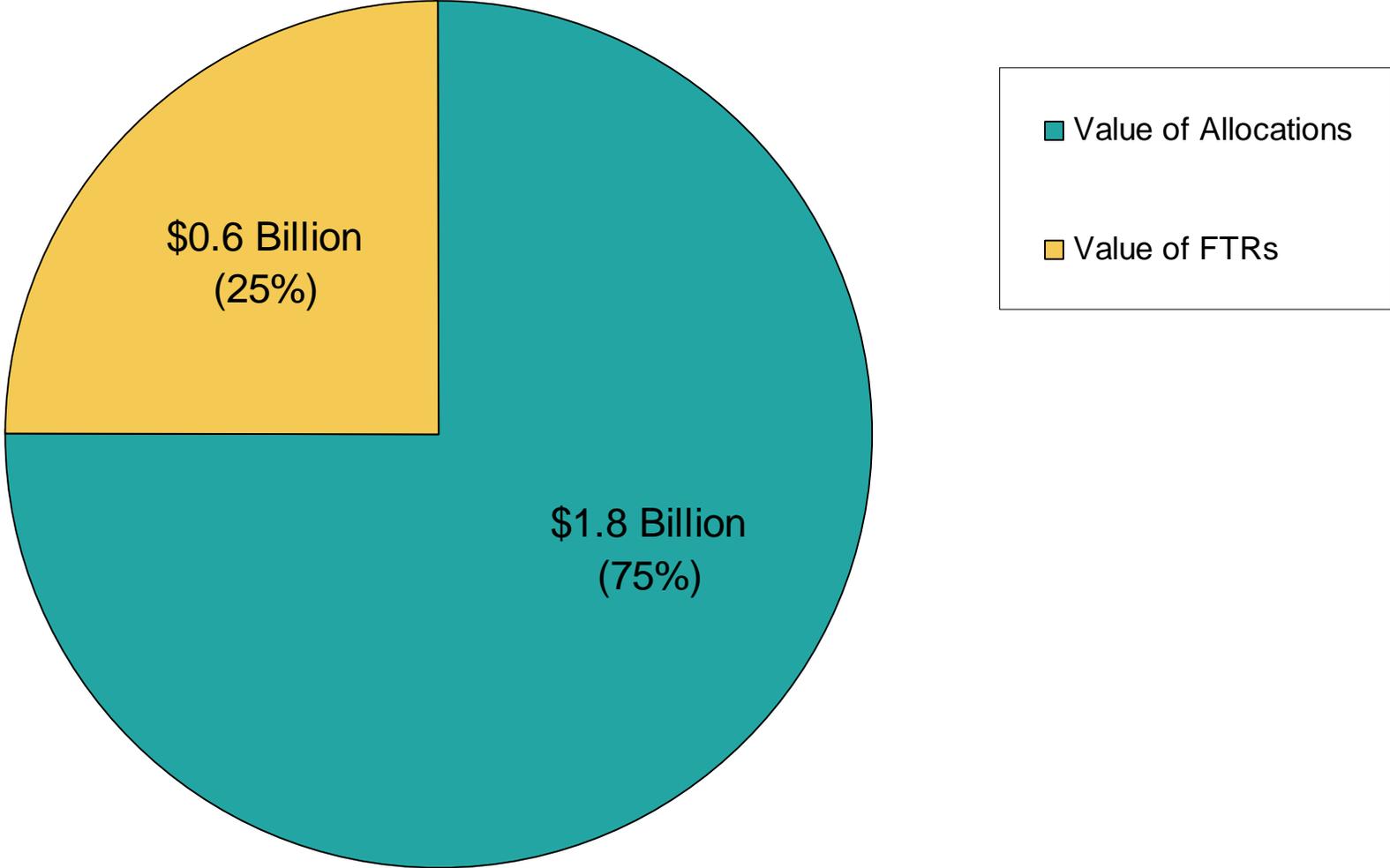
Source: Derived from Ventyx, Bloomberg and Massachusetts government data.
December 2009 Northeast Snapshot Report

Created December 6, 2009

New Jersey's Basic Generation Service Rate and PJM West Wholesale Monthly Forward and Daily Spot Prices



PJM 2008/09 Annual FTR Auction Value



Total Market Value = \$2.4 Billion

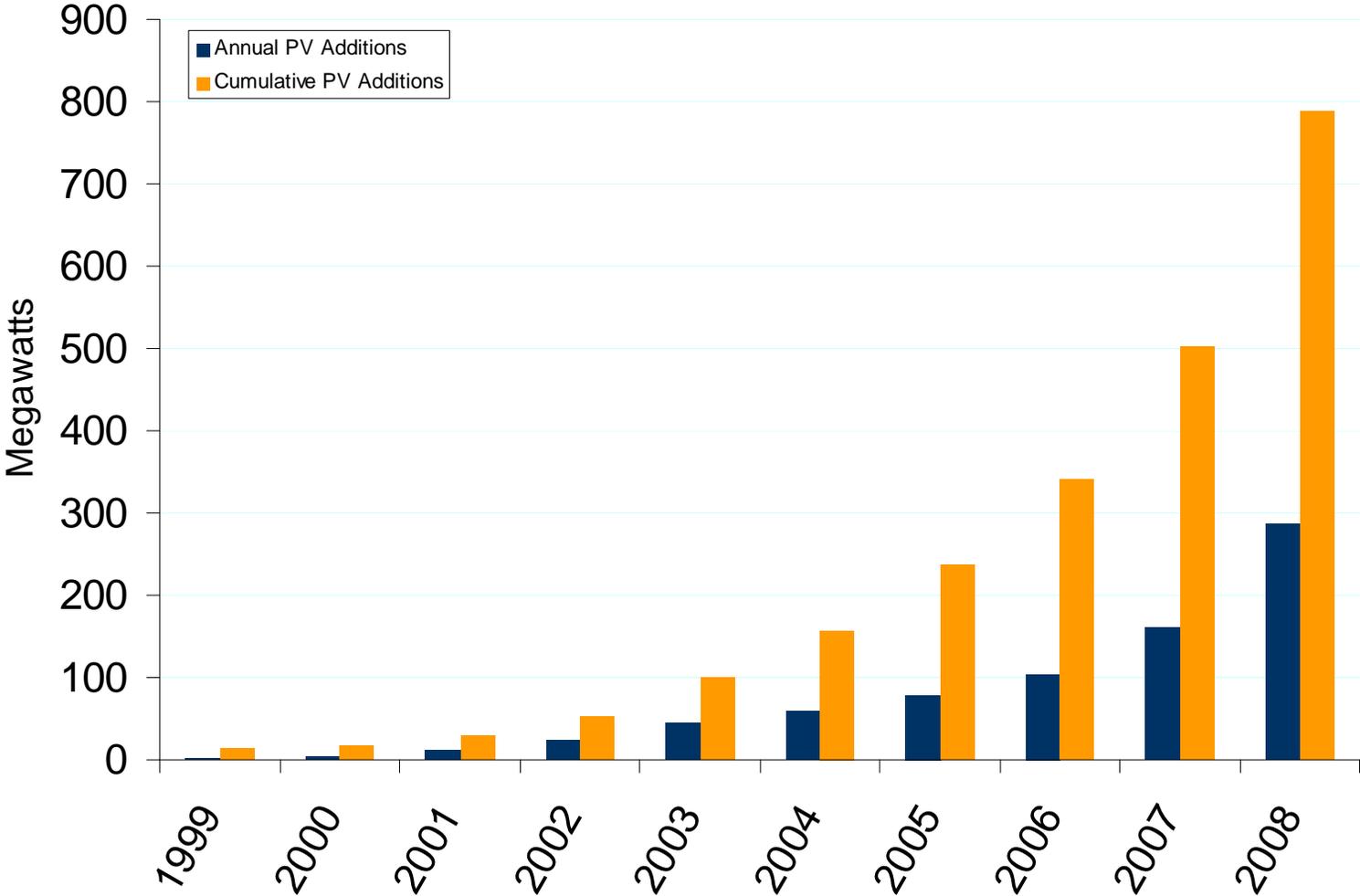
Source: Derived from Ventyx and PJM non-public data.

2009 FTR Market Participants active in multiple markets

FTR Market	2009 Market Participants	Active FTR Paths in 2009
PJM	181	51,156
MISO	100	18,715
ISO-NE	47	23,113
CAISO	41	15,485
NYISO	36	2,508
		110,977

Total Unique Participants	309
----------------------------------	------------

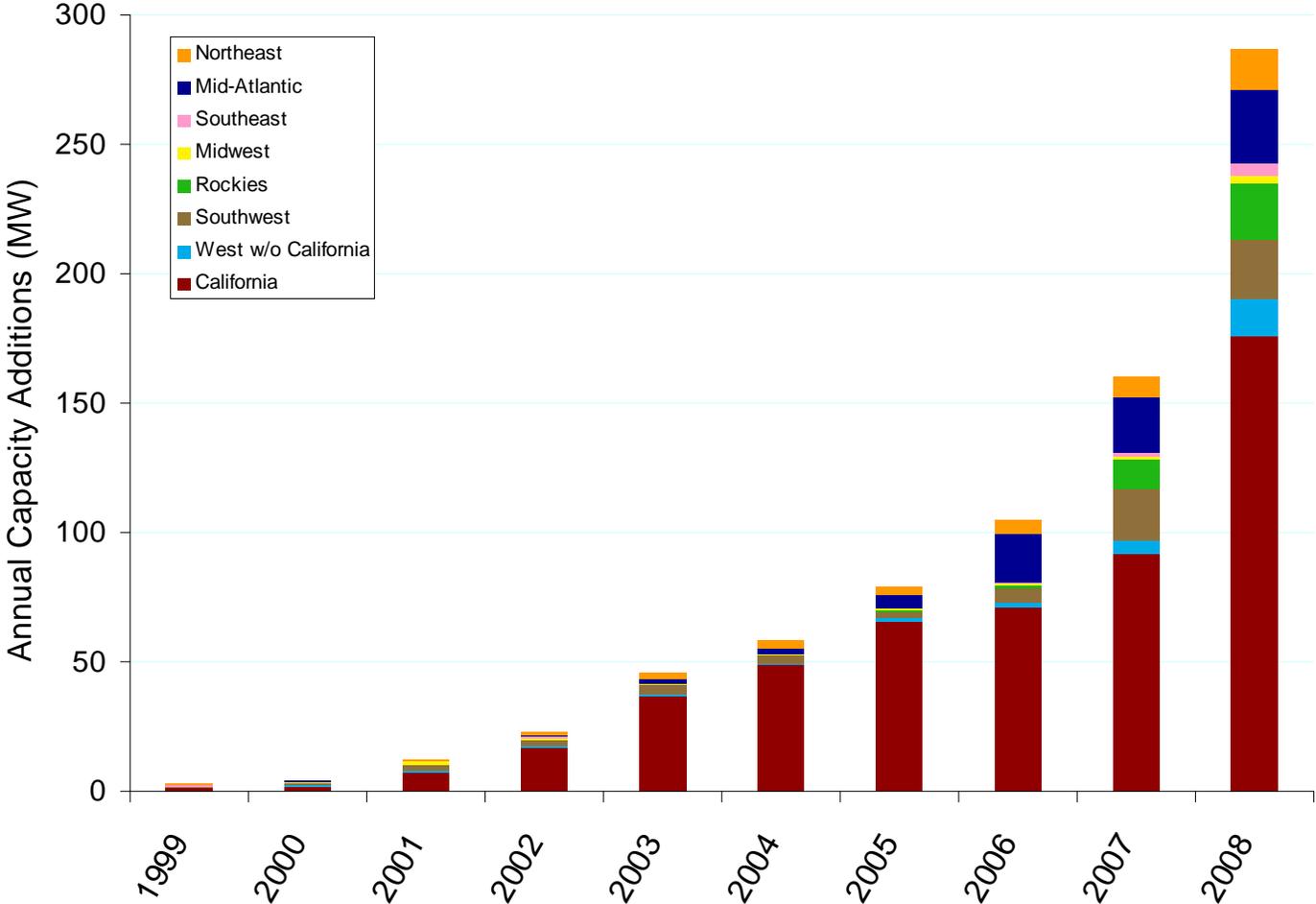
U.S. Grid-Connected Photovoltaic Capacity Growth, 1999 – 2008



Source: IREC: Interstate Renewable Energy Council
December 2009 Northeast Snapshot Report

Updated October 7, 2009

Regional Grid-Connected Photovoltaic Capacity Growth

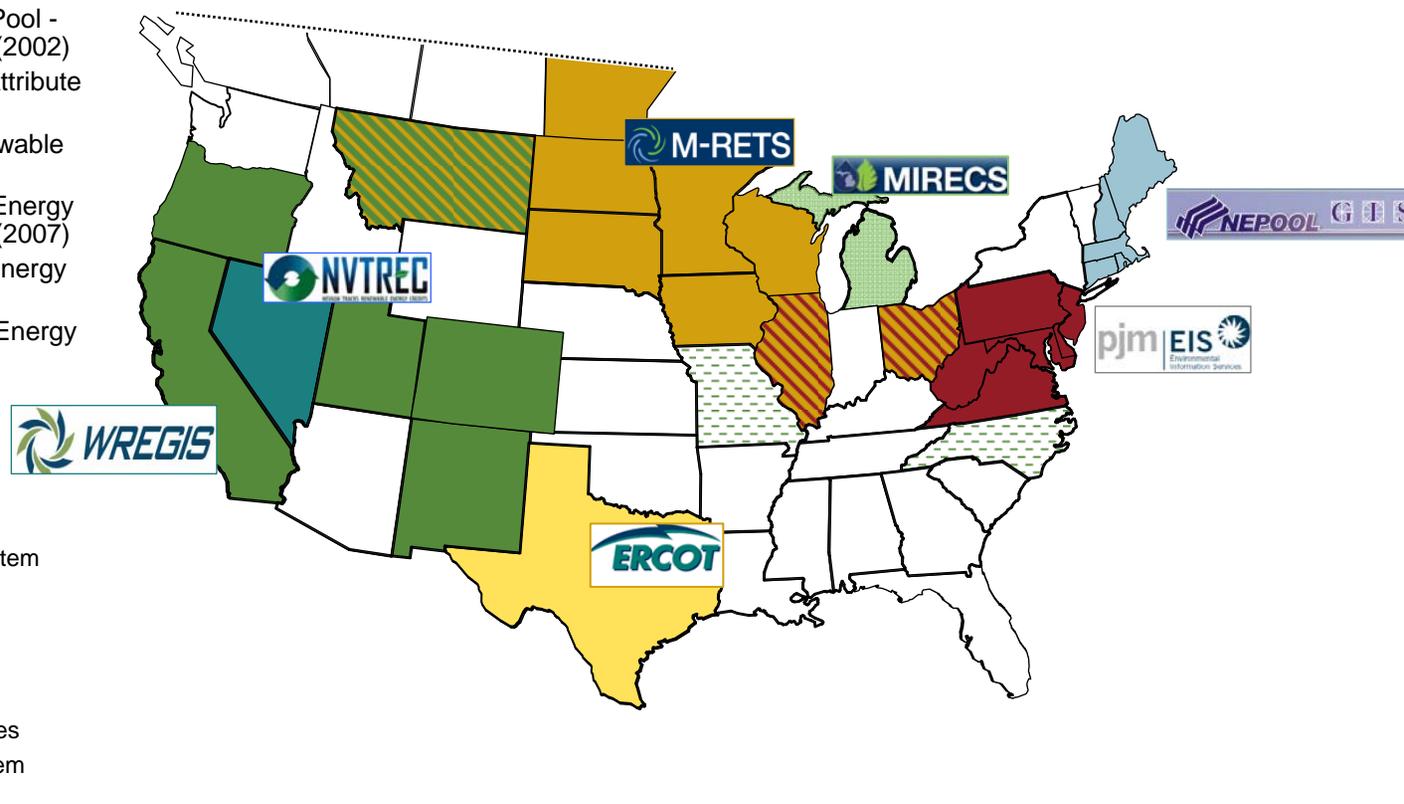


Note: 43 states and D.C. have at least 1 MW of grid-connected PV:
Northeast: CT, ME, MA, NH, RI, VT
Mid-Atlantic: DE, DC, MD, NJ, NY, PA
Southeast: AL, AR, FL, GA, MS, NC, SC, TN, VA
Midwest: IL, IN, IA, KY, MI, MN, MO, OH, OK, WI
Rockies: CO, ID, MT, UT, WY
Southwest: AZ, NV, NM, TX
West w/o California: HI, OR, WA

Seven Renewable Energy Tracking Systems Operate in North America

Tracking Systems: (year operational)

- **ERCOT:** Texas REC Trading System (2001)
- **NEPOOL – GIS:** New England Pool - Generation Information System (2002)
- **PJM – GATS:** PJM-Generator Attribute Tracking System (2005)
- **NVTREC:** Nevada Tracks Renewable Energy Credits (2007)
- **WREGIS:** Western Renewable Energy Generation Information System (2007)
- **M-RETS:** Midwest Renewable Energy Tracking System (2007)
- **MIRECS:** Michigan Renewable Energy Certification System (Oct 2009)



Updates at: <http://www.ferc.gov/market-oversight/otr-mkts/renew/otr-rnw-rec-trk.pdf>

Note: neither Alaska nor Hawaii have renewable tracking systems

Abbreviations: EERS – Energy Efficiency Resource Standard; REC - Renewable Energy Certificate; also renewable energy credit; RFP – request for proposal; RPS – Renewable Portfolio Standard (or RES, Renewable Electricity Standard); SREC – Solar REC

Sources: Individual tracking system administrators and websites; APX; State Commission websites

Renewable Energy Certificate (REC) Tracking Systems

Seven Operating Systems Track RECs:

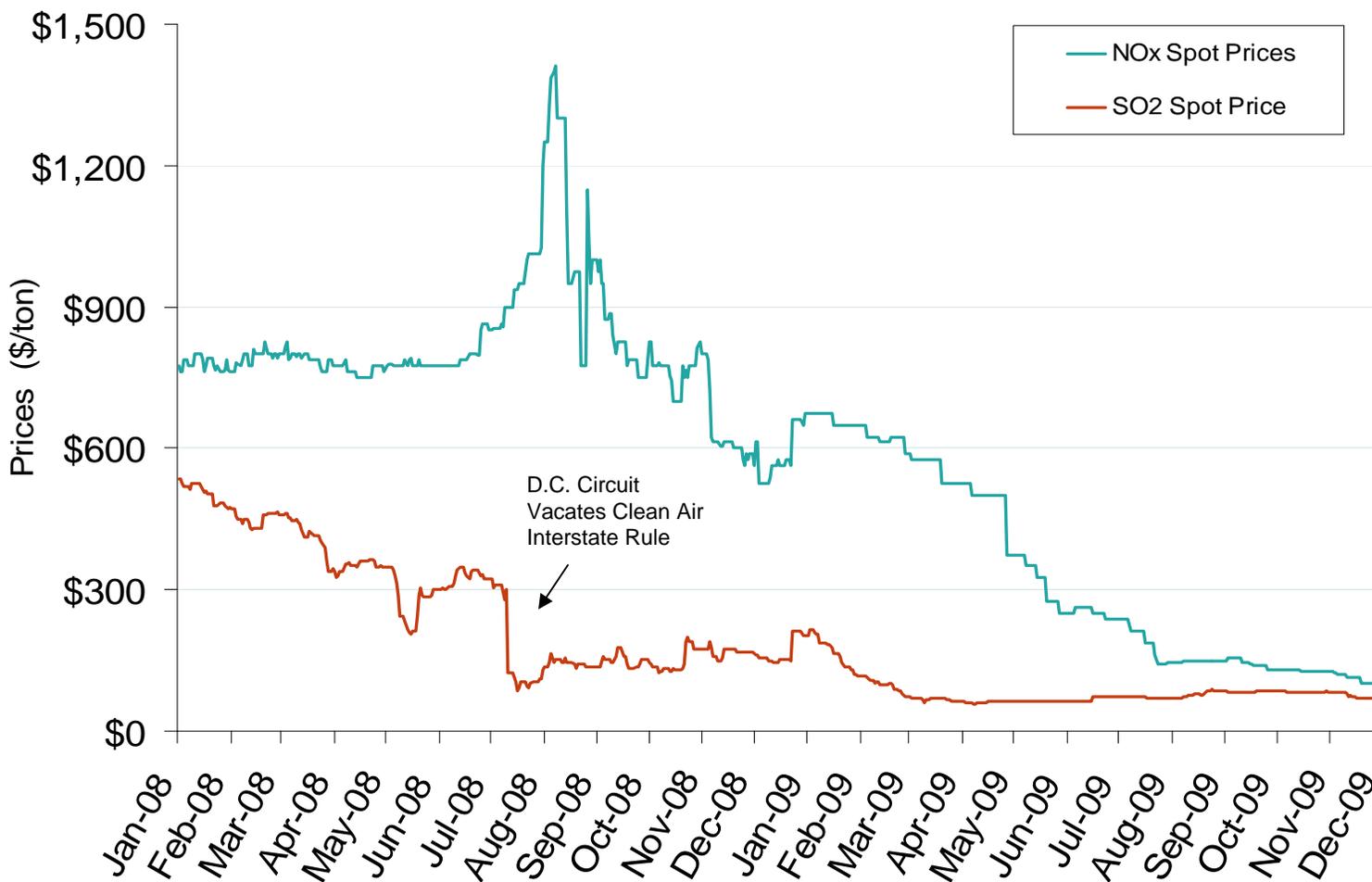
- These quasi-governmental regional entities were created as accounting systems to issue, track, and retire RECs, or certificates of renewable generation, within their jurisdiction in accordance with different state's Renewable Portfolio Standard (RPS) rules.
- Each reported megawatt-hour (MWh) of eligible generation results in a system-issued REC with a unique identification number to prevent double-counting.
- RECs allow regulators to track compliance with mandatory RPS targets and to verify progress in voluntary state renewable programs.
- Each REC includes attributes such as generator location, capacity, fuel-type and source, owner, and date operational. Records are tagged by program eligibility.
- Differences in intra-regional rules include whether RECs can be banked for use in future years and for how long; which renewable technologies are eligible; and whether some fuels or technologies are granted multiple credits.
- Compliance entities, such as retail suppliers, can meet RPS targets by purchasing RECs in lieu of generating renewable electricity.
- Most systems have added attributes to support other state, provincial, or regional programs or requirements such as solar set-asides, voluntary utility green-power programs, or emissions tracking.
- Where necessary, systems track conservation or energy efficiency credits in states with a combined RPS and Energy Efficiency Resource Standard (EERS).

The **Waxman-Markey** bill would give FERC responsibility for issuing federal RECs with respect to a national RES, and to develop a tracking system compatible with existing state, tribal, and regional systems.

State Tracking Activities:

- 24 states (including D.C.) with an RPS or goal use seven REC tracking systems to monitor compliance or progress.
- **Michigan** launched MIRECS – Michigan Renewable Energy Certification System on Oct 30. It chose a stand-alone system because the nuances of its RPS would have involved complicated and expensive modifications to PJM-GATS.
- **North Carolina** and **Missouri** issued RFPs for third-parties to design, implement and administer tracking systems (Oct 19).
 - **NC** will consider proposals to create a NC-RETS as an independent state system or to make modifications in an existing system to accommodate its RPS features.
 - **MO** asked that proposals be returned by Nov 4. The RFP was a discussion item at the PUC's November meeting.
- **Virginia** and **West Virginia** do not now require compliance RECs, although PJM-GATS tracks all generation for member utilities in those states, including renewables.
- States that don't participate in operating regional systems but track or plan to track RECs include:
 - **Nevada** has a PUC-run web-based system. NVTREC – Nevada Tracks Renewable Energy Credits – tracks renewable generation at the kilowatt/hour level, credit multipliers, and energy conservation with Portfolio Energy Credits. Generators and utilities are also eligible to register with WREGIS.
 - **New York** plans to have a regionally-compatible system that supports environmental disclosure.
- **APX, Inc.** designed the infrastructure for all operating systems except Nevada's and is developing a national system to track renewable certificates in states without renewable requirements. It administers the systems for NEPOOL-GIS, M-RETS, and MIRECS.

SO₂ Allowance Spot Prices and NOx Seasonal Allowance Spot Prices



Brief Overview of the SO₂ and NO_x Emissions Markets

The electric power industry is a major source of sulfur dioxide emissions (SO₂) and nitrogen dioxide emissions (NO_x) – both precursors of acid rain and smog. According to the Environmental Protection Agency's (EPA) 2006 Acid Rain Progress Report, the power sector is responsible for 70% of SO₂ emissions and 20% of NO_x emissions.

Currently US policy encourages reduction in SO₂ and NO_x emissions which can be achieved through a cap and trade program. This market based model also allows for relative flexibility in compliance options. An emitting source may choose pollution control technology such as add-on controls like flue gas desulfurization (FGD) for SO₂ and selective catalytic reduction (SCR) for NO_x, fuel switching, and/or participation in the respective cap and trade markets. The decision is primarily driven by the regulatory environment, fuel input type, the level of emission output, and compliance costs, the latter of which affects wholesale and retail prices.

The Acid Rain Program

<http://www.epa.gov/airmarkets/progsregs/arp/index.html>

EPA's Acid Rain Program (ARP), established under the 1990 Clean Air Act Amendments, requires reductions of SO₂ and NO_x emissions from the electric power industry. The Acid Rain Program was the first cap and trade program implemented nationwide to reduce SO₂ emissions.^[1] The SO₂ program set a permanent cap on the total amount of SO₂ that can be emitted by fossil fuel-fired generating units and allows allowance trading so affected sources have some flexibility in their compliance method. Currently, SO₂ sources must surrender one allowance to emit one ton of SO₂. If a source falls short on the number of allowances it needs to comply with its individual cap, it can purchase allowances from another source that has a surplus of allowances. An emitting source may have a surplus of allowances for several reasons. For example, if it chose to install and/or run scrubbers, it can "bank" those unused allowances for future use or sell the leftover allowances to other emitting sources.

The NO_x Budget Trading Program

<http://www.epa.gov/airmarkets/cap-trade/docs/nox.pdf>

In 2003, the cap-and-trade method was also implemented to reduce seasonal (primarily summer) NO_x emissions from fossil fuel-fired plants. While the EPA administers the program, states are required to share the responsibility for allowance allocation and enforcement. Currently, NO_x sources must surrender one allowance to emit one ton of NO_x.

[1] The Acid Rain Program also required NO_x emission reductions by select coal units but under a rate-based regulatory program [<http://www.epa.gov/airmarkets/progsregs/arp/nox.html>].