OE ENERGY MARKET SNAPSHOT

Western States Version – December 2008 Data

- **Special Report**
- **Electricity Markets**
- **Natural Gas and Fuel Markets**

Office of Enforcement
Federal Energy Regulatory Commission
January 2009

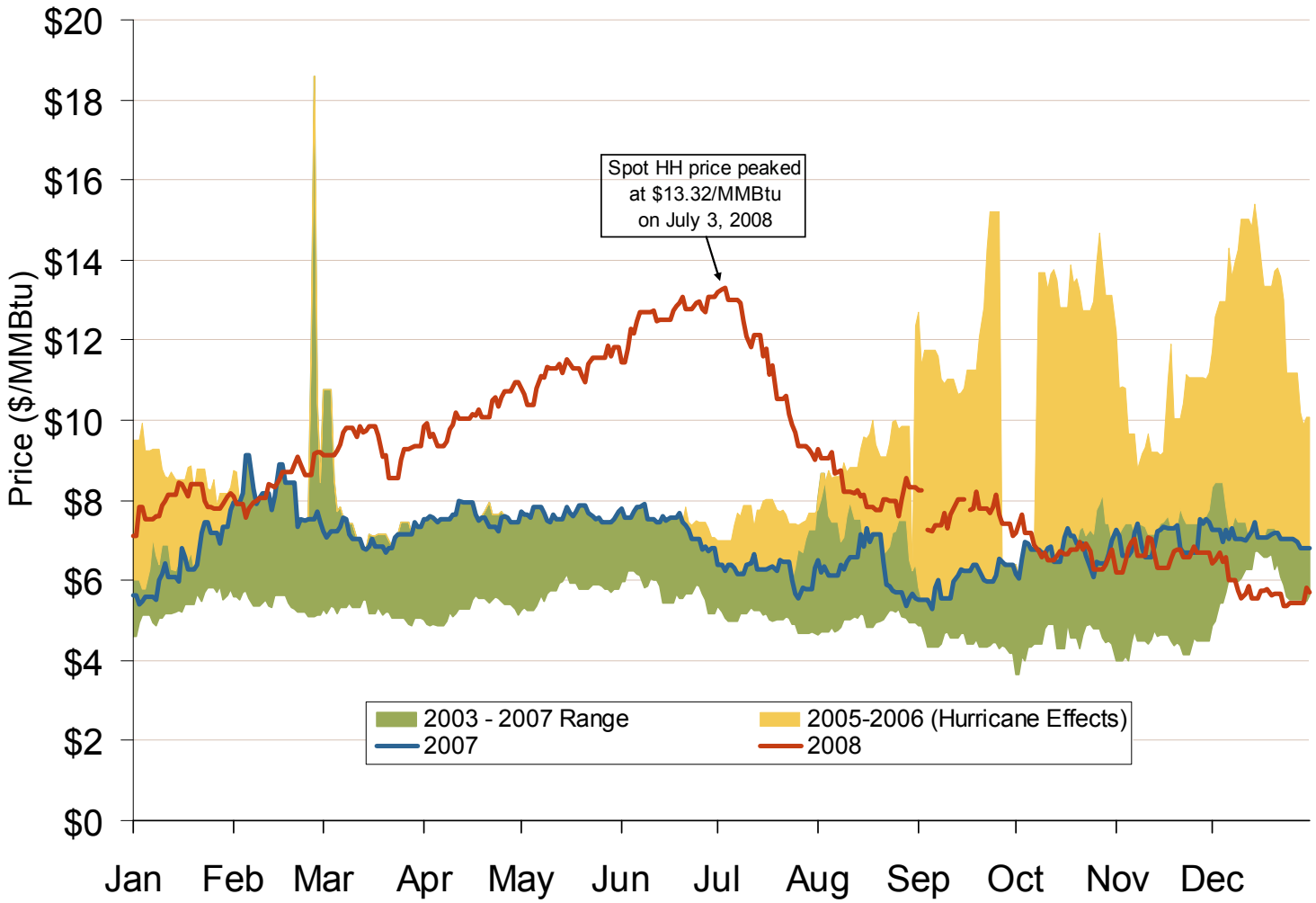
Special Report:

- **Fundamentals of North American Gas Markets in 2008**

2008 Gas Market Fundamentals

- Summer prices reach record highs, then collapse below 5-year average.
- Domestic production up again in 2008.
- Gas consumption growth is primarily due to very high January demand.
- Despite biggest January storage withdrawals in more than 10 years, overall inventories approximate the 5-year average.
- Cool summer helped to reduce consumption growth.
- September hurricane damage defers 300 Bcf of production, but does not prevent gas price collapse.
- Overall gas balance indicates well-supplied market for most of 2008.

Henry Hub Natural Gas Daily Spot Prices
Prices Climb Far Outside the 2003-2007 Range



Source: Derived from *Platts* data.

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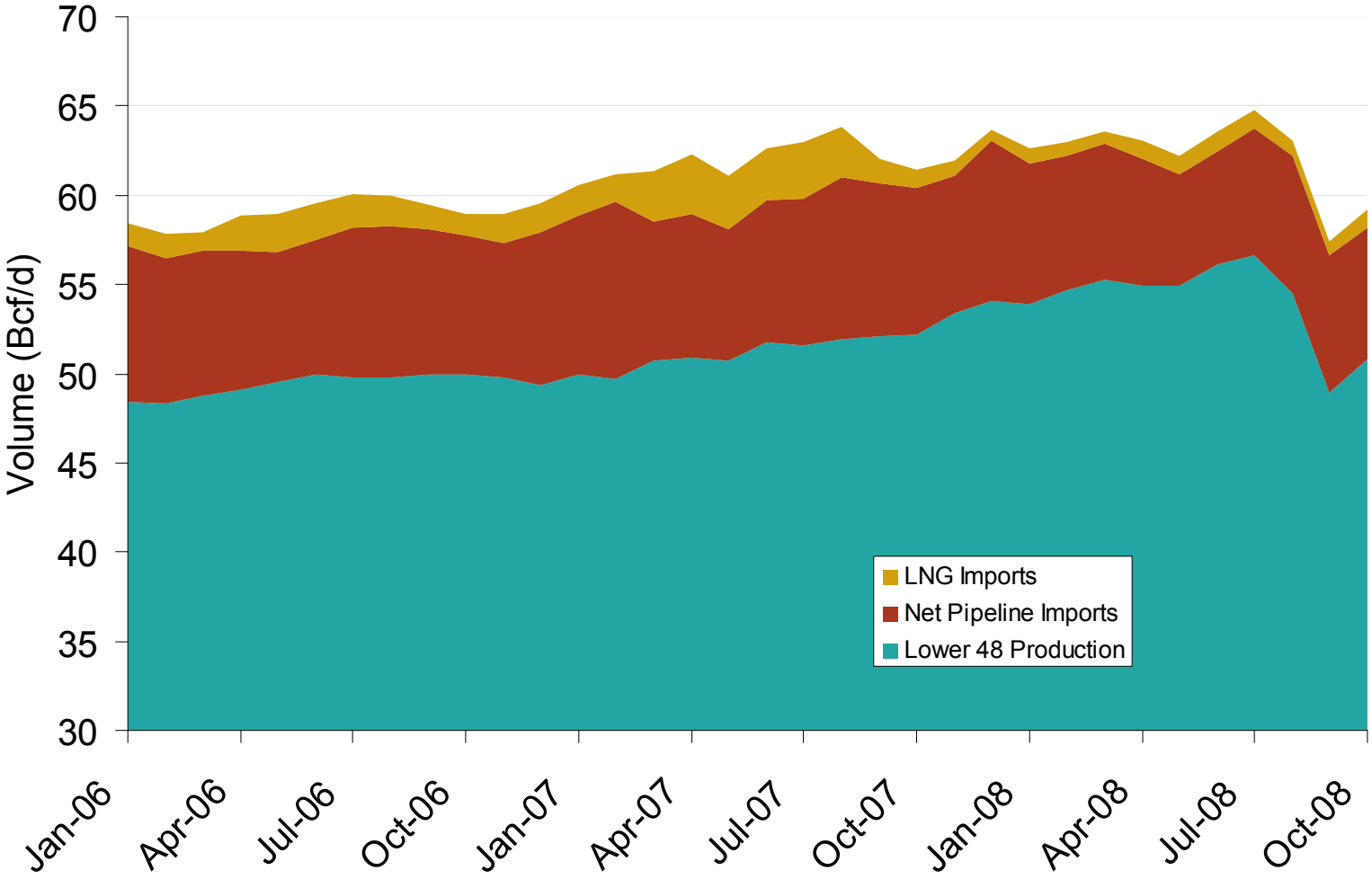
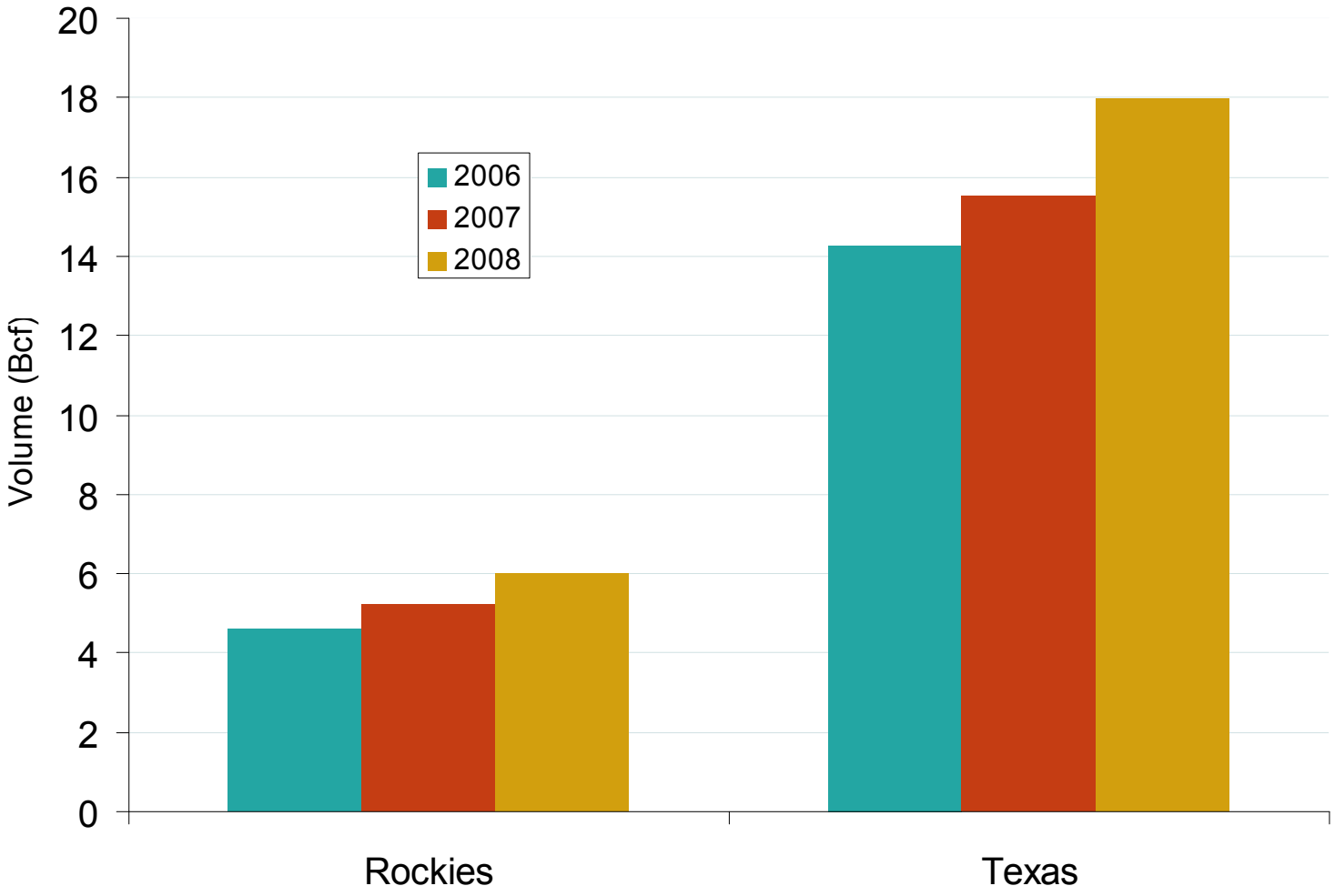
US Gas Supply (Production and Imports) Shows Robust Growth



Source: Derived from EIA, *Monthly Energy Review*.

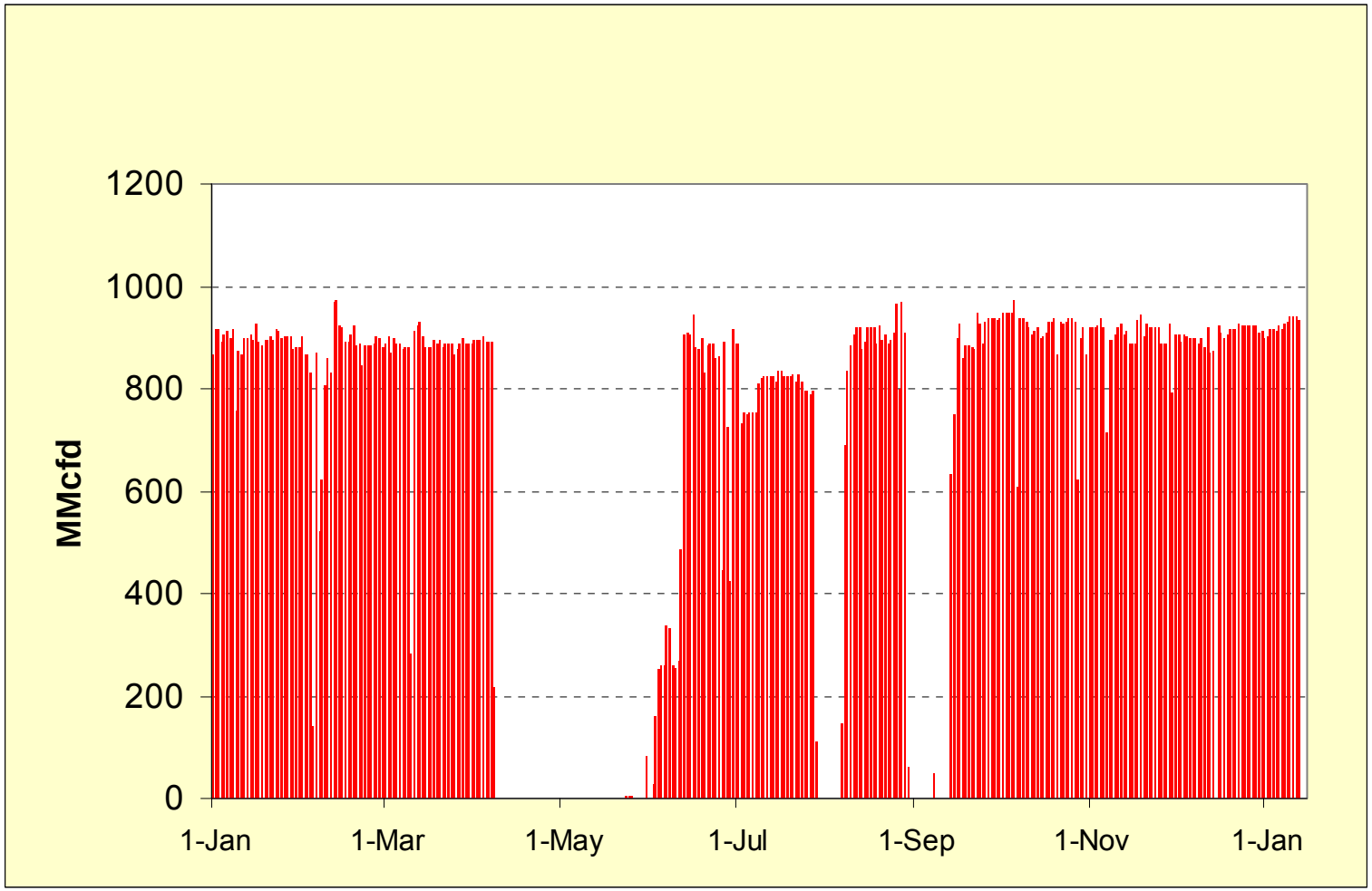
Robust Production Growth Led by Texas and the Rockies



Note: Rockies includes Colorado and Wyoming.

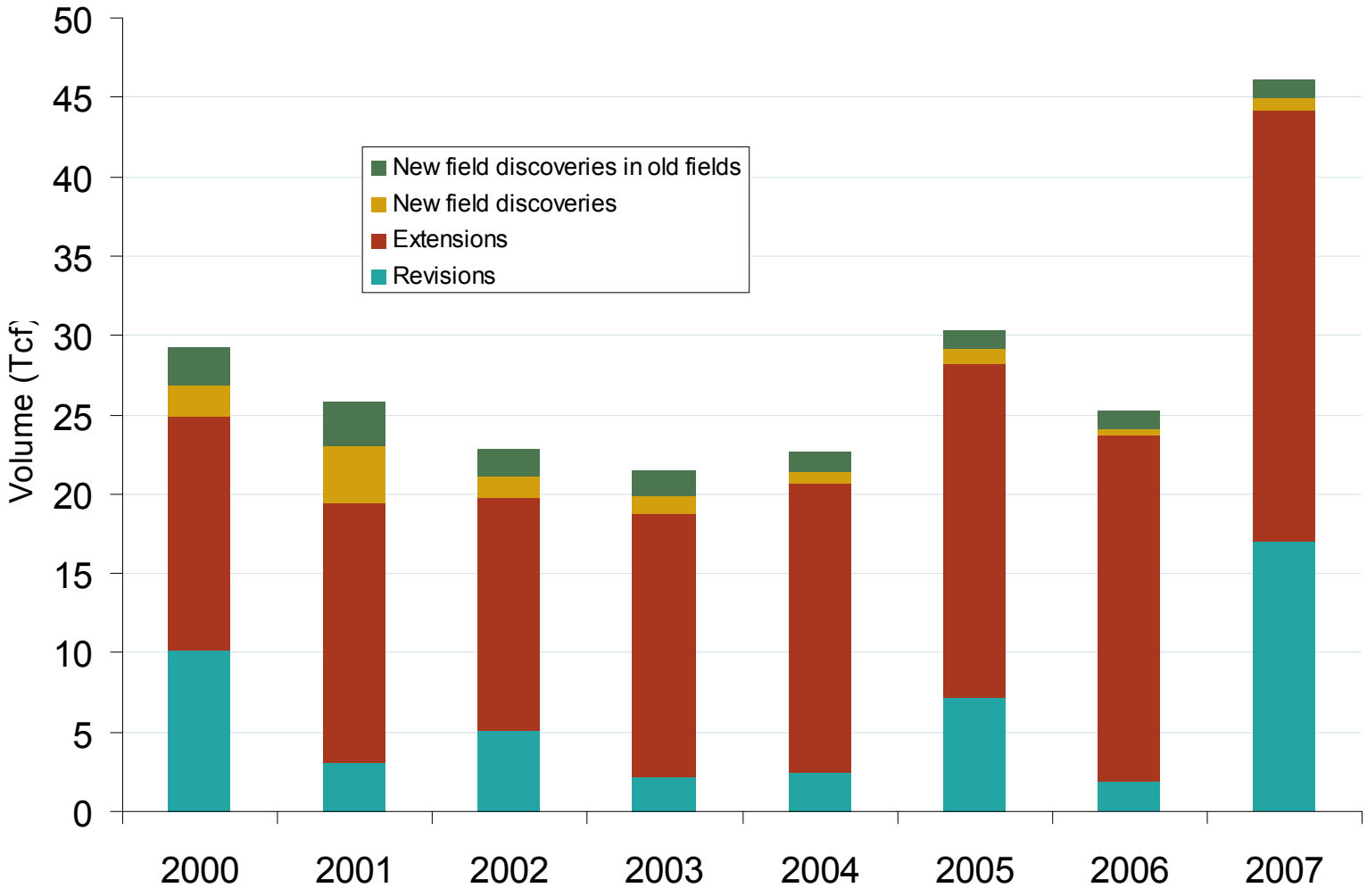
Source: Derived from Bentek Energy data.

Outages Temporarily Reduced Independence Hub Gas Supplies



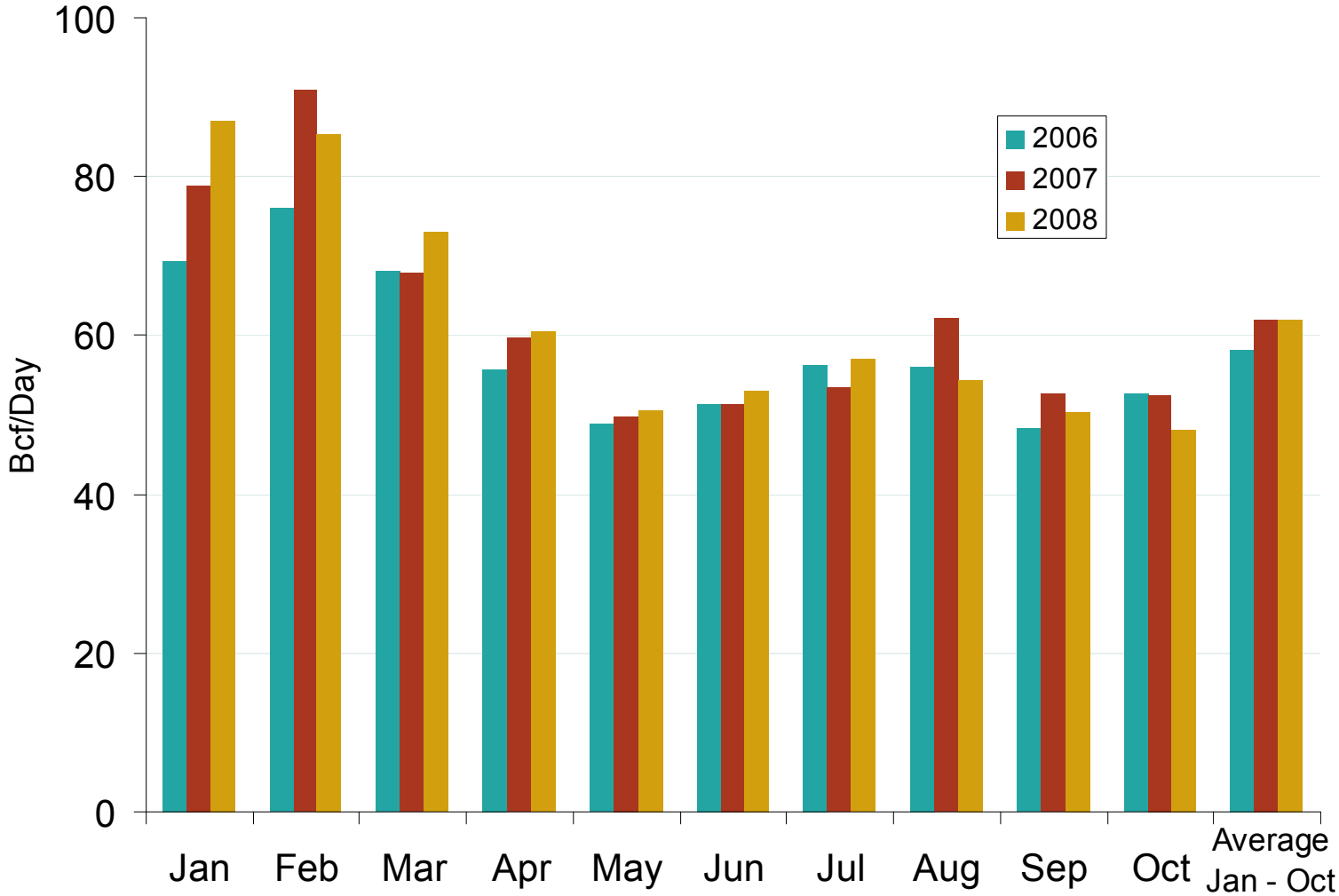
Source: Derived from Bentek Energy data.

Large Natural Gas Reserve Additions in 2007 Lead to Highest Leserves Since 1974



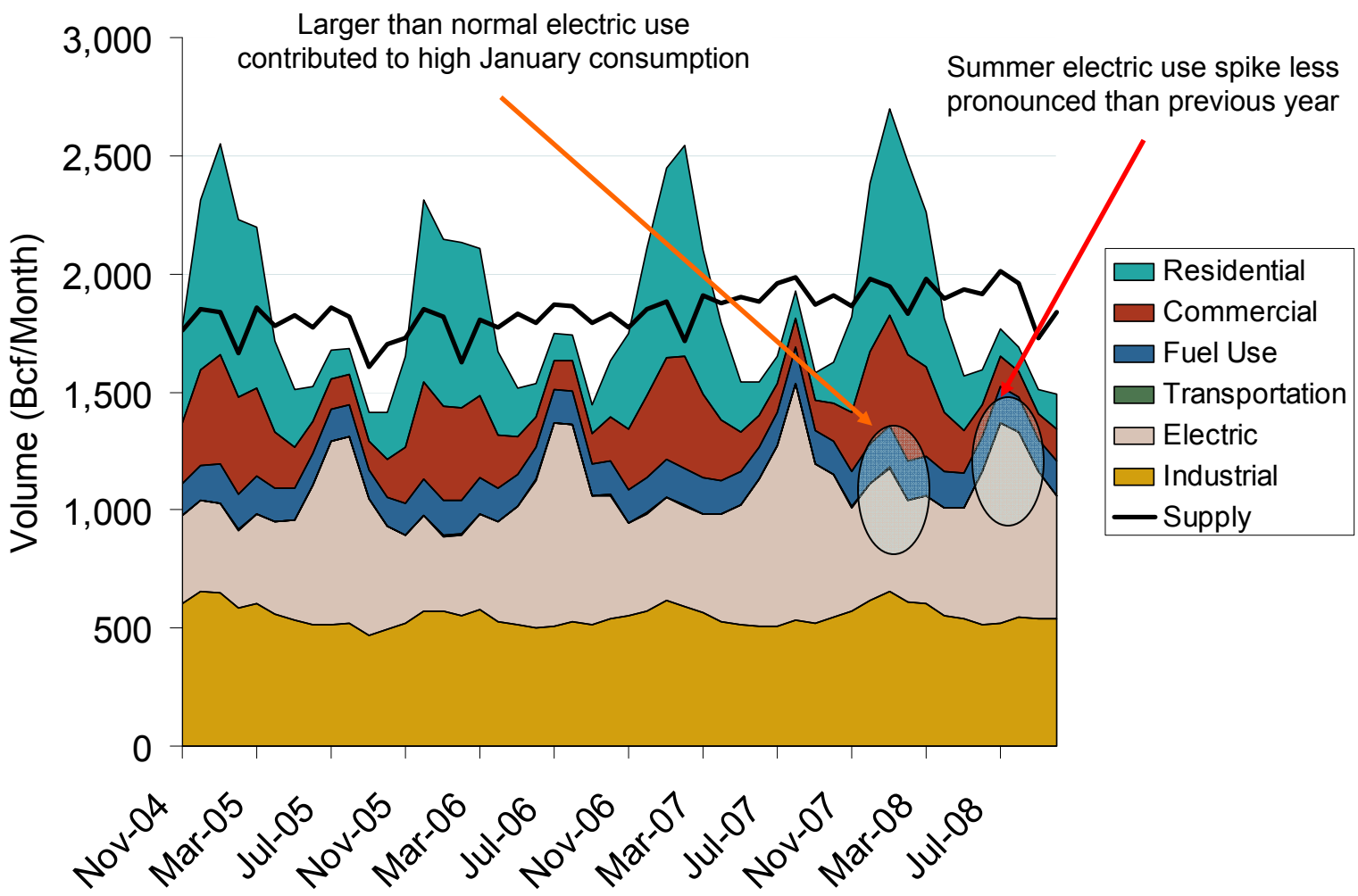
Source: Derived from EIA, *Annual Reserves Report*.

High January Gas Consumption Boosts Consumption Growth in 2008



Source: Derived from EIA, *Monthly Energy Review*.

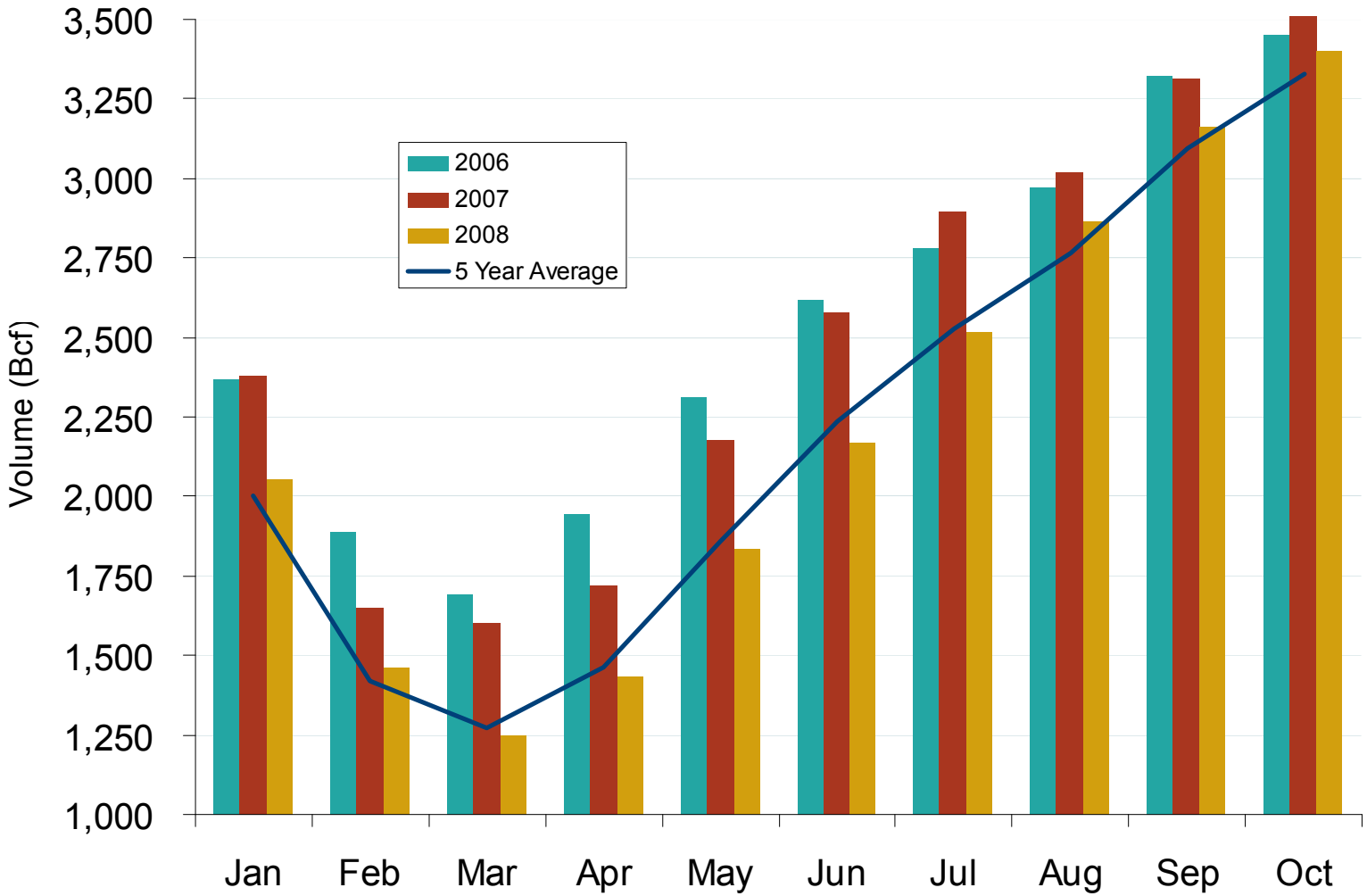
US Gas Consumption by Sector 2004-2008



Note: Supply includes lower 48 state production, net pipeline imports, and LNG imports.

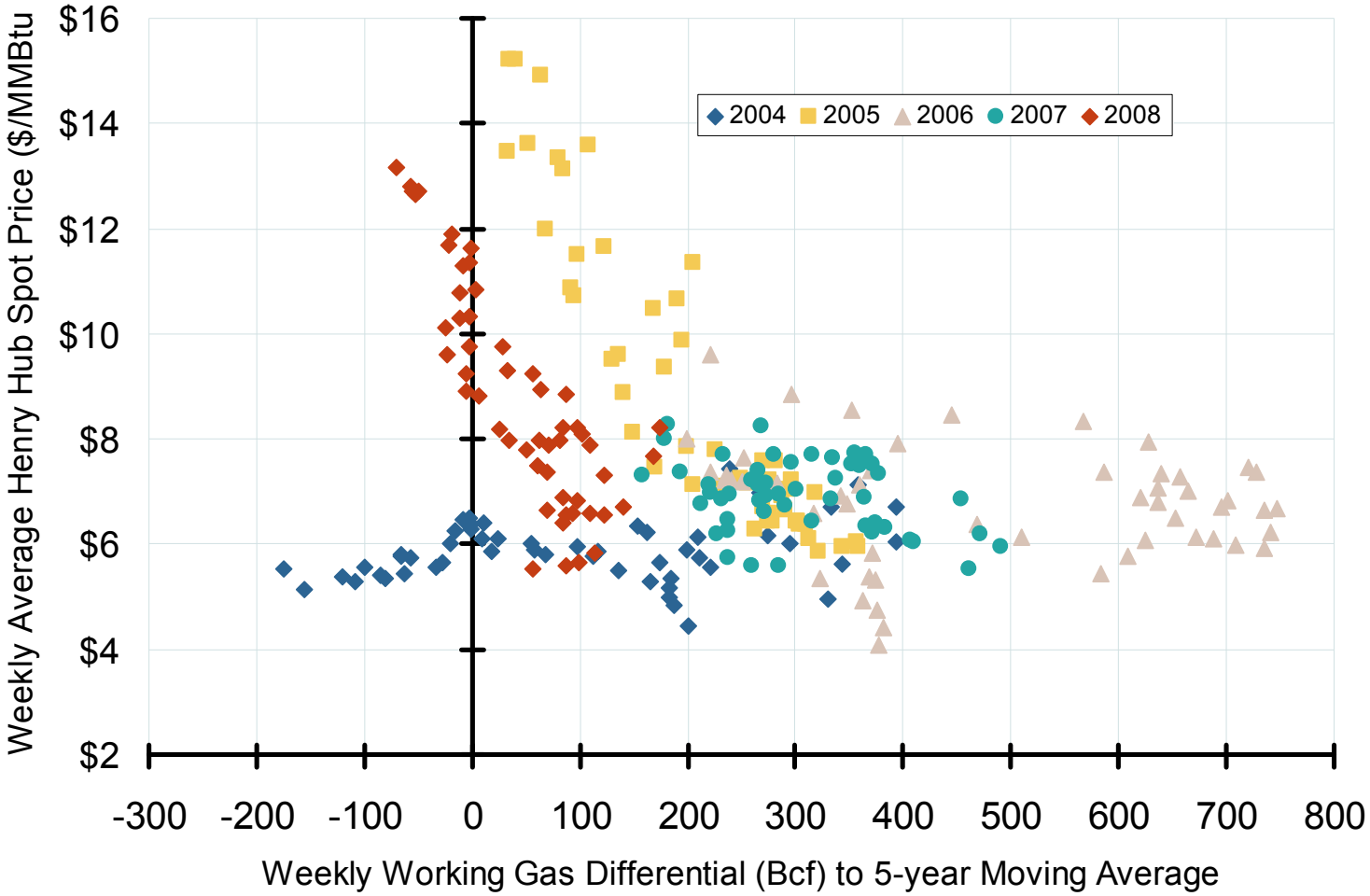
Source: Derived from EIA, *Monthly Energy Review*.

US Gas Inventories Approximate the 5-Year Average, But Were Below 2006-2007 Inventories



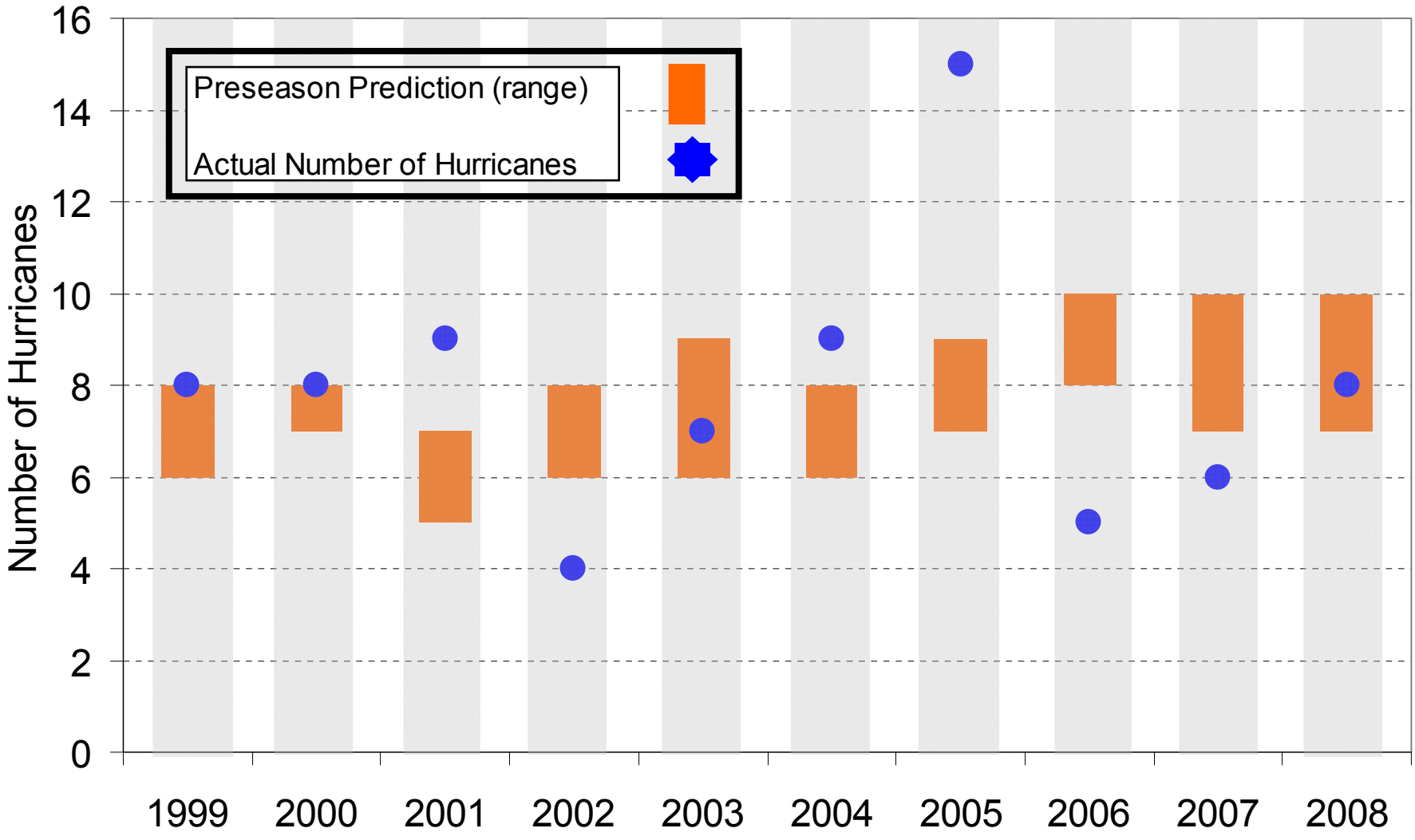
Source: Derived from EIA, *Monthly Energy Review*.

Departures from Average Gas Inventories and Prices



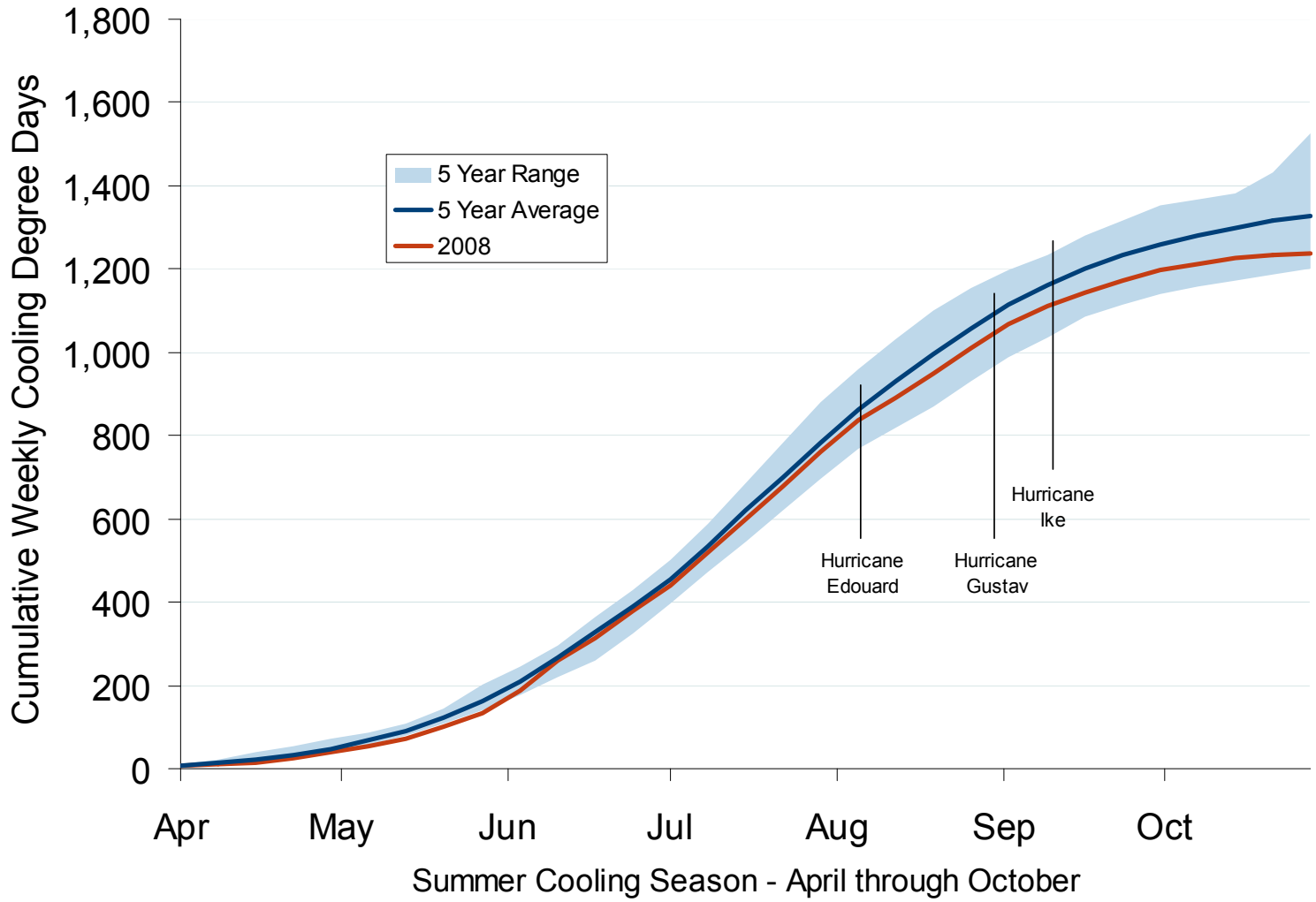
Source: Derived from *EIA* and *ICE d*ata.

NOAA Forecasts for Above Average Hurricane Season



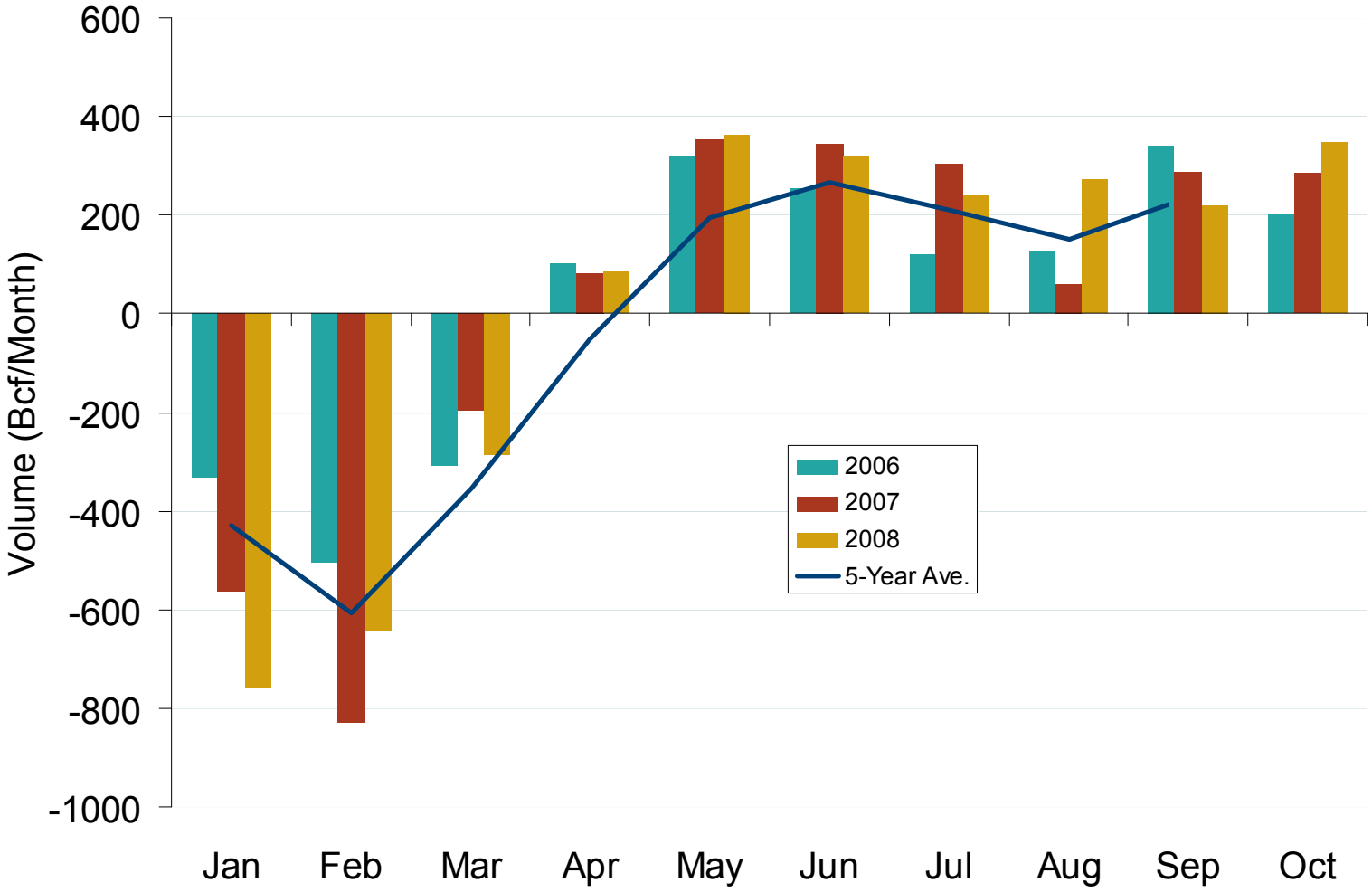
Source: Derived from *NOAA data*.

Summer of 2008 Was Cooler Than the 5-Year Average



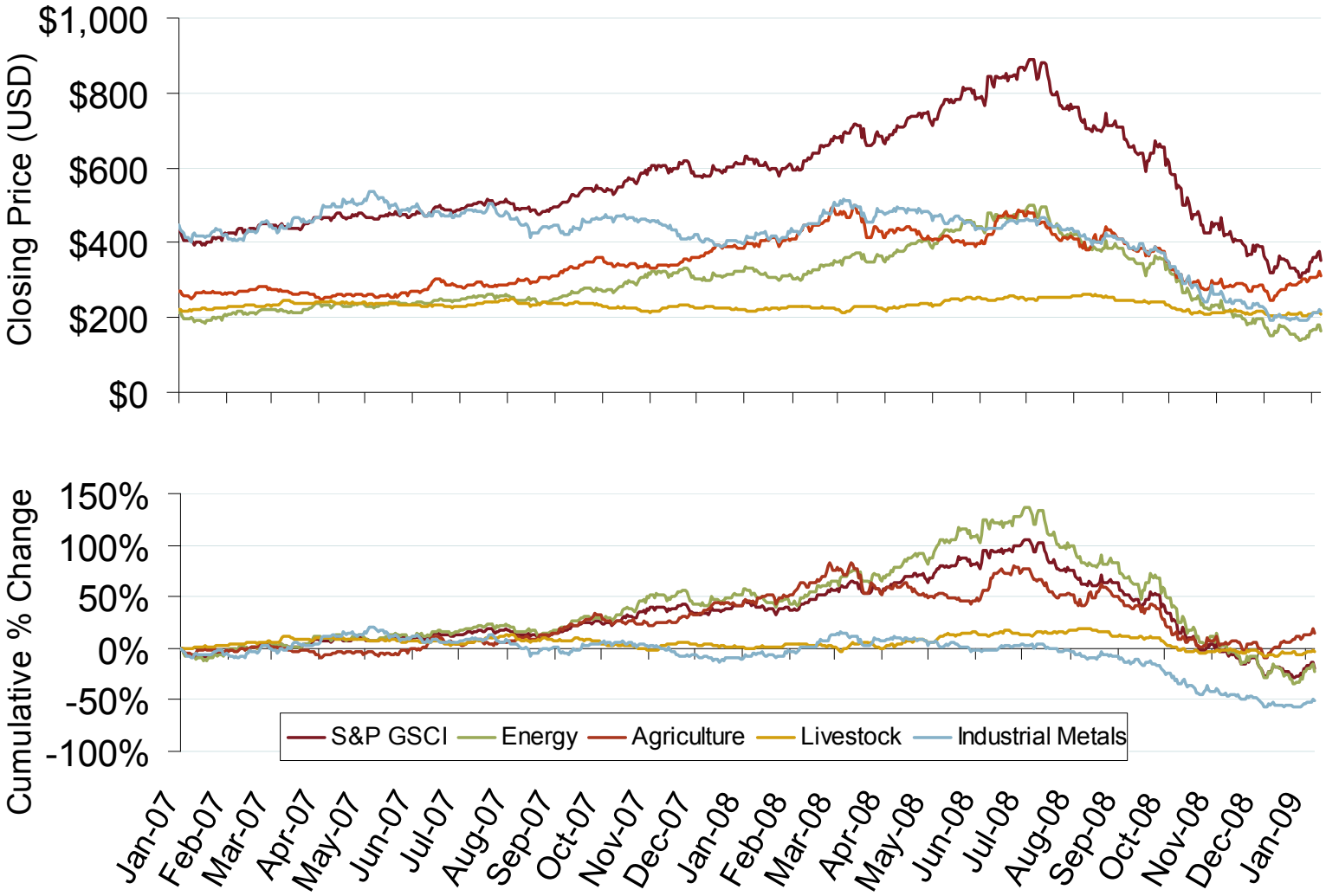
Source: Derived from *NOAA data*.

US Gas Supply and Demand Balance
Gas Market Well Supplied in 2008



Source: Derived from EIA, *Monthly Energy Review*.

S&P Goldman Sachs Commodity Index
Official Closing Price



Source: Bloomberg Data

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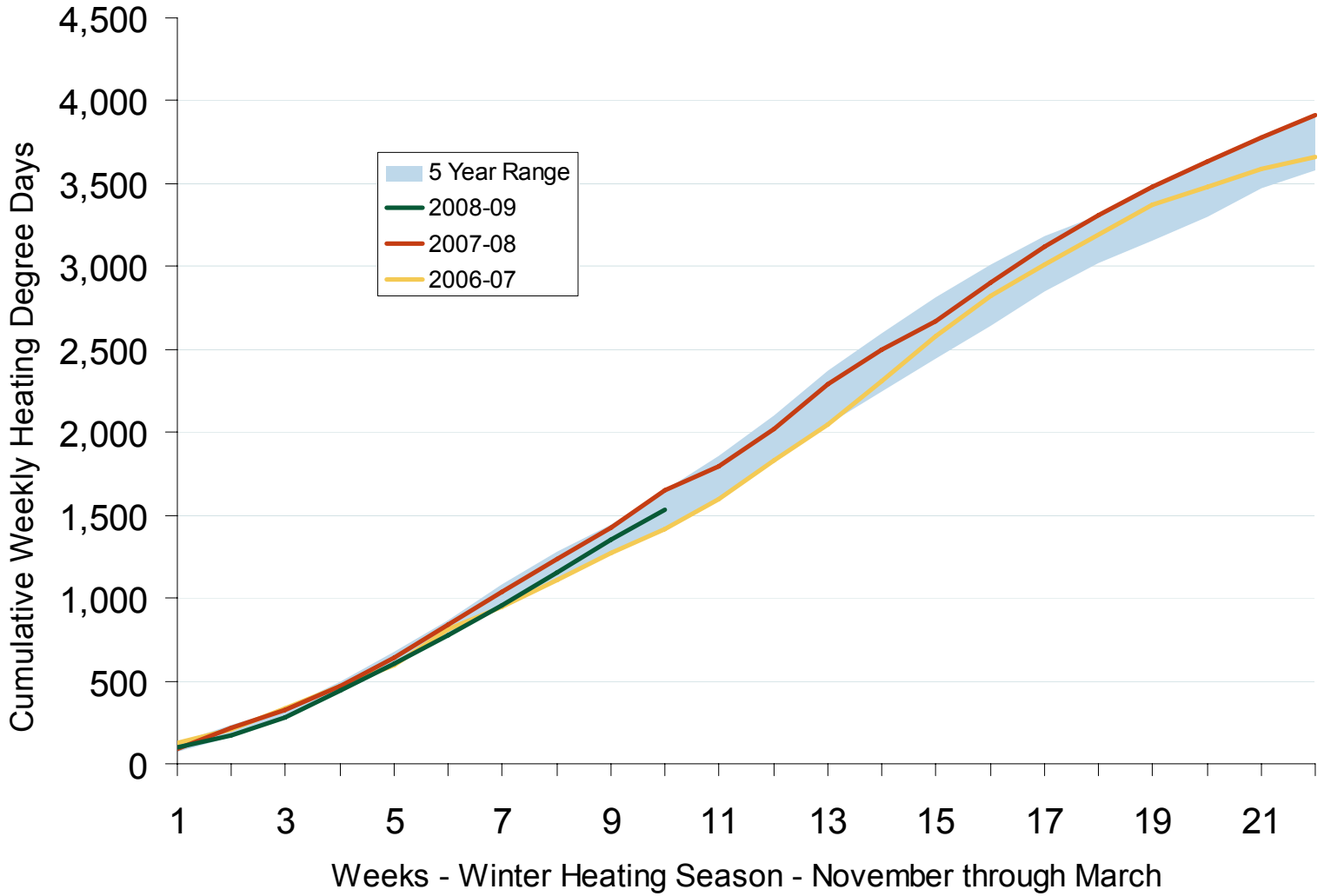
Electricity Markets

U. S. Winter Cumulative Heating Degree Days



Source: Derived from *NOAA* data.

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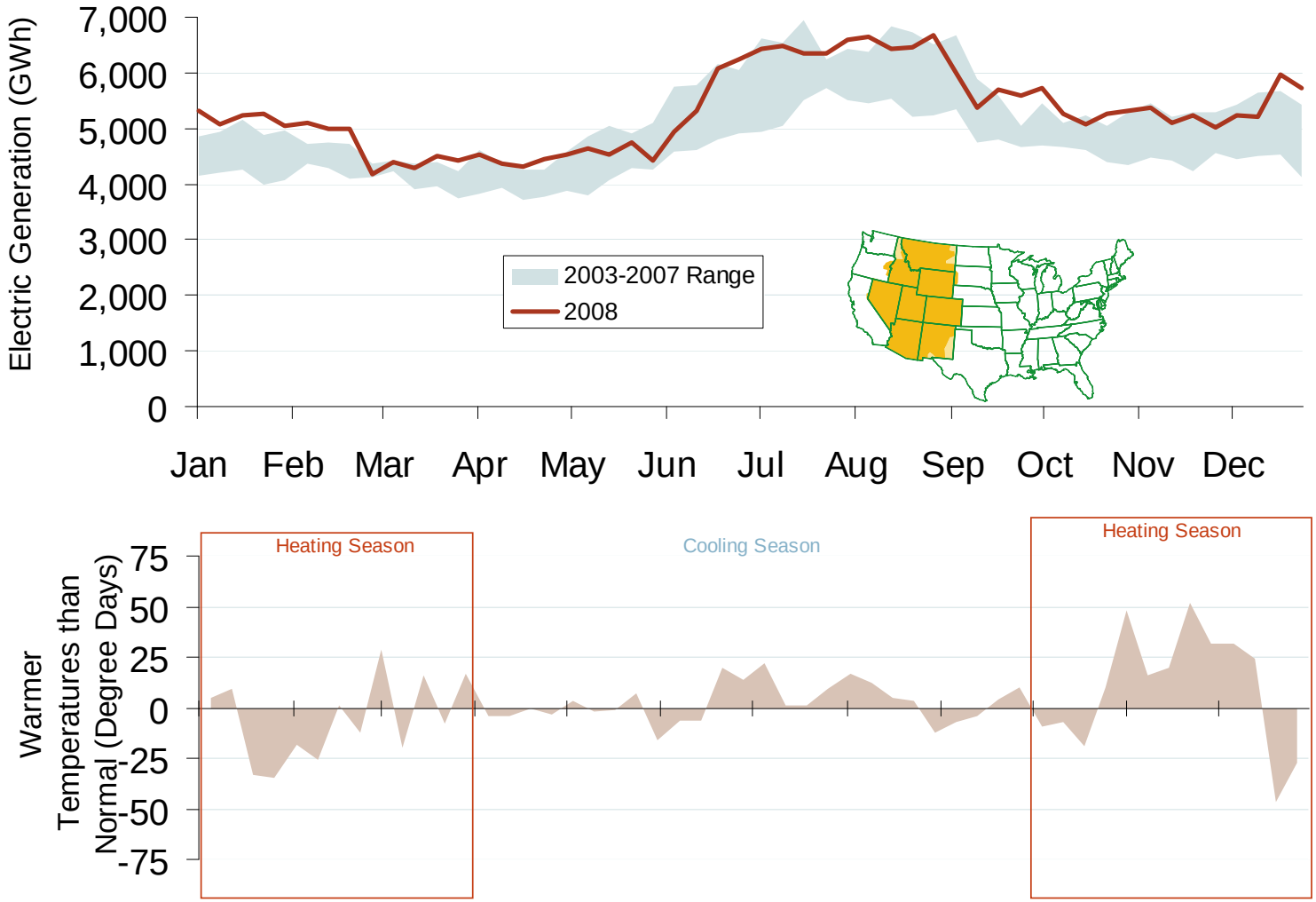
Weekly Electric Generation Output and Temperatures Rocky Mountains Region



Source: Derived from *EEI* and *NOAA* data.

January 2009 Western Snapshot Report

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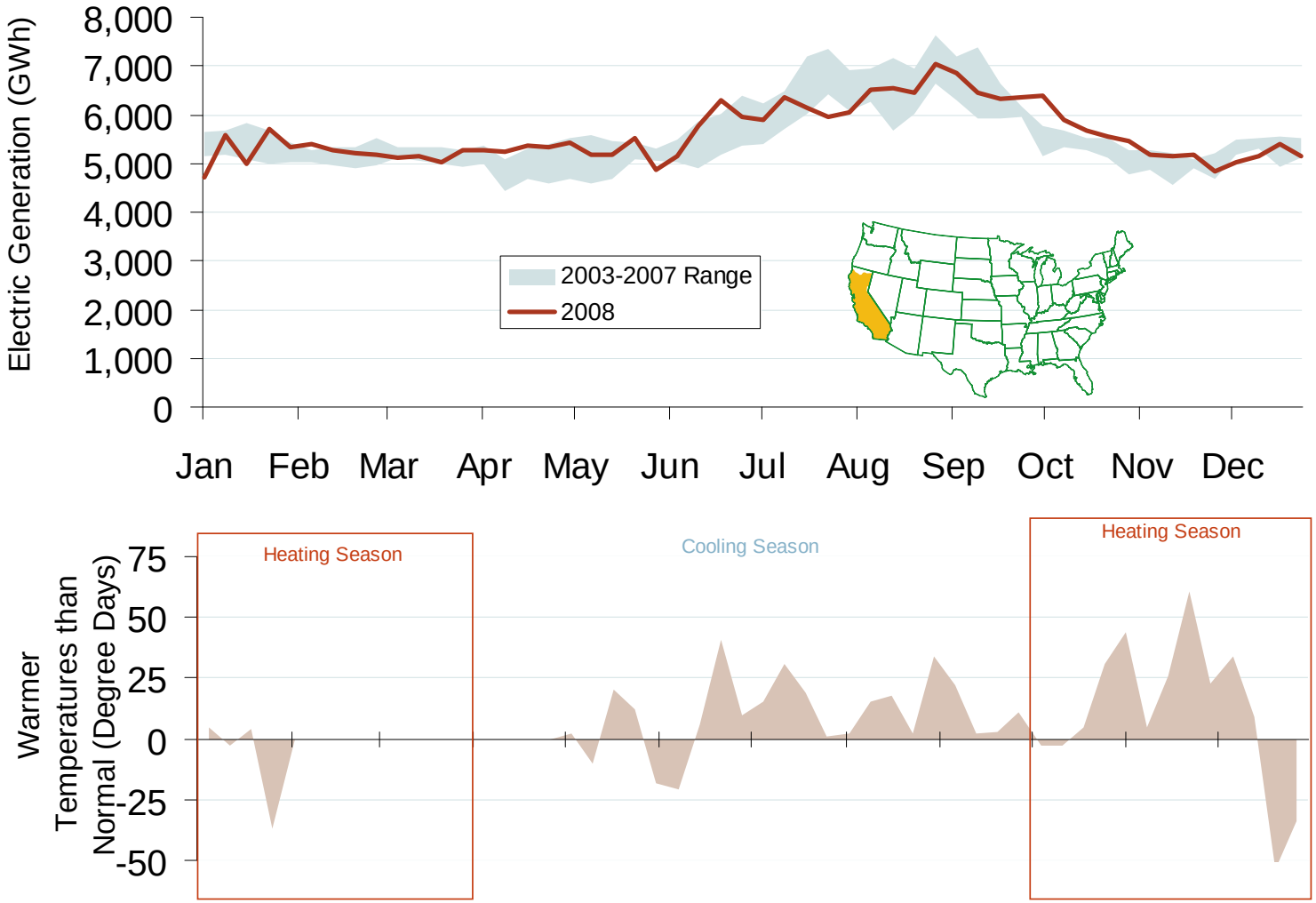
Weekly Electric Generation Output and Temperatures California



Source: Derived from *EEI* and *NOAA* data.

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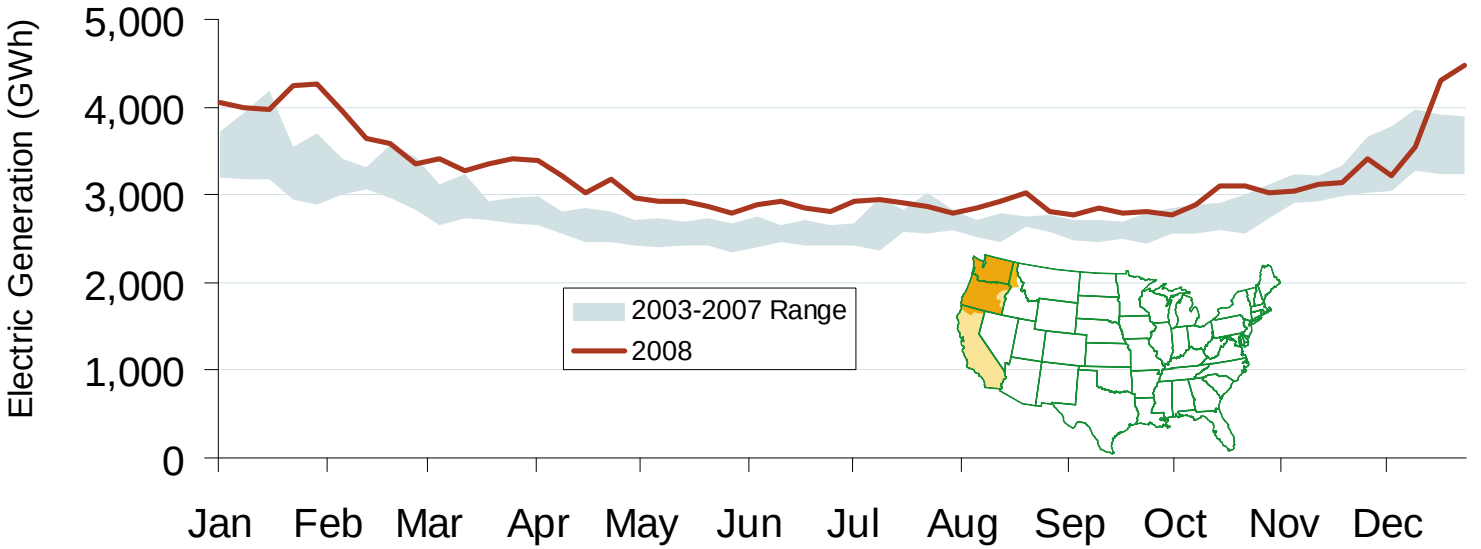
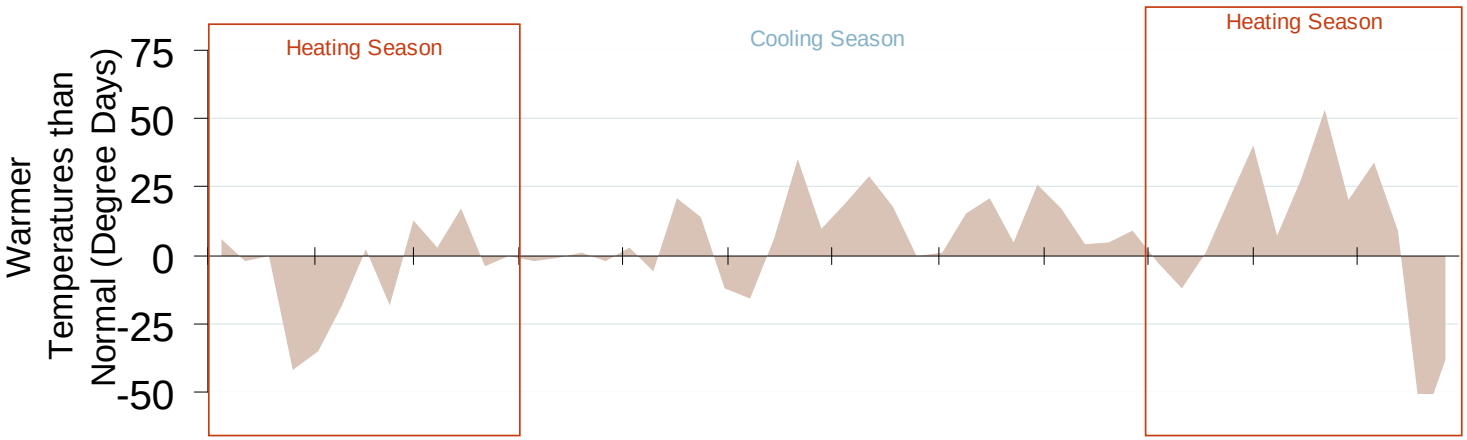
Weekly Electric Generation Output and Temperatures Pacific Northwest Region





Source: Derived from *EEI* and *NOAA* data.

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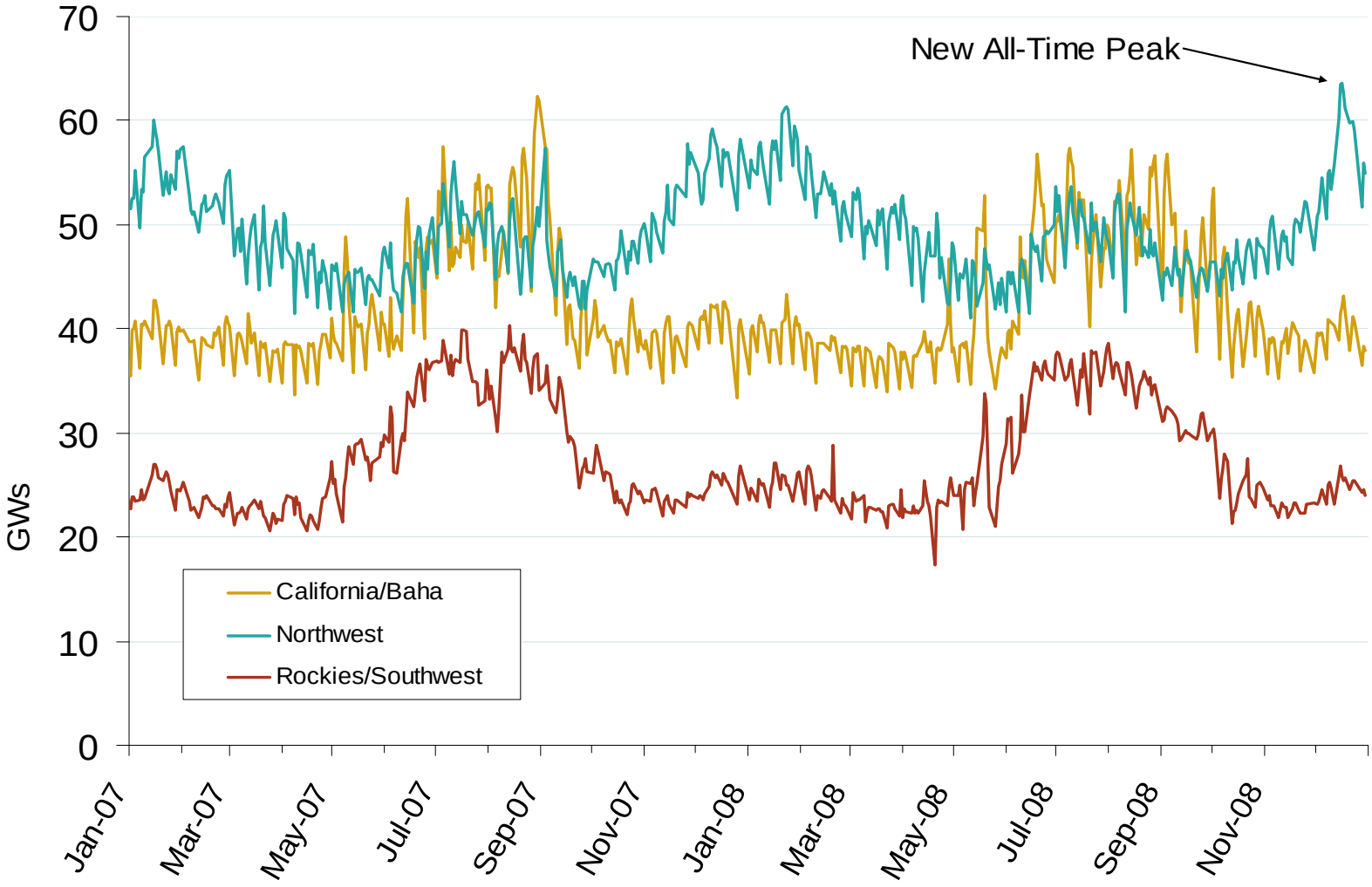
Western Daily Actual Peak Demand



Source: Derived from WECC Daily Report data available at http://wecc.biz. Data shown is generally Sunday through Thursday due to limitations of daily reports.

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Pacific/Northwest Hydro and Snowpack Levels

	Hydro Generation		Snow Water Equivalent[3]		
	In-State Capacity (MW)[1]	Additional Capacity Created Downstream (MW)[2]	One Year Ago (% of average)	1/2/09 (% of average)	1/7/09 (% of average)
California	10,400	0	62%	76%	74%
British Columbia	10,000	16,200	106%	84%	83%
Idaho	2,700	19,700	93%	96%	104%
Washington	21,500	0	108%	87%	97%
Montana	2,700	16,200	95%	88%	97%
Oregon	9,100	0	122%	122%	123%

1 Net summer capacity in megawatts by state (EIA).

2 Approximate electric capacity created by water flow through the downstream states (EIA and BPA). The capacity estimates reflect the water flow pattern of the series of hydro facilities on the Snake and Columbia Rivers.

3 Snow Water Equivalent, in percent of the historical average for the same date, is the ratio of current snow water daily data (collected by the Natural Resources Conservation Services' Snowtel Telemetry sites) compared to the average snow water for the same day between 1961-1990. Total Hydro Capacity figures by state do not tie precisely to Snow Water Equivalent data due to such factors as snow basin terrain and complex distribution of run-off to neighboring state hydroelectric dams or shared facilities (e.g., Columbia River hydroelectric dams on the border of Washington and Oregon) (Bloomberg, California Dept. of Water Resource and Government of British Columbia Ministry of Environment).

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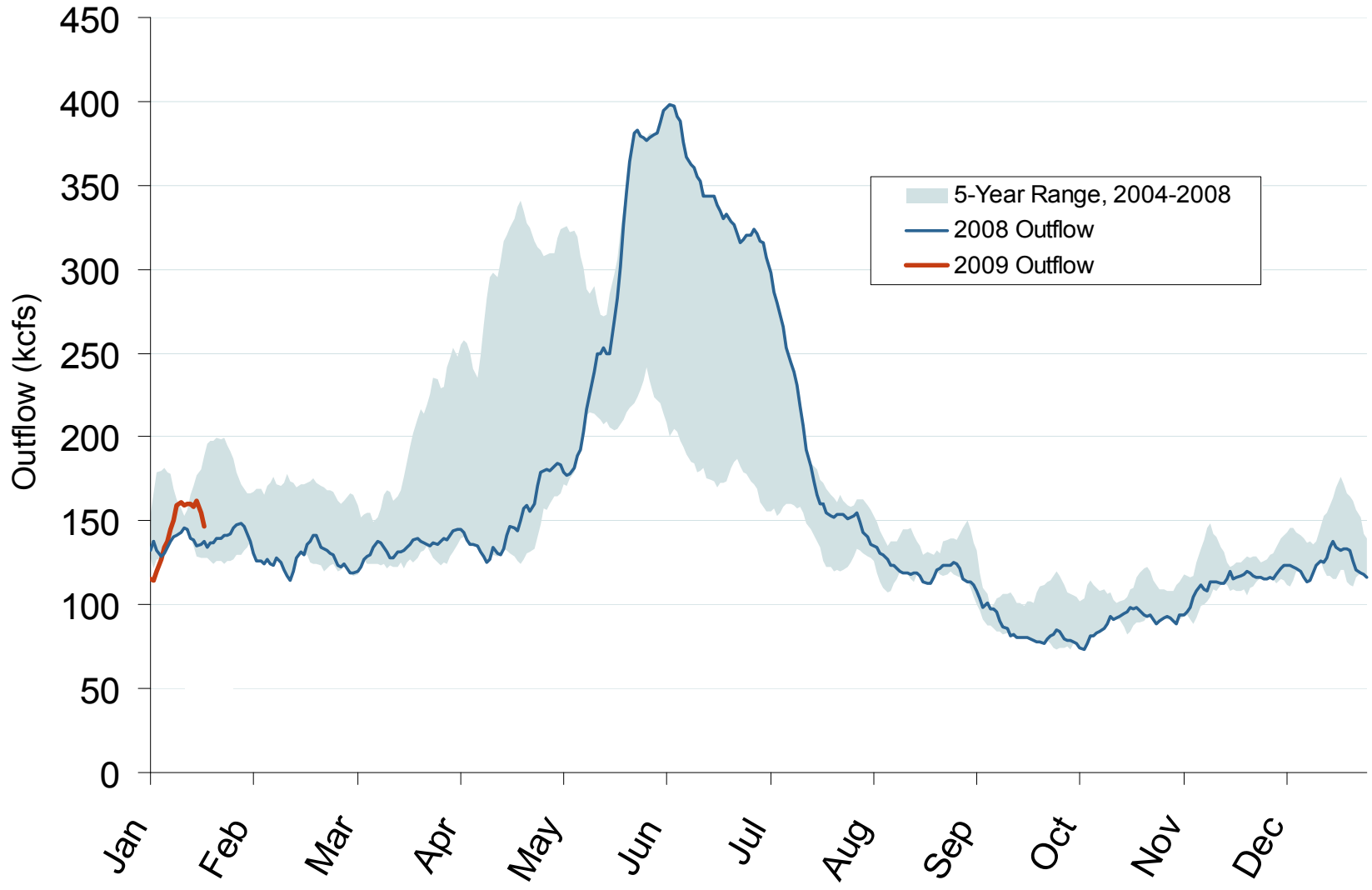
Stream Flow at The Dalles Dam



Source: Derived from *USACE* data.

Trend lines are 7-day moving averages.

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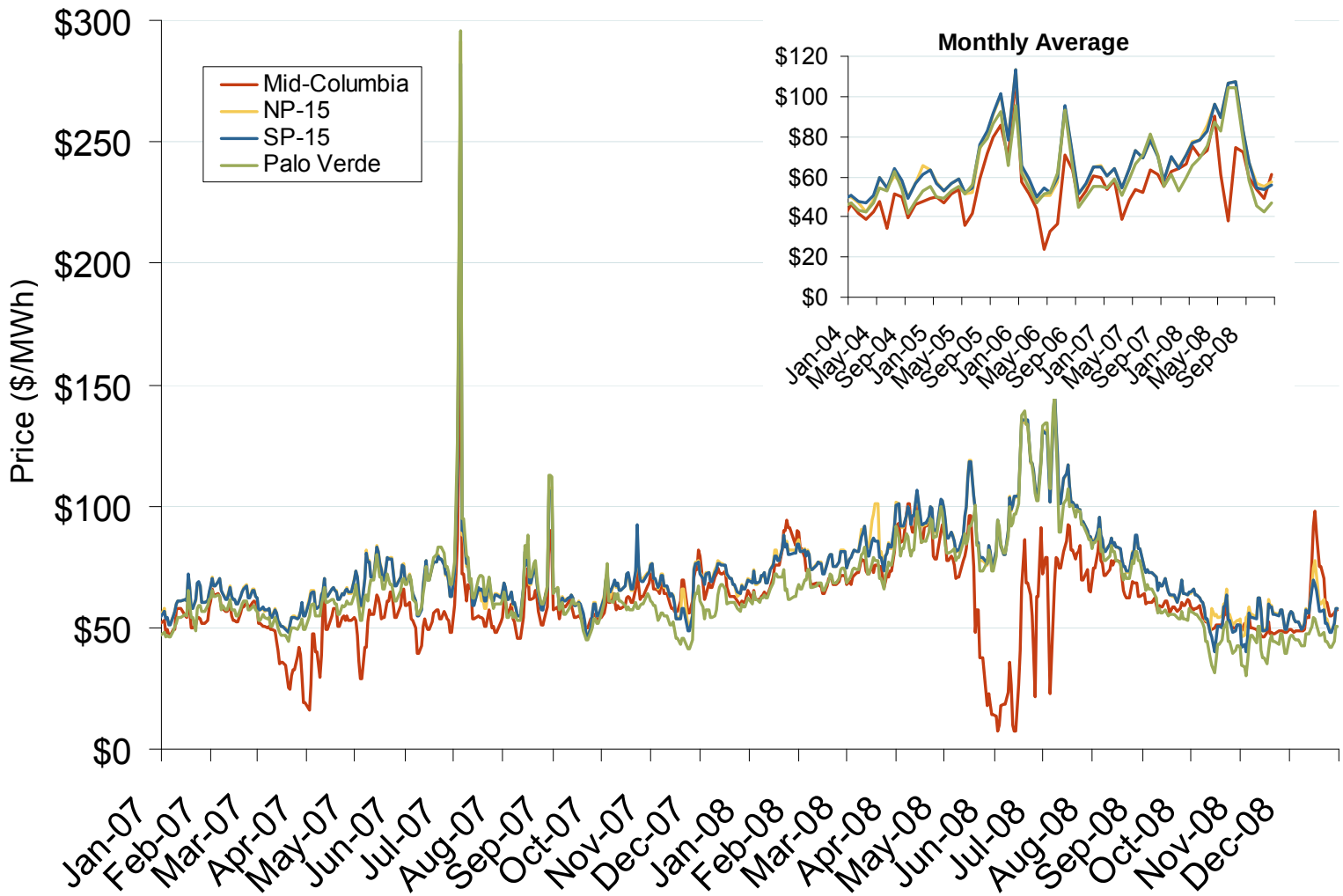
Western Daily Bilateral Day-Ahead On-Peak Prices



Source: Derived from *Platts* data.

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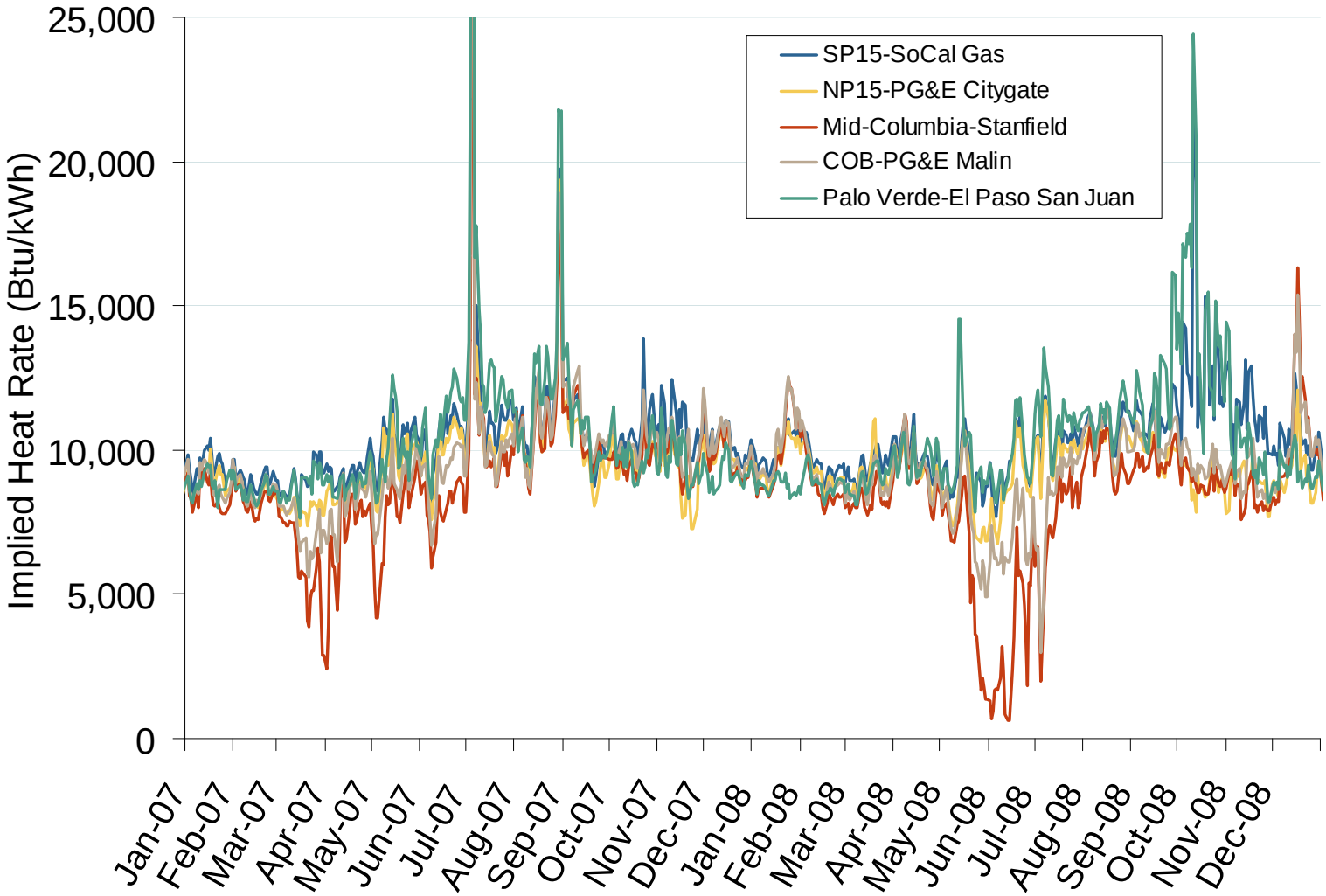
Implied Heat Rates at Western Trading Points



Source: Derived from *Platts* data

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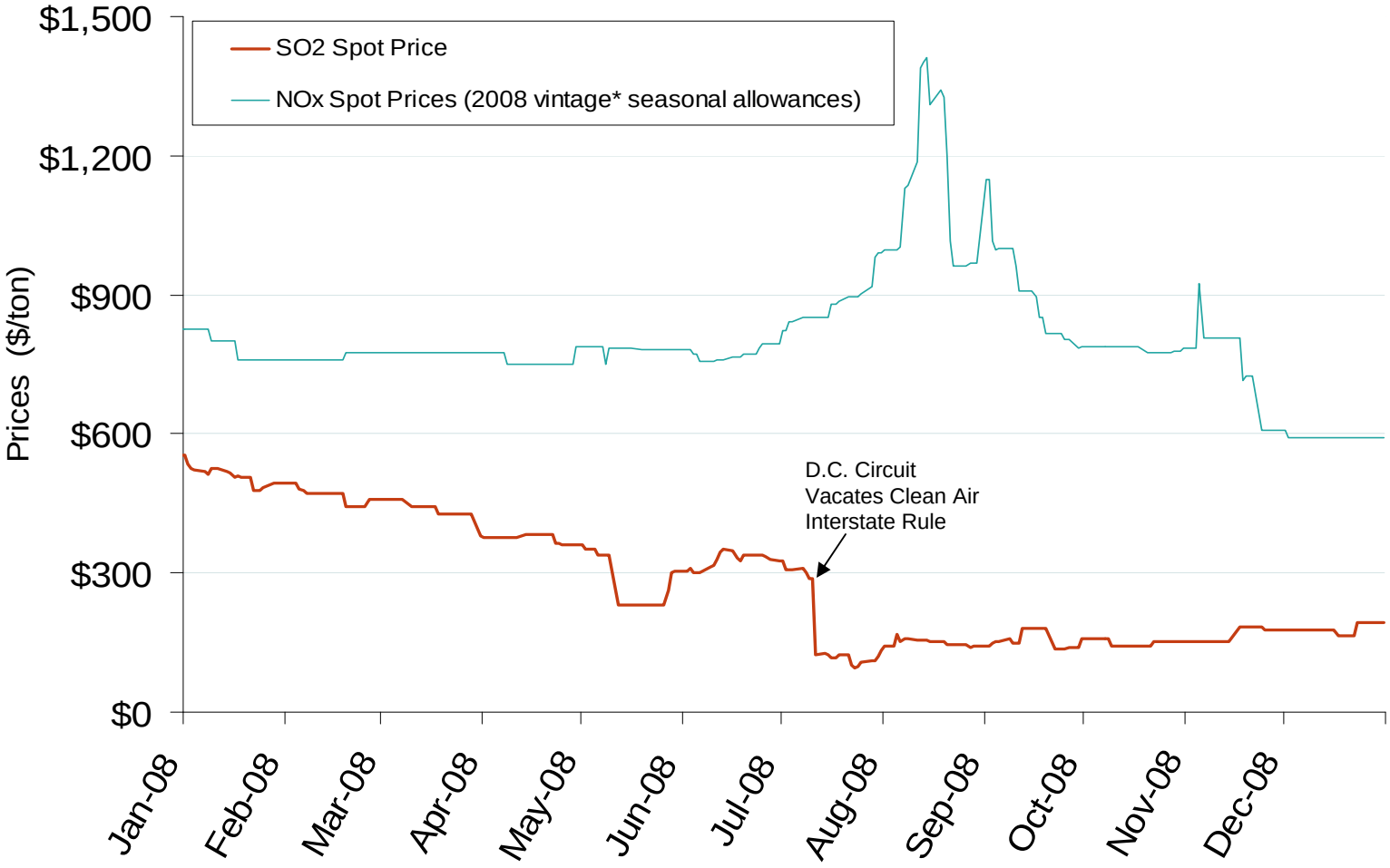
SO_2 Allowance Spot Prices and NOx Seasonal Allowance Spot Prices



Source: Derived from *Cantor Fitzgerald* data.

* Earliest year an allowance may be applied against emissions.

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Renewable Energy Portfolio Standards (RPS)

28 states and D.C. have an RPS

WA: 15% by 2020

OR: 25% by 2025; small utilities 5-10%

ID: Priority to DR, EE, and in-state RE

CA: 20% by 2010; goal: 33% by 2020

NV: 20% by 2015; solar 5% per year

UT: 20% by 2025

CO: 20% by 2020; co-ops & munis 10%; includes 4% solar

AZ: 15% by 2025; includes 30% DG

NM: 20% by 2020; co-ops 10%

TX: 5,880 MW by 2015; goal: 10,000 MW by 2025

HI: 20% by 2020; *proposed increase to 40%* by 2030 agreed to for 2009 session

MT: 15% by 2015

ND: 10% by 2015

SD: 10% by 2015

KS: 20% wind by 2020

OK: Studying an RPS

MN: 25% by 2025 Xcel 30% by 2020

IA: 1,105 MW by 2011*

MO: 15% by 2021; at least 2% solar

AR: Utility IRPs to include RE

WI: 10% by 2015

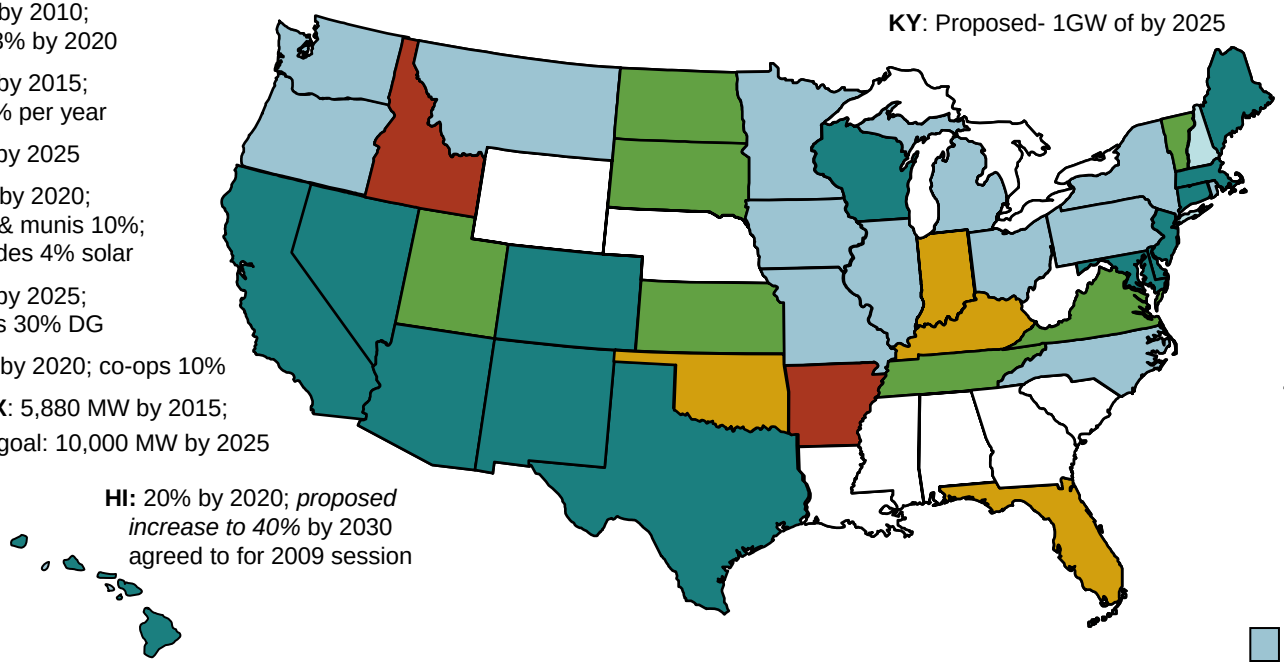
IL: 25% by 2025

MI: 10% by 2015, and new RE capacity: 1,100 MW by 2015

OH: 12.5% by 2025; 0.5% solar

IN: Introduced- 25% by 2026

KY: Proposed- 1GW of by 2025



ME: 40% by 2017 goal: 3 GW wind by 2020

NH: 23.8% BY 2025

VT: 25% by 2025

MA:15% by 2020; goal: 250 MW solar by 2017

RI: 16% by 2019

CT: 23% Class I/II by 2020 4% Class III by 2010

NY: 25% by 2013

PA: 8% Tier I, 10% Tier II by 2020; 0.5% solar set-aside

NJ: 22.5% by 2020; 2% solar

DE: 20% by 2019, with 2% solar

DC: 20% by 2020, with 0.4% solar

MD: 20% by 2022, with 2% solar

VA: 12% by 2022

TVA: 50% of generation from zero- or low-carbon sources by 2020*

NC: 12.5% by 2021 co-ops & munis: 10% by 2018

FL: PSC draft RPS: 20% by 2020

- RPS
- Strengthened/ amended RPS
- Voluntary standards or goals
- Proposed RPS or studying RPS
- Other renewable energy goal

Updates at: http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-rps.pdf

Notes: Alaska has no RPS; * Iowa has a goal of 1,000 MW of wind by 2010; TVA's "Renewable Energy and Clean Energy Assessment" is from the Public Power Authority; it is not a state policy.
Abbreviations: DG: distributed generation; DR: demand response; EE: energy efficiency; IRP: integrated resource plan.
Sources: Derived from data in: EEI, EIA, LBNL, PUCs, State legislative tracking services, Database of State Incentives for Renewables and Efficiency, Pew Center, and the Union of Concerned Scientists.

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Renewable Energy Portfolio Standards

- **A Renewable Portfolio Standard (RPS)** requires a percent of energy sales or installed capacity to come from renewable resources.
- **29** states and D.C. have renewable energy standards.
- **Six** states have renewable goals without financial penalties: UT, ND, KS, MO, SD, VA, and VT.
- **Sixteen** states include energy efficiency in their RPS or renewable goals; more are considering energy efficiency additions or companion bills.
- Recent state policy developments include:
  - **Indiana** introduced an RPS. Similar bills were introduced before, but did not pass. (Jan 7)
  - **New York** Governor Patterson called for increasing the RPS to 30% by 2015, and decreasing electric use by 15% through EE measures, dubbing his plan "45 by 15." (Jan 7)
  - **Delaware**'s Energy Advisory Group recommended expanding the RPS to include two large munis and co-ops and evaluating whether to increase the RPS to 20% by 2020. (Jan 8)
  - **Florida's PSC** approved a draft RPS that now goes to the legislature to be ratified. (Jan 9)
  - **Kansas** Governor Sibelius' 2009 legislative plan includes codifying the voluntary RPS. (Jan 9)
  - **Wisconsin** and **Hawaii** announced in late 2008 they would seek to amend and strengthen their RPS's in the 2009 legislative session.

OVERVIEW OF 2008 RPS DEVELOPMENTS:

- **Three states passed a new RPS:** Ohio, Michigan, and Missouri. Ohio's and Michigan's were by state legislation; Missouri's was the third RPS to pass by ballot (after Colorado and Washington state).
- **Five jurisdictions amended or strengthened** existing standards: Washington, D.C.; Maryland; Massachusetts; Minnesota; and New Hampshire.
- **Four states** with an existing goal or RPS strengthened them: ME, VT, CA, HI. Maine enacted an installed wind goal. Vermont increased its goal to 25% RE by 2025. California's goal, set by Executive Order, is to increase RE to 33% by 2020. Hawaii set a goal of 70% of energy from renewable sources by 2030.
- **Four states** adopted a voluntary RPS or renewable goal: SD, UT, KS, and FL. South Dakota (Feb) and Utah (April) and enacted goals without non-compliance penalties. An MOU between the Governor and Kansas utilities created its goal. Florida's goal, via Executive Order, is for utilities to produce 20% from RE, but its PSC approved a draft RPS (Jan 9) that will be sent to the legislature by Jan 30.
- Kentucky and Oklahoma are working to establishing a renewable standard by legislation in 2009. In 2008, OK passed a bill allowing recovery of wind-related transmission costs.
- Several states issued major energy plans or draft plans with goals encompassing renewable energy, energy efficiency, and greenhouse gas reduction, including Kentucky, New Jersey, New York, and Vermont.

Abbreviations: EE: Energy Efficiency; MOU: Memorandum of Understanding; RE: Renewable Energy

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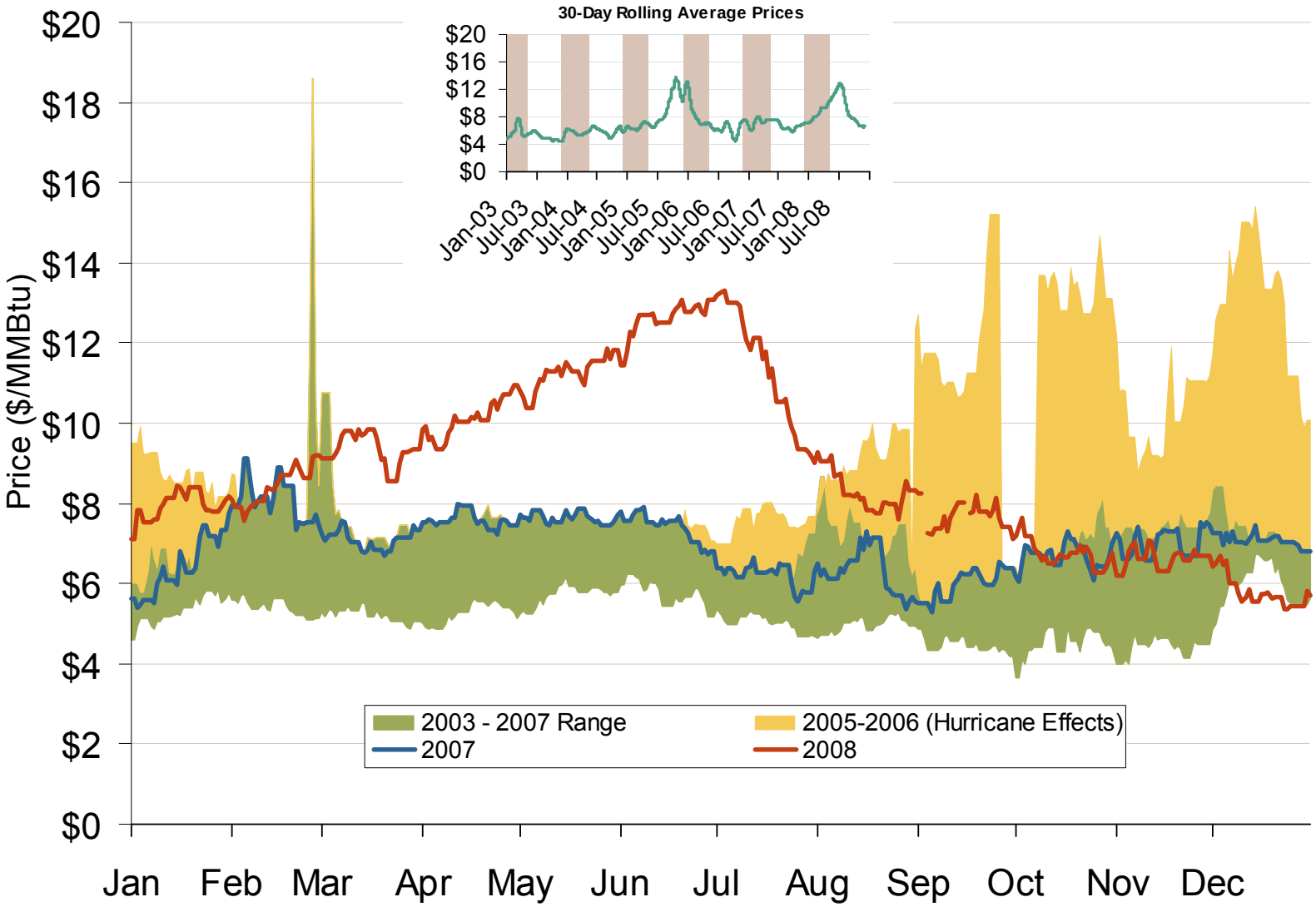
Natural Gas and Fuel Markets

Natural Gas Market Overview: 5 Year Range of Henry Hub Spot Prices

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

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



Source: Derived from *Platts* data.

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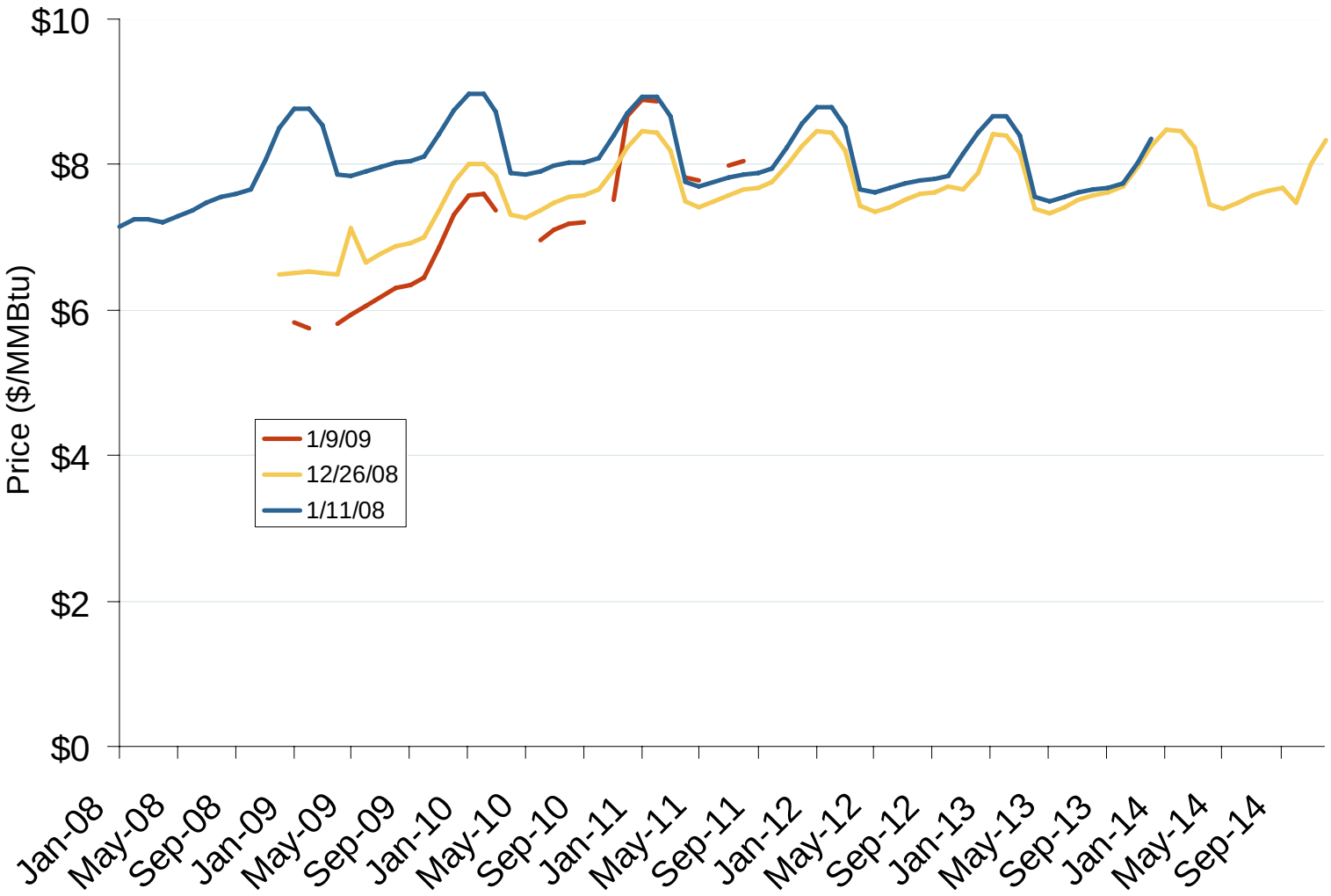
NYMEX Natural Gas Forward Price Curve



Source: Derived from *NYMEX* data.

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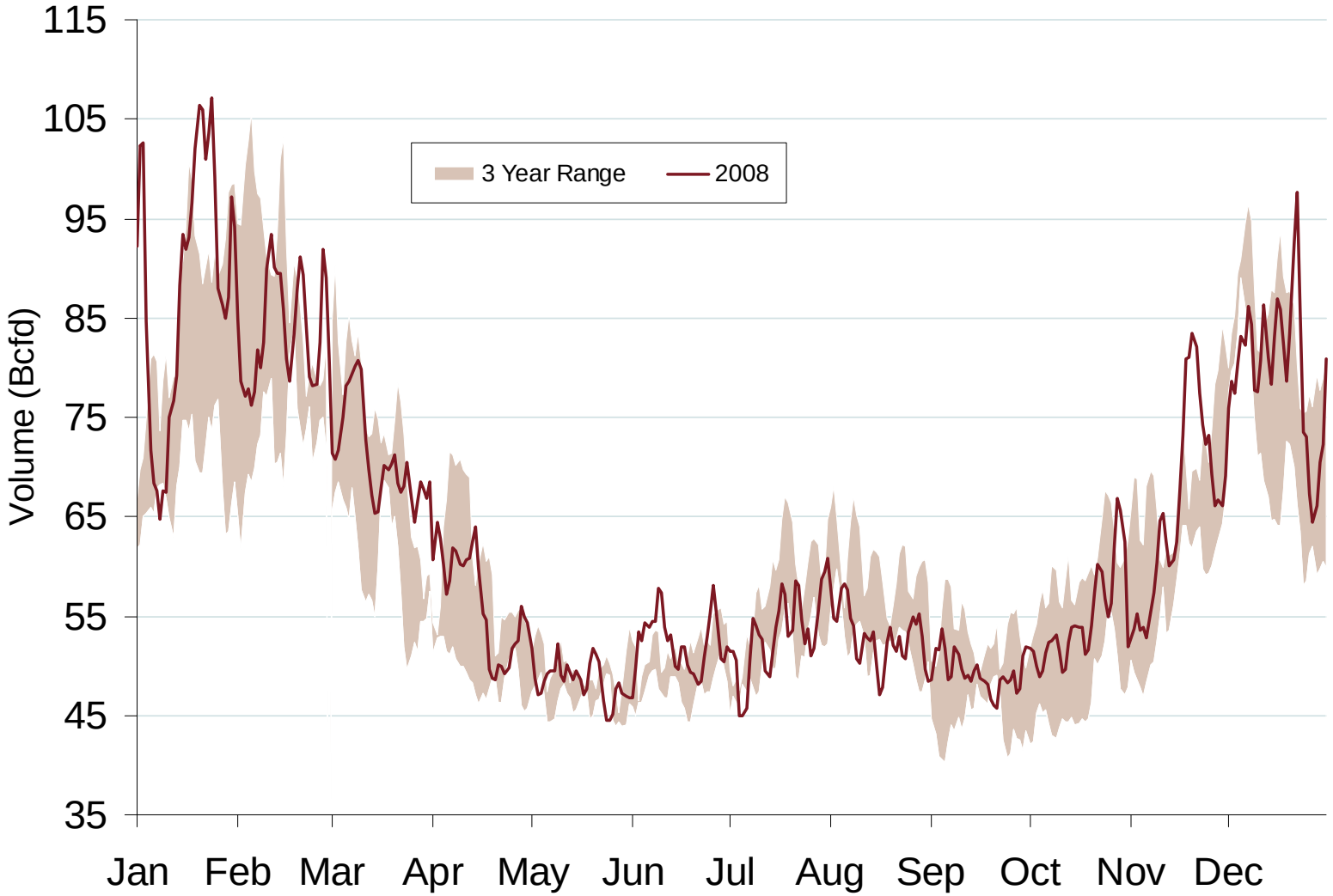
Total U.S. Natural Gas Demand (All Sectors)



Source: Derived from *Bentek Energy* data.

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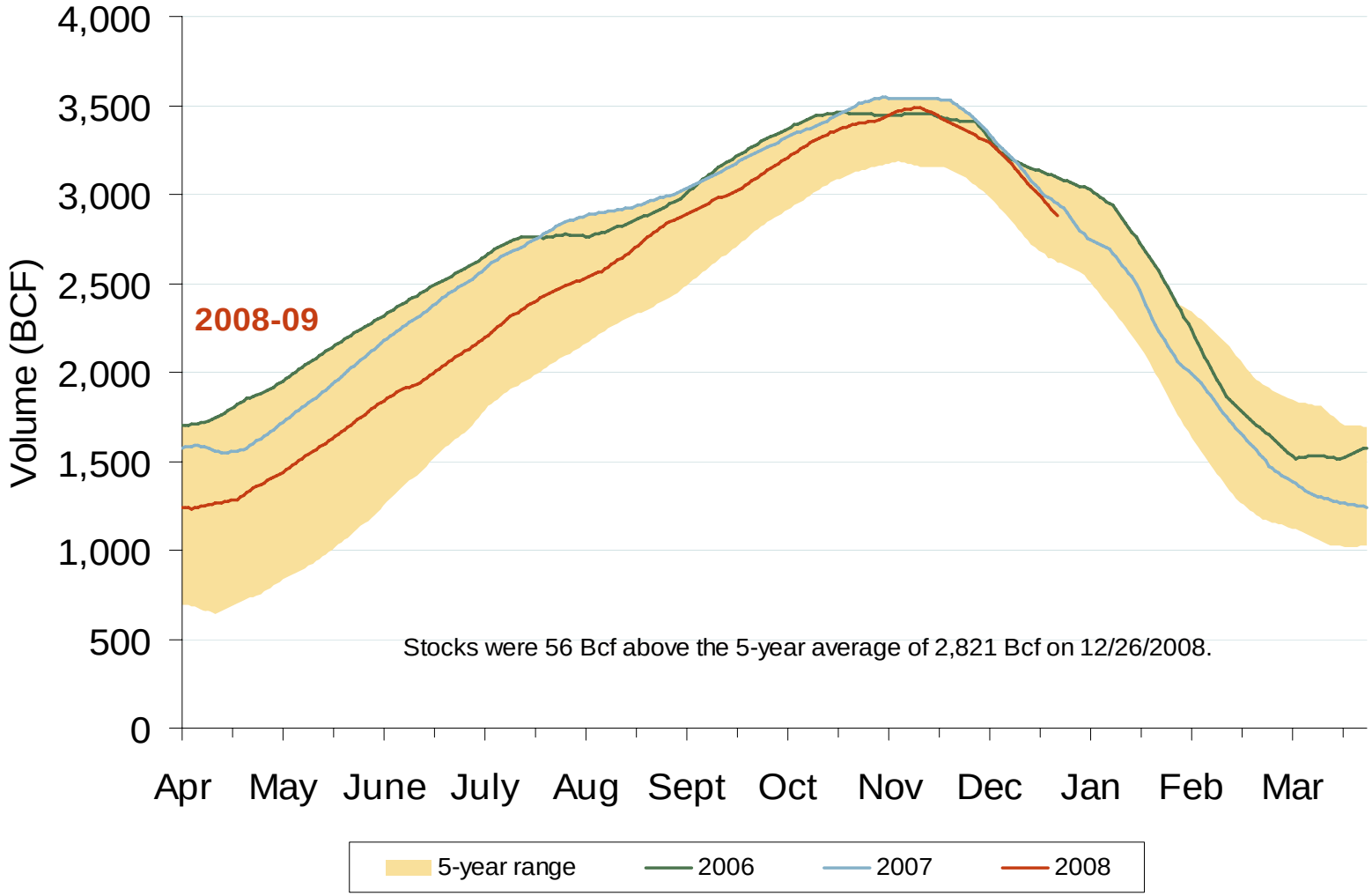
Total U.S. Working Gas in Storage



Source: Derived from *EIA* data.

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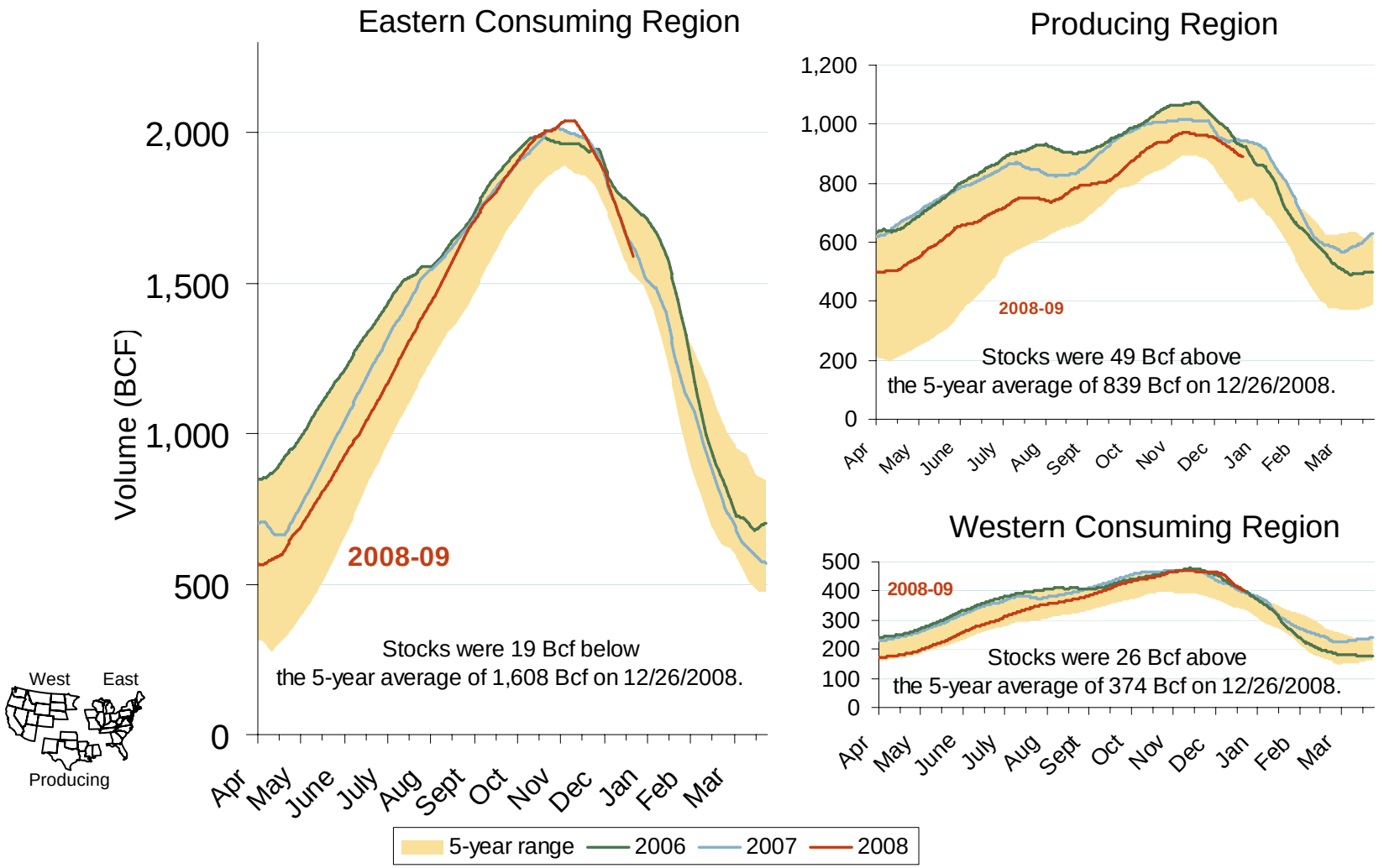
Regional Totals of Working Gas in Storage



Source: Derived from *EIA* data.

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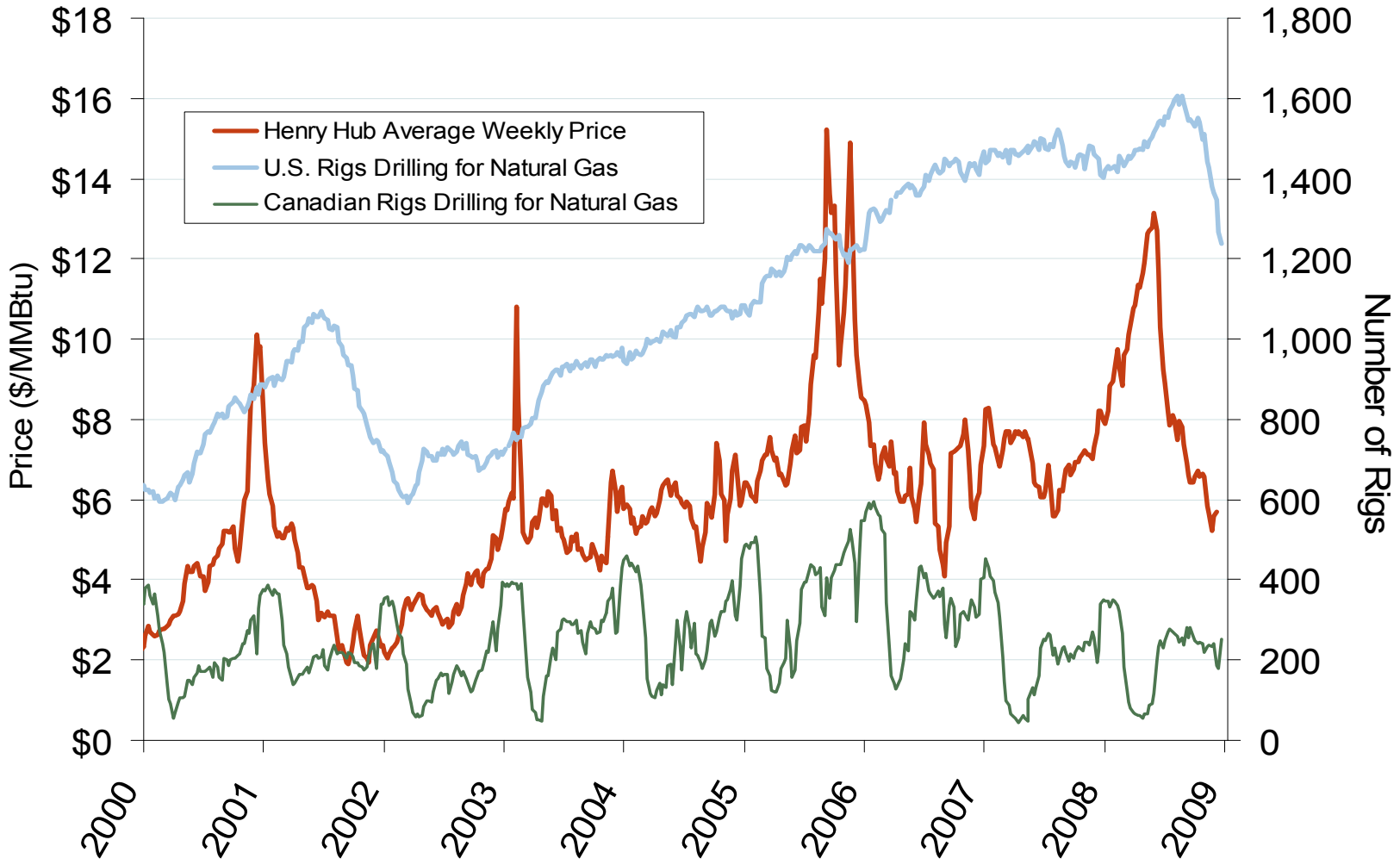
U.S. and Canadian Natural Gas Drilling Rig Count and Daily Spot Prices



Source: Derived from *Platts* and *Baker Hughes* data.

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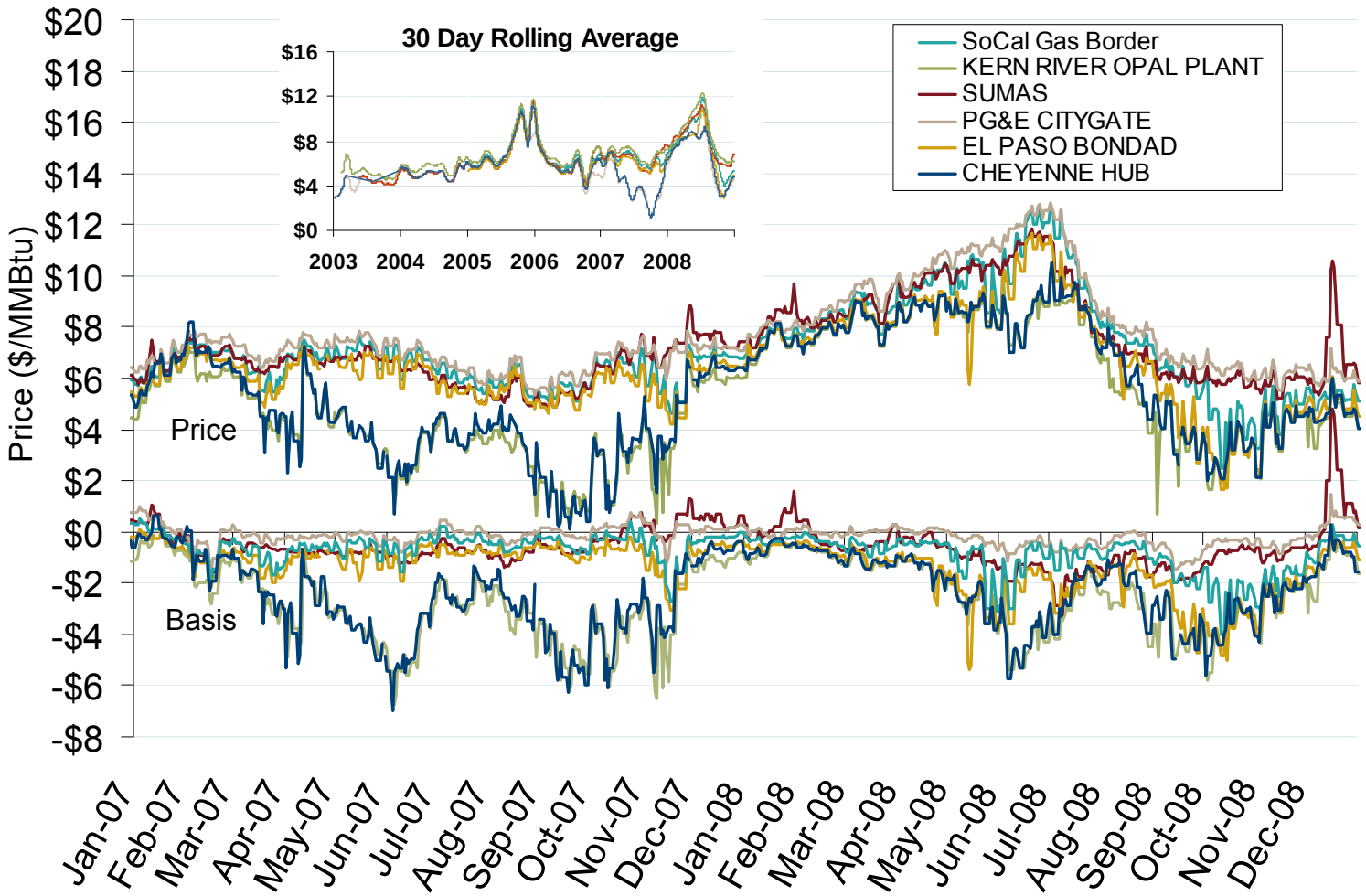
Western Day-Ahead Hub Spot Prices and Basis



Source: Derived from *Platts* data.

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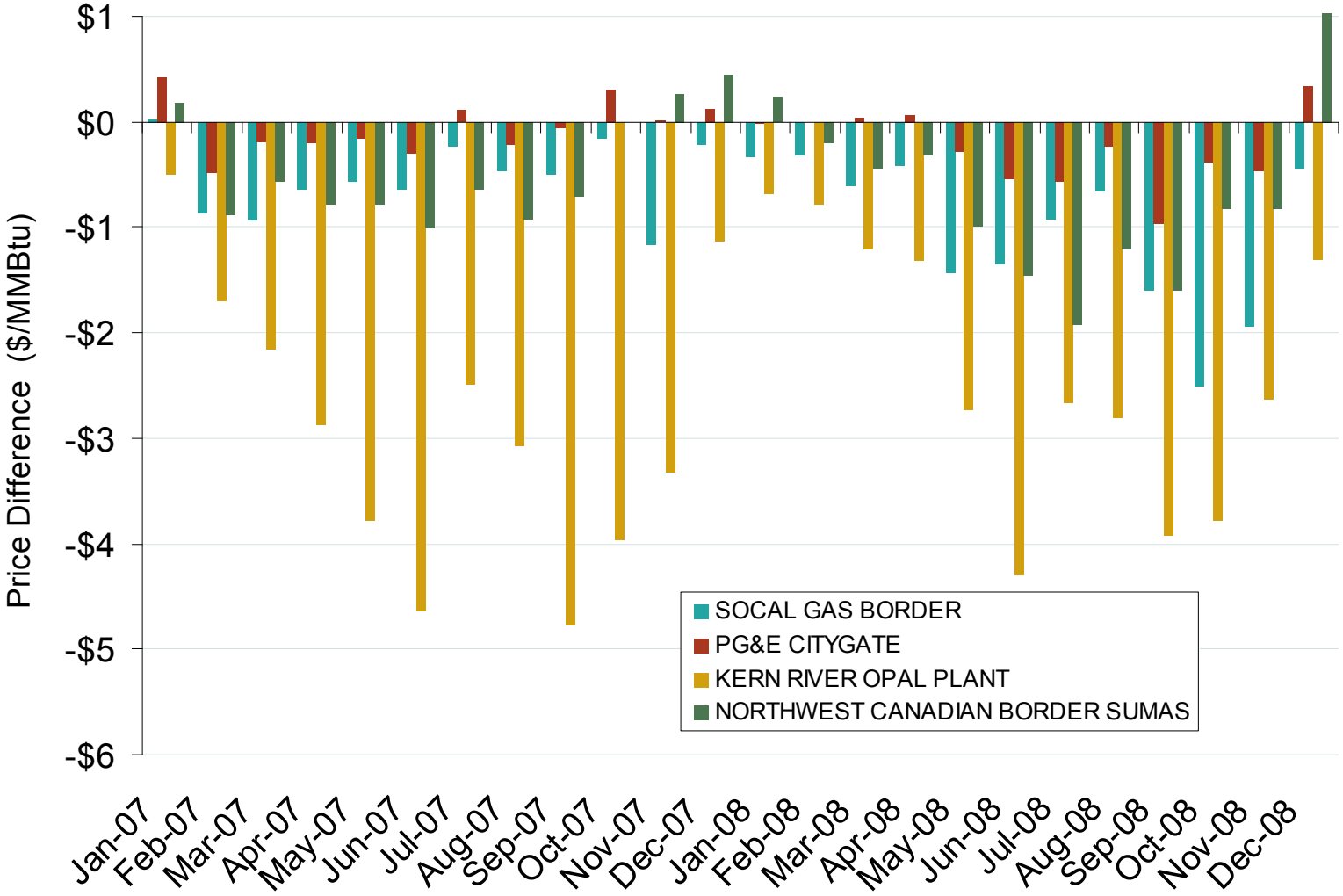
Western Monthly Average Basis Value to Henry Hub



Source: Derived from *Platts* data.

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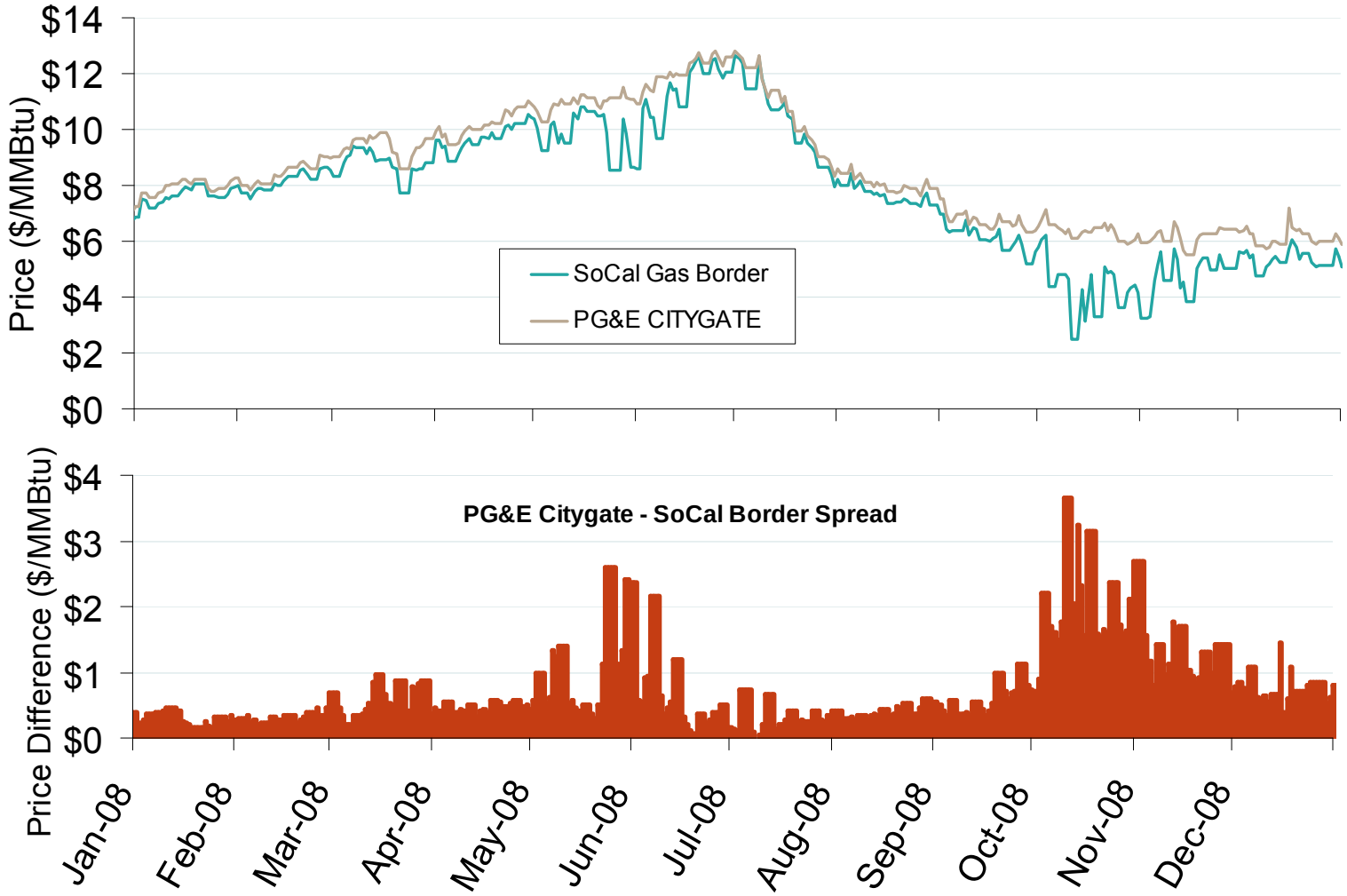
Difference in Northern and Southern California Daily Spot Prices



Source: Derived from *Platts* data.

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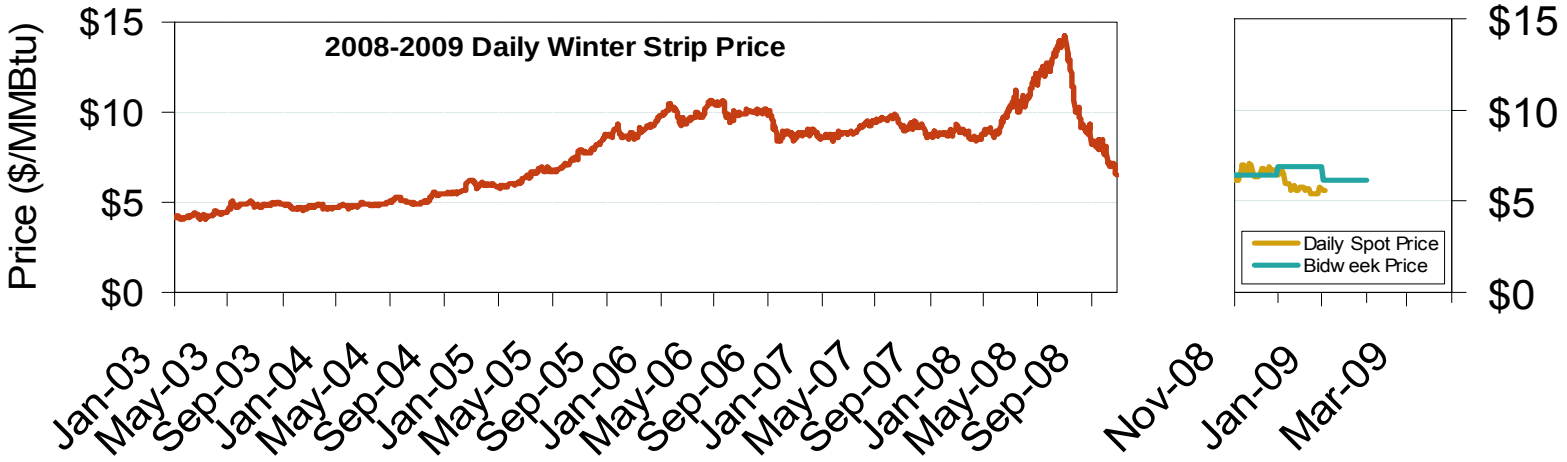
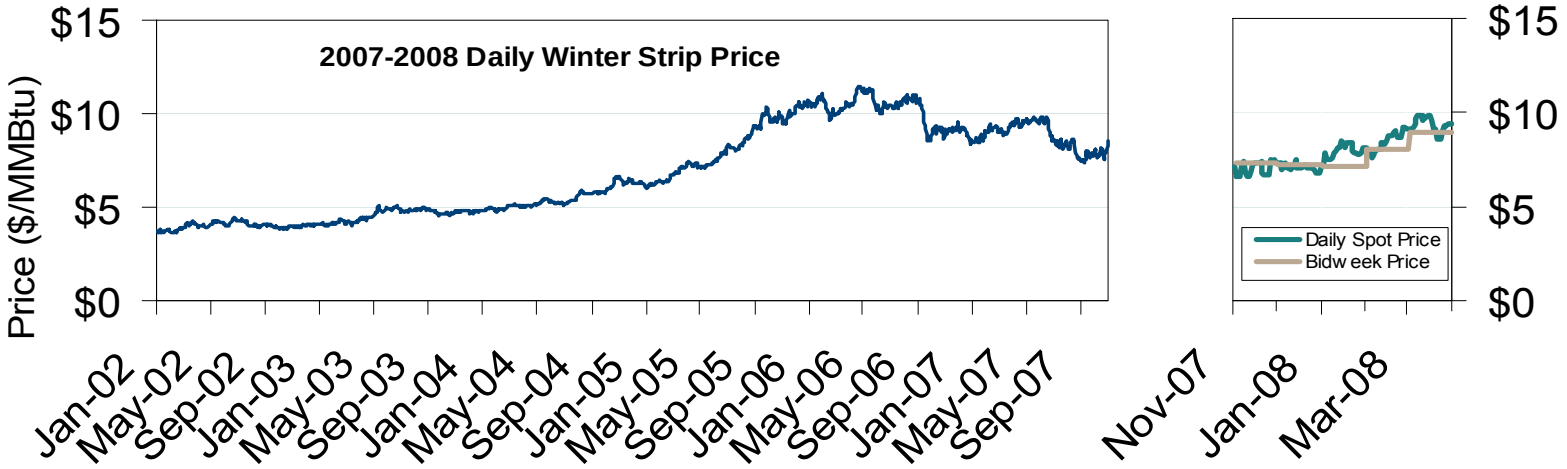
Natural Gas Winter Futures Strip and Daily Henry Hub Spot and Bidweek Prices





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

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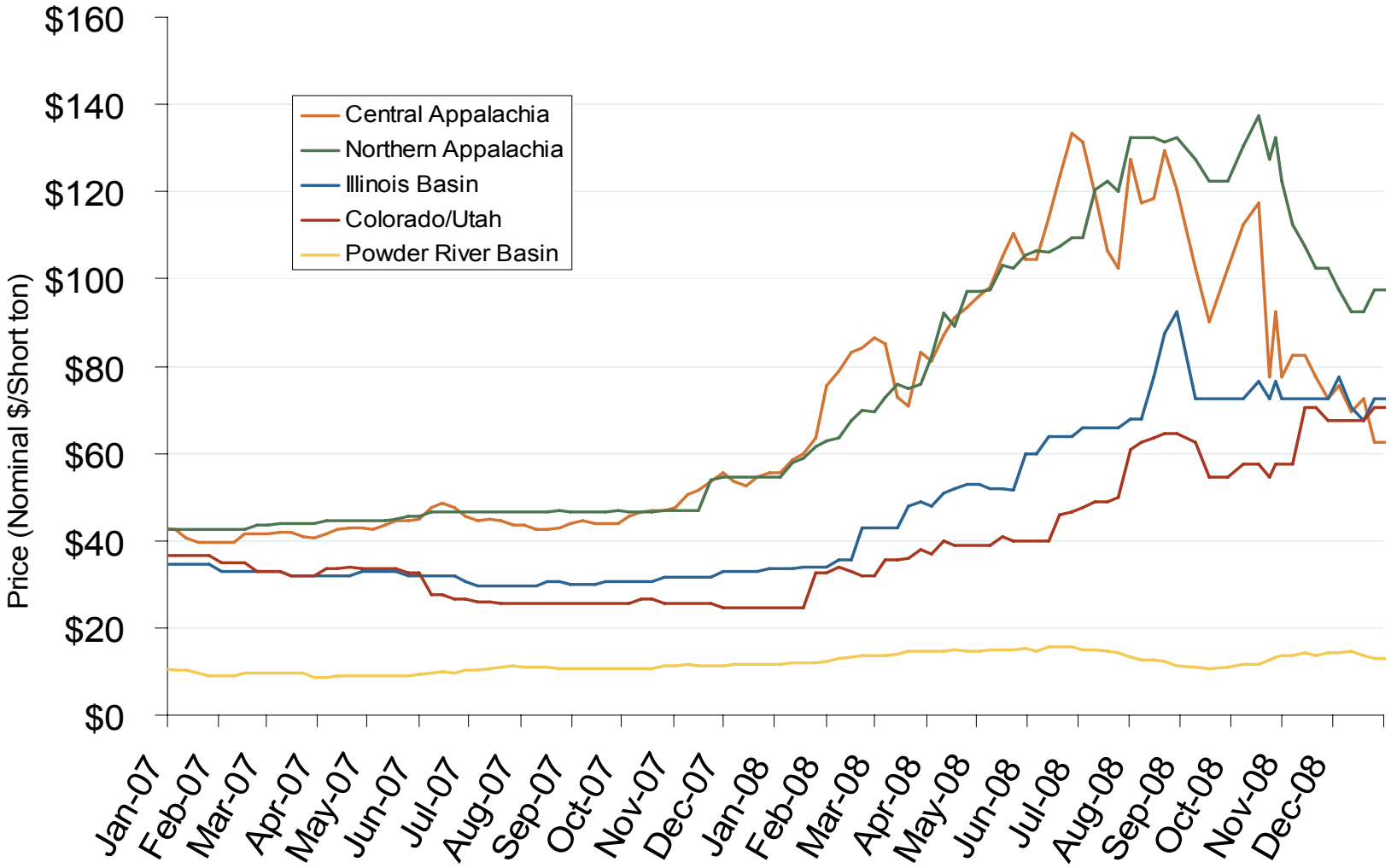
Regional Coal Spot Prices



Note: Does not reflect the delivered price of coal; excludes incremental cost of emissions allowances.

Source: Derived from *Bloomberg* data.

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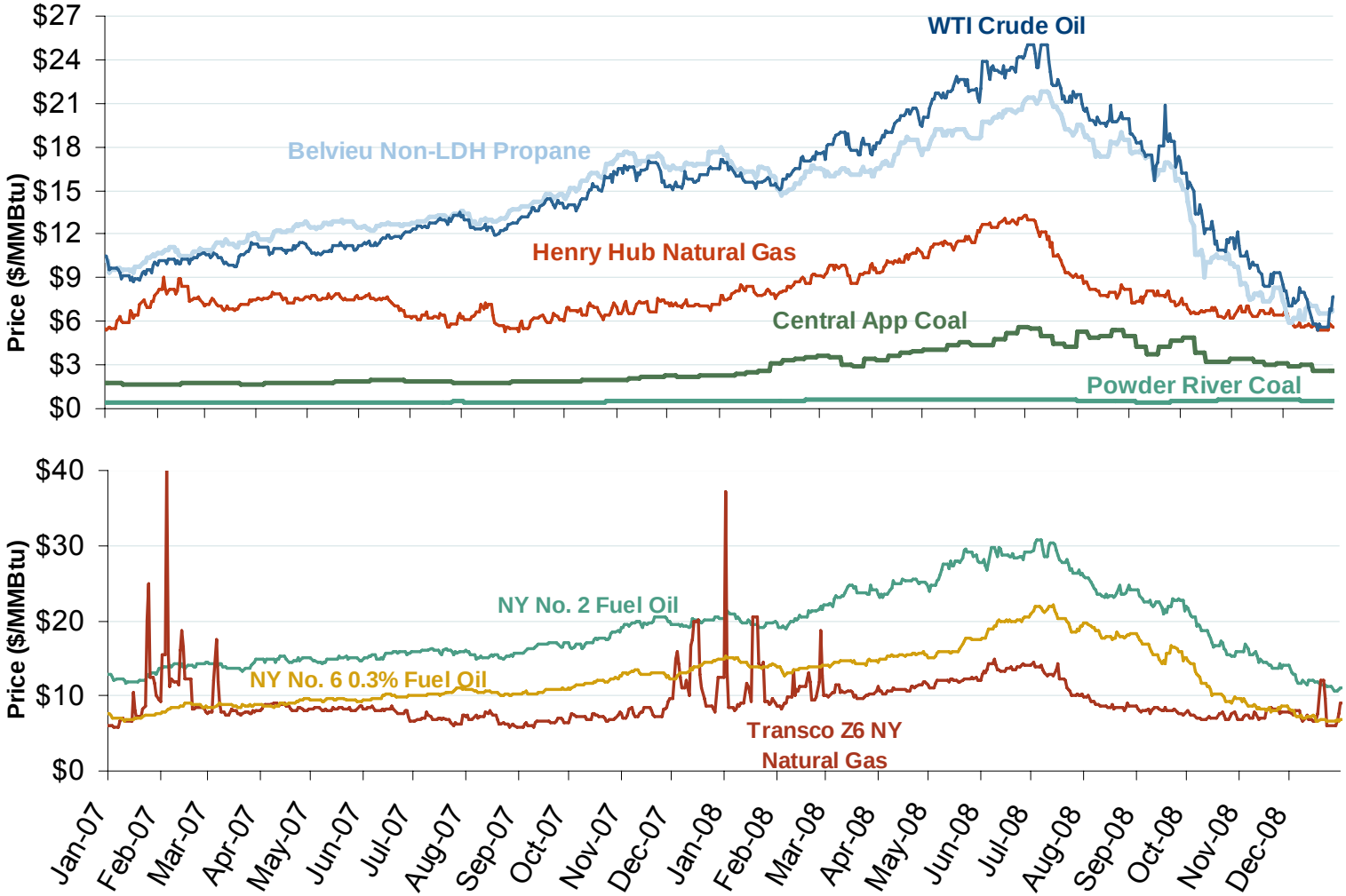
Oil, Coal, Natural Gas and Propane Daily Spot Prices



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.

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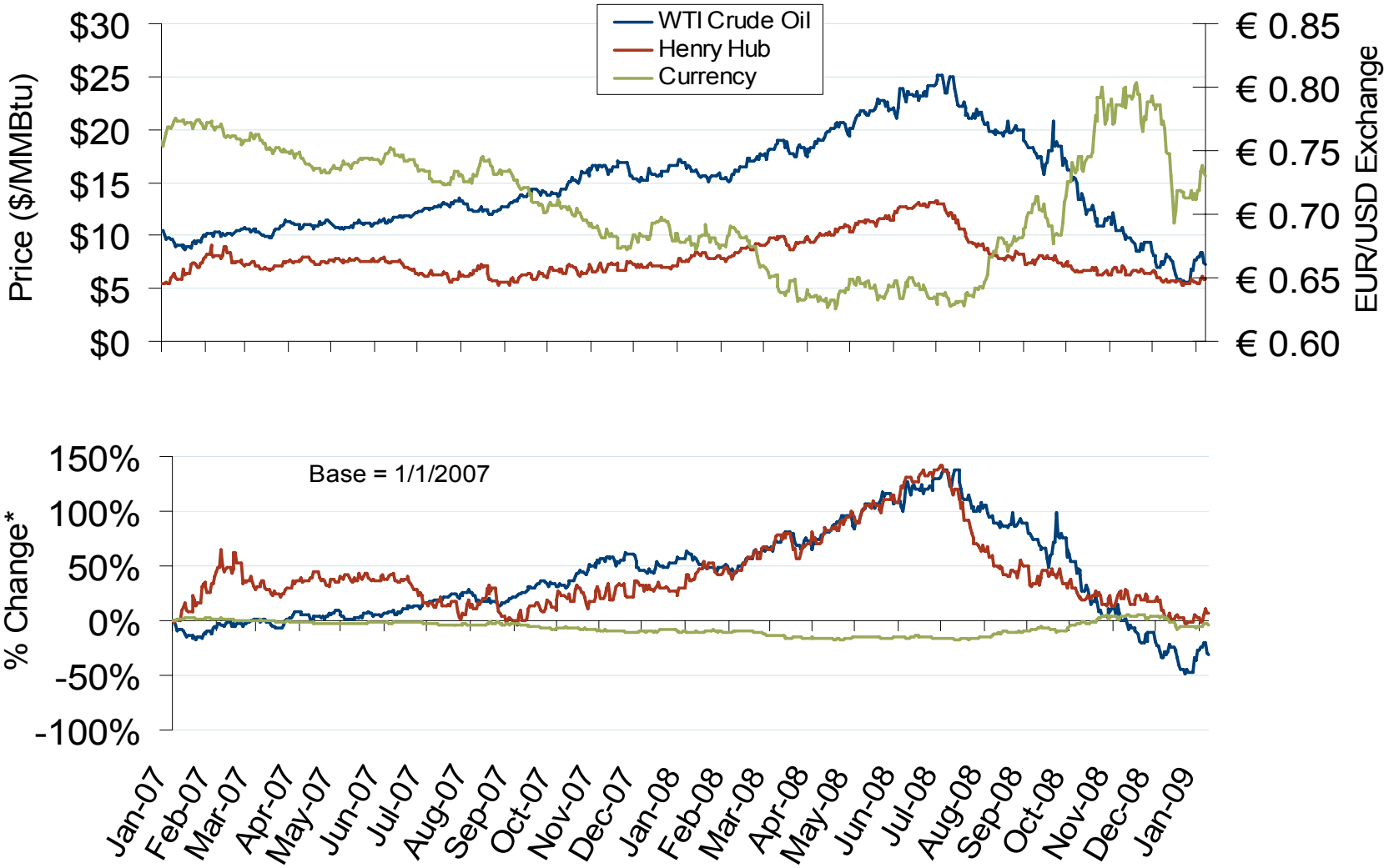
Oil, Natural Gas and Currency Spot Prices



Source: Derived from *Bloomberg* data.

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World LNG Estimated January 2009 Landed Prices

Source: *Waterborne Energy, Inc.* Data in $US/MMBtu.
January 2009 Western Snapshot Report

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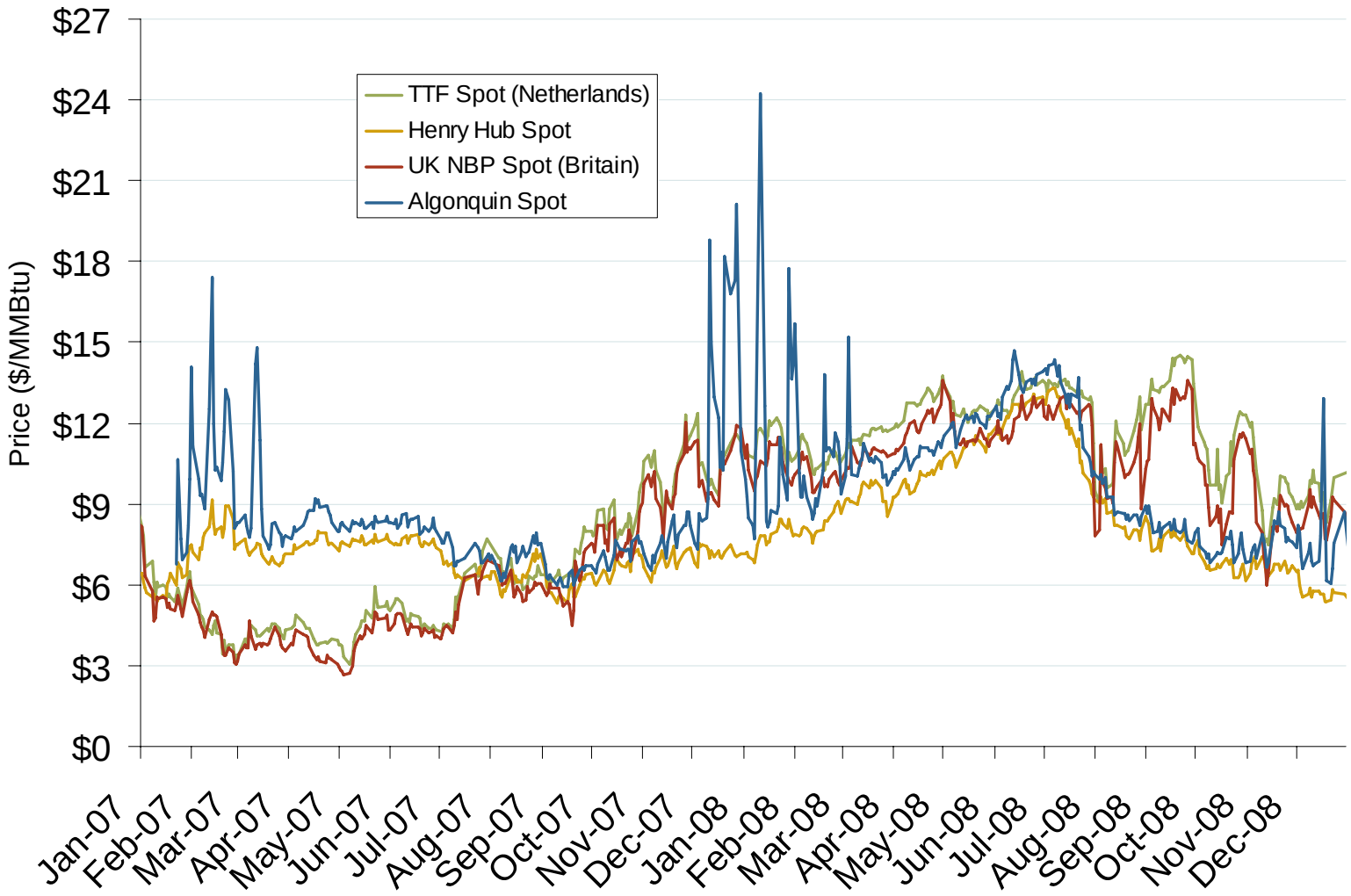
Atlantic Basin European and US Spot Natural Gas Prices



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

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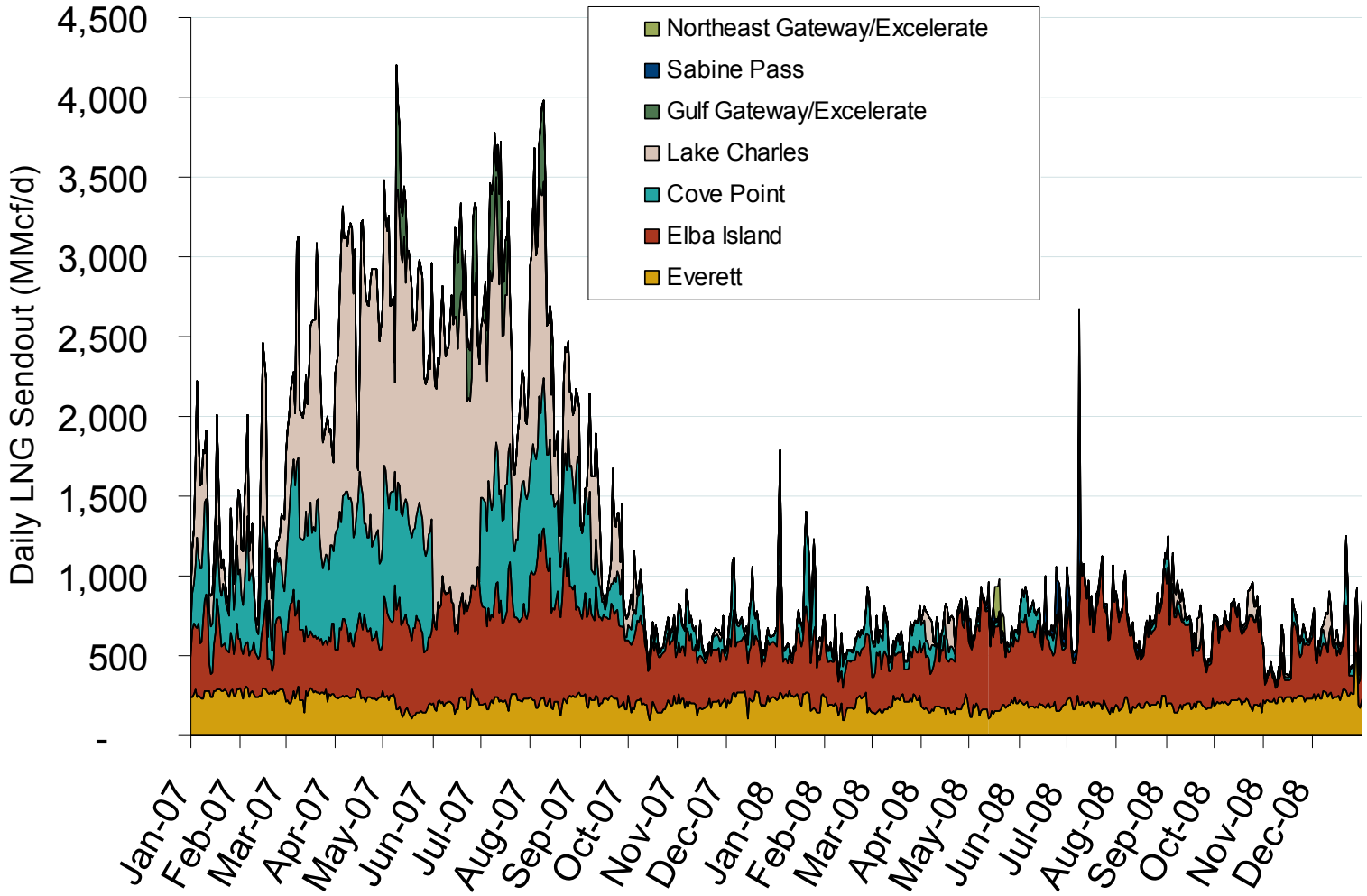
Daily Gas Sendout from Existing U.S. LNG Facilities



Source: Derived from *Bentek* data. Excludes Everett LNG delivered via truck and consumed by the Mystic plant as well as Freeport LNG which flows via intrastate pipelines.

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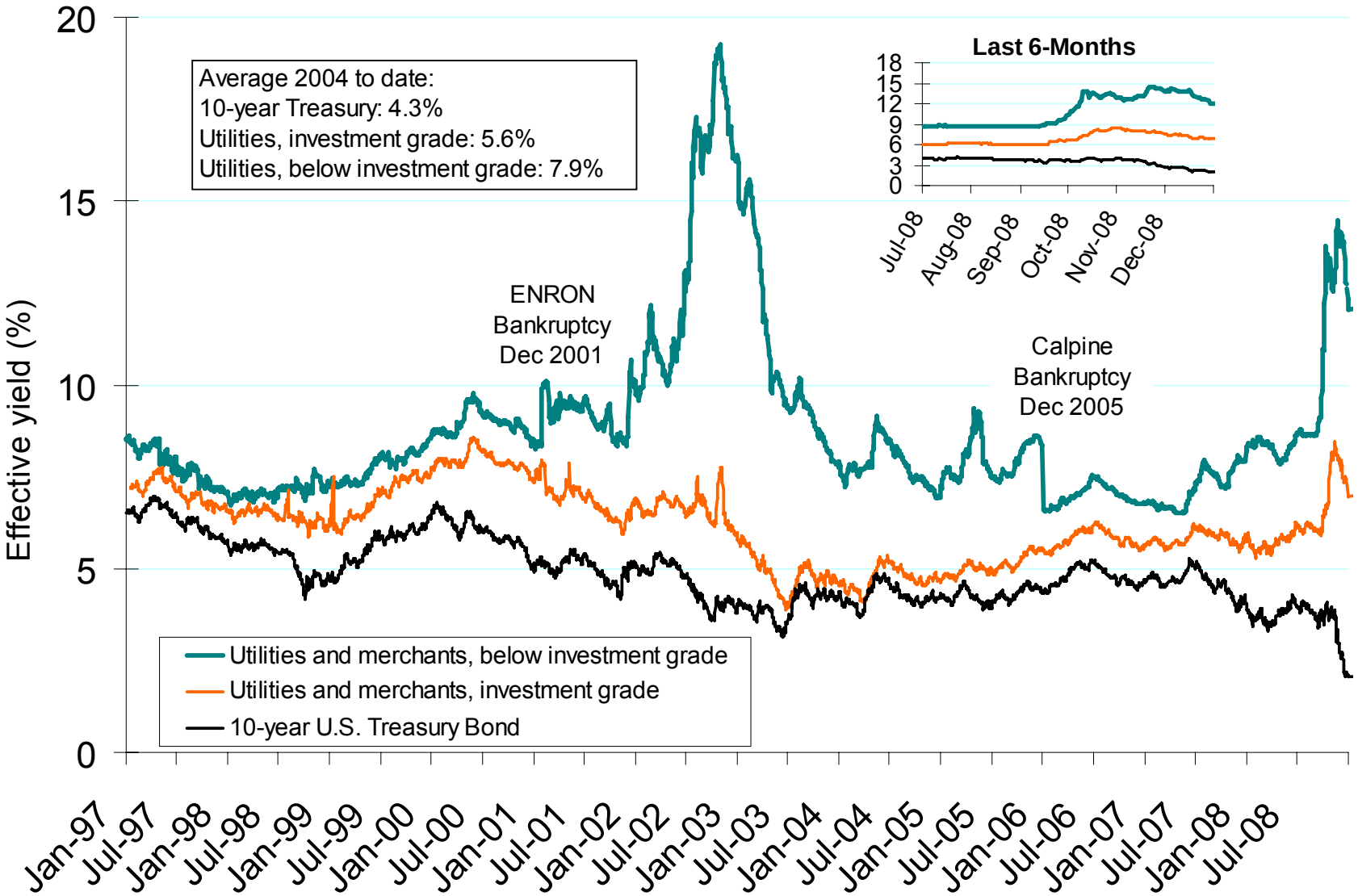
Financial Markets: Comparative Bond Yields

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

Yields of Utilities, Merchants and Ten Year Treasury Bonds



Source: Derived from Merrill Lynch Index U.S Corporates, Gas and Electric Utilities and Bloomberg data.

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