

# OE ENERGY MARKET SNAPSHOT

## Western States Version – March 2011 Data

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

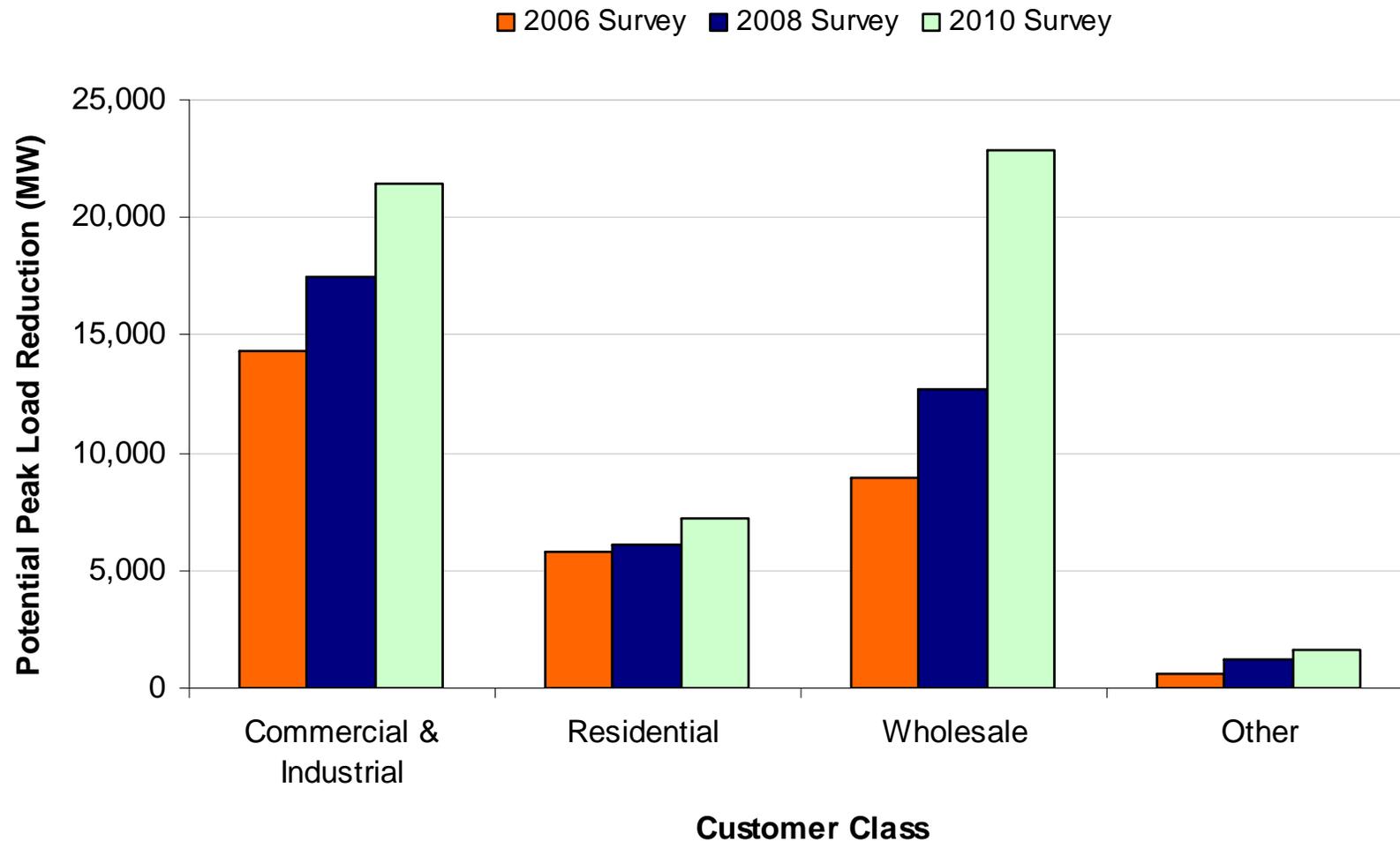
Office of Enforcement  
Federal Energy Regulatory Commission  
April 2011



# Special Report:

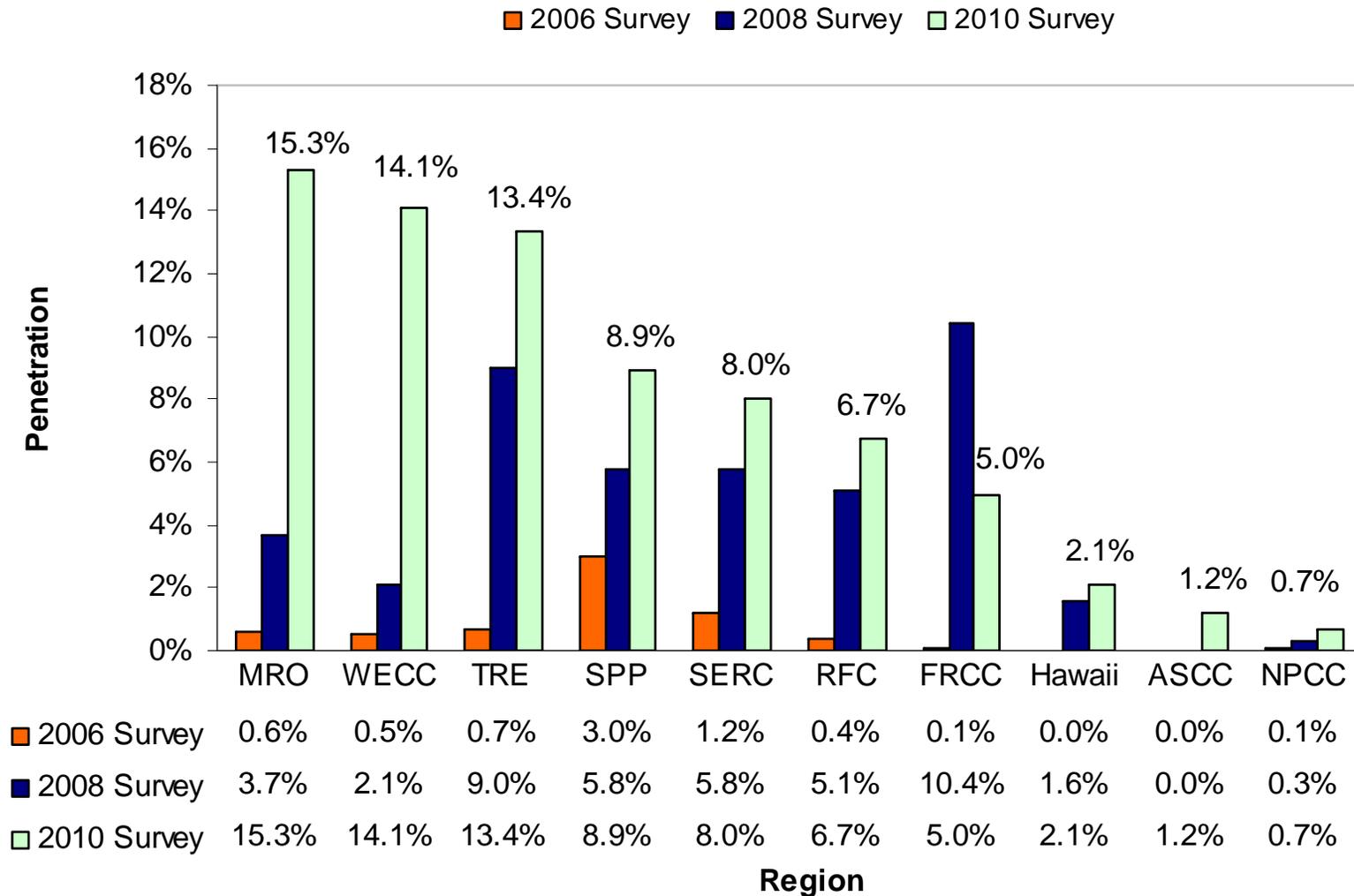
- **Demand Response and Advanced Metering**

## Reported Potential Peak Load Reduction

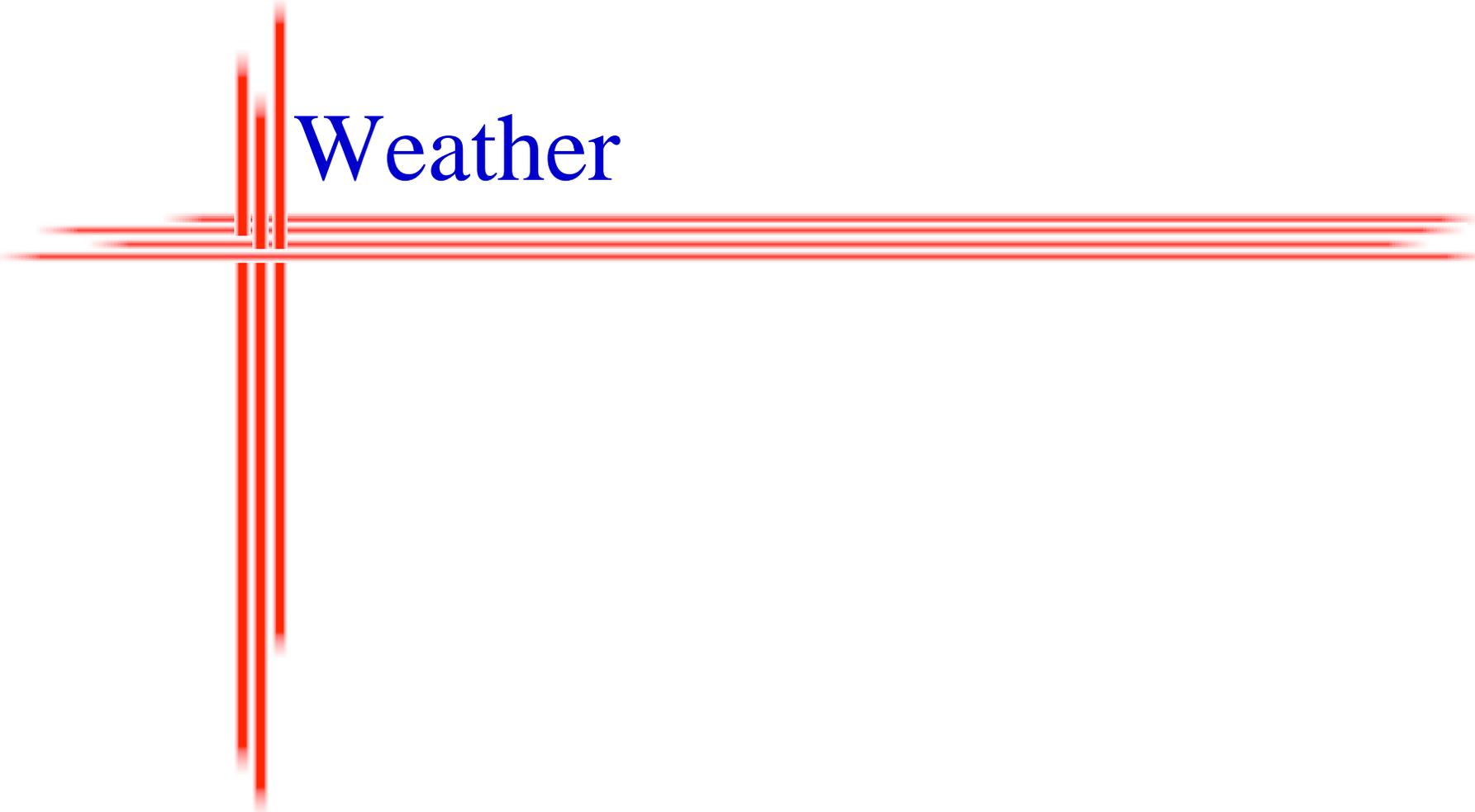


Full report at <http://www.ferc.gov/legal/staff-reports/2010-dr-report.pdf>

## Estimated Advanced Metering Penetration

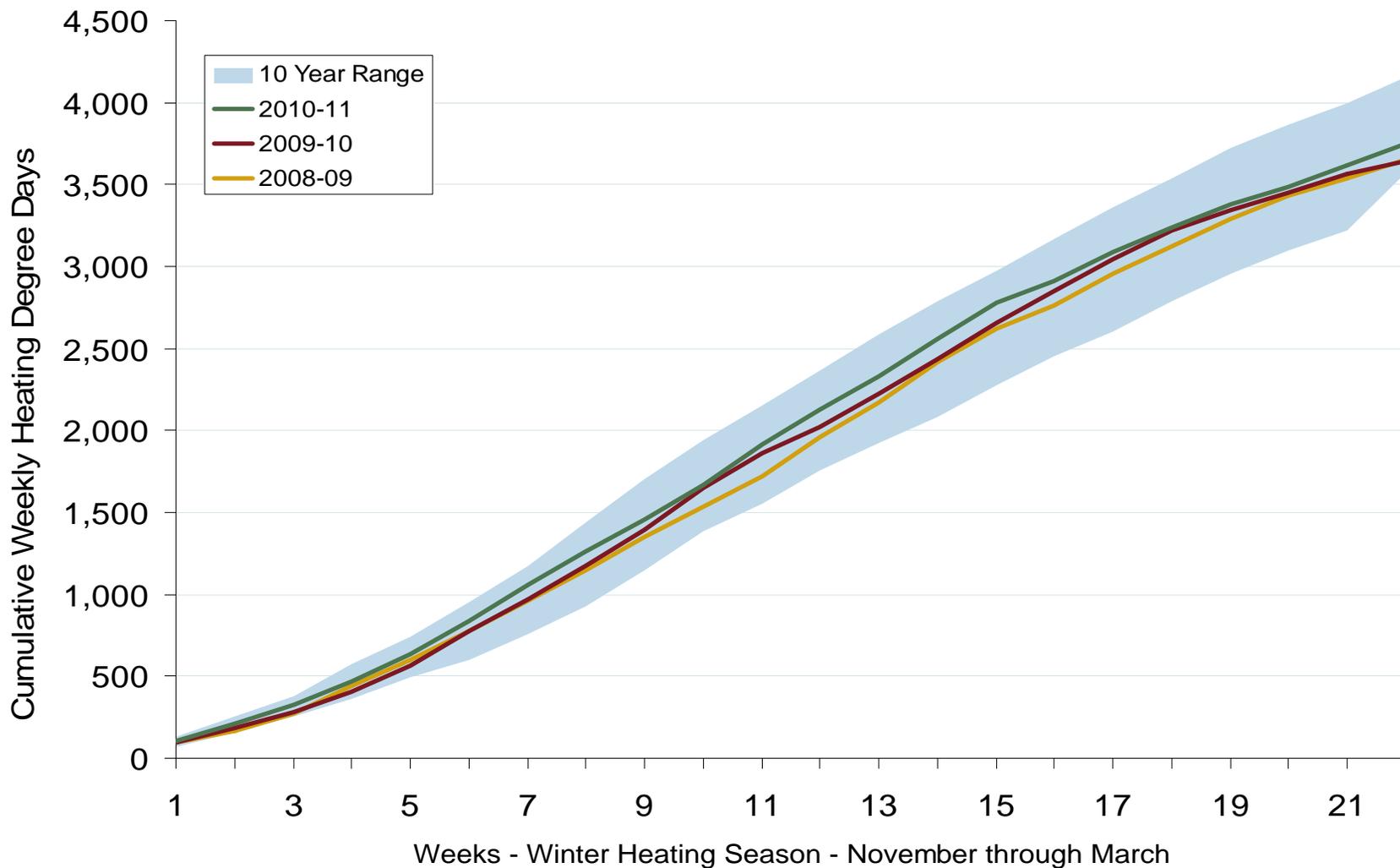


Full report at <http://www.ferc.gov/legal/staff-reports/2010-dr-report.pdf>

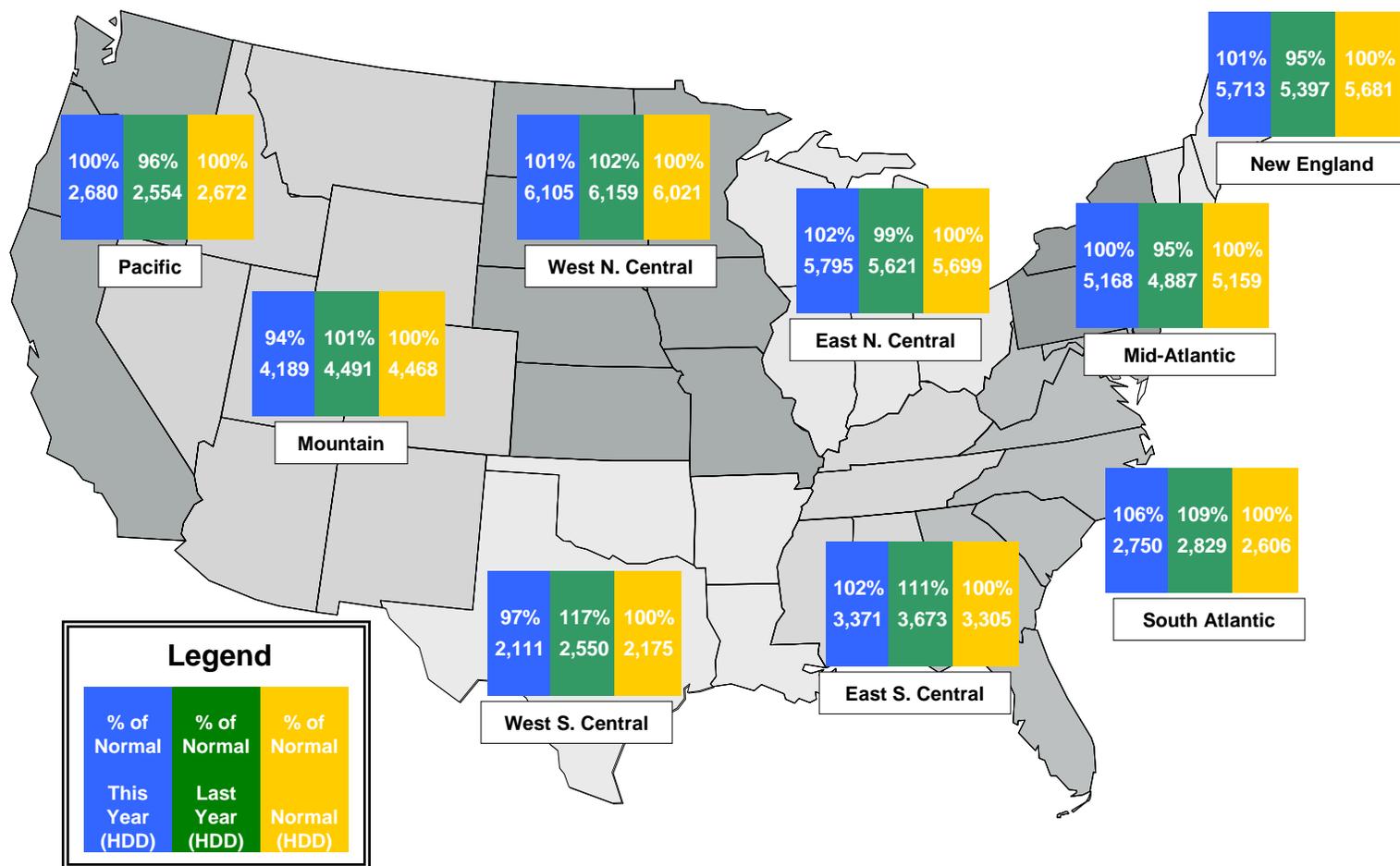


# Weather

## U. S. Winter Cumulative Heating Degree Days

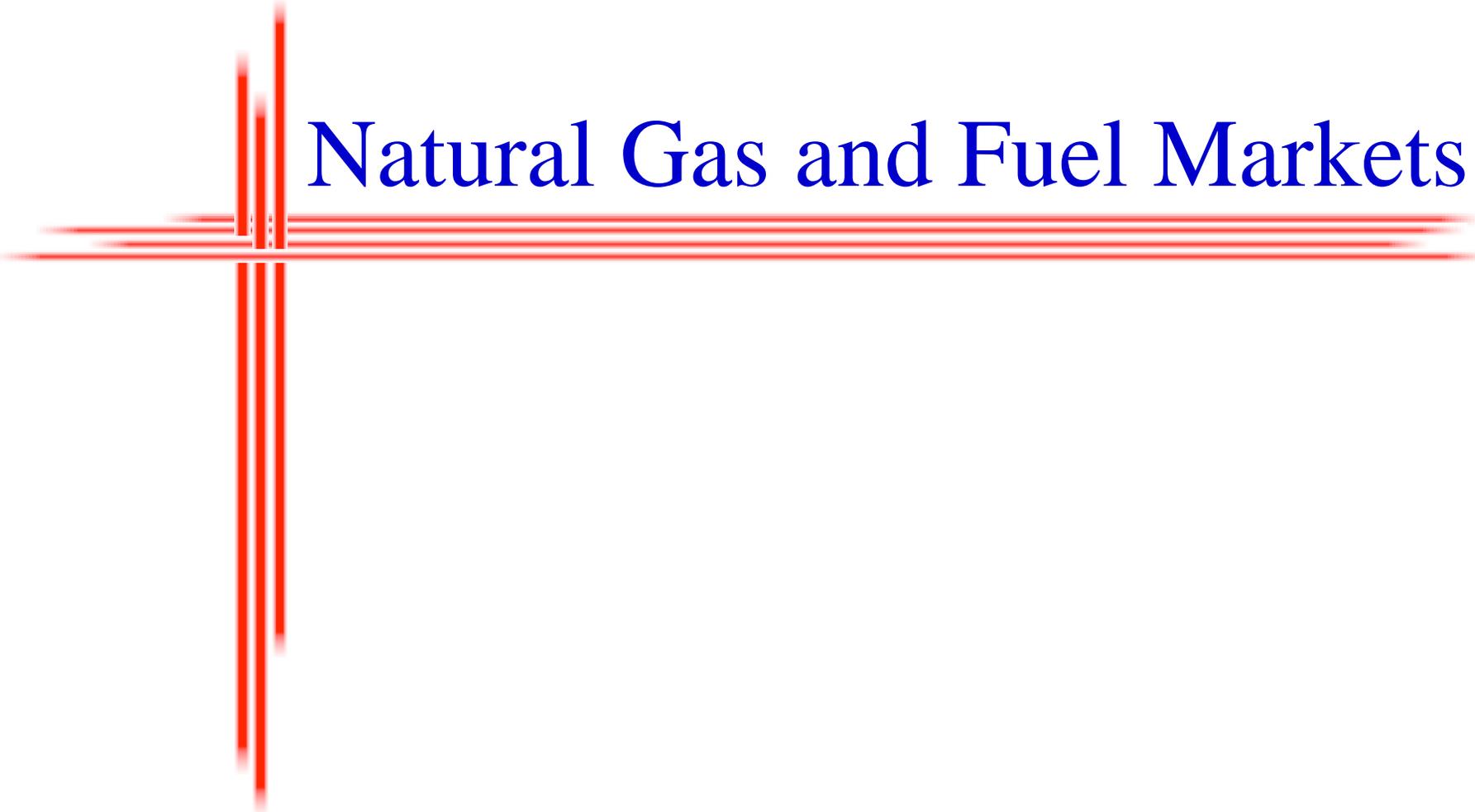


# Regional Heating Degree Days July 2010 Through March 2011



Source: Derived from NOAA data. Normal is based on a 30-year average of heating degree day data.  
April 2011 Western Snapshot Report

Updated April 8, 2011

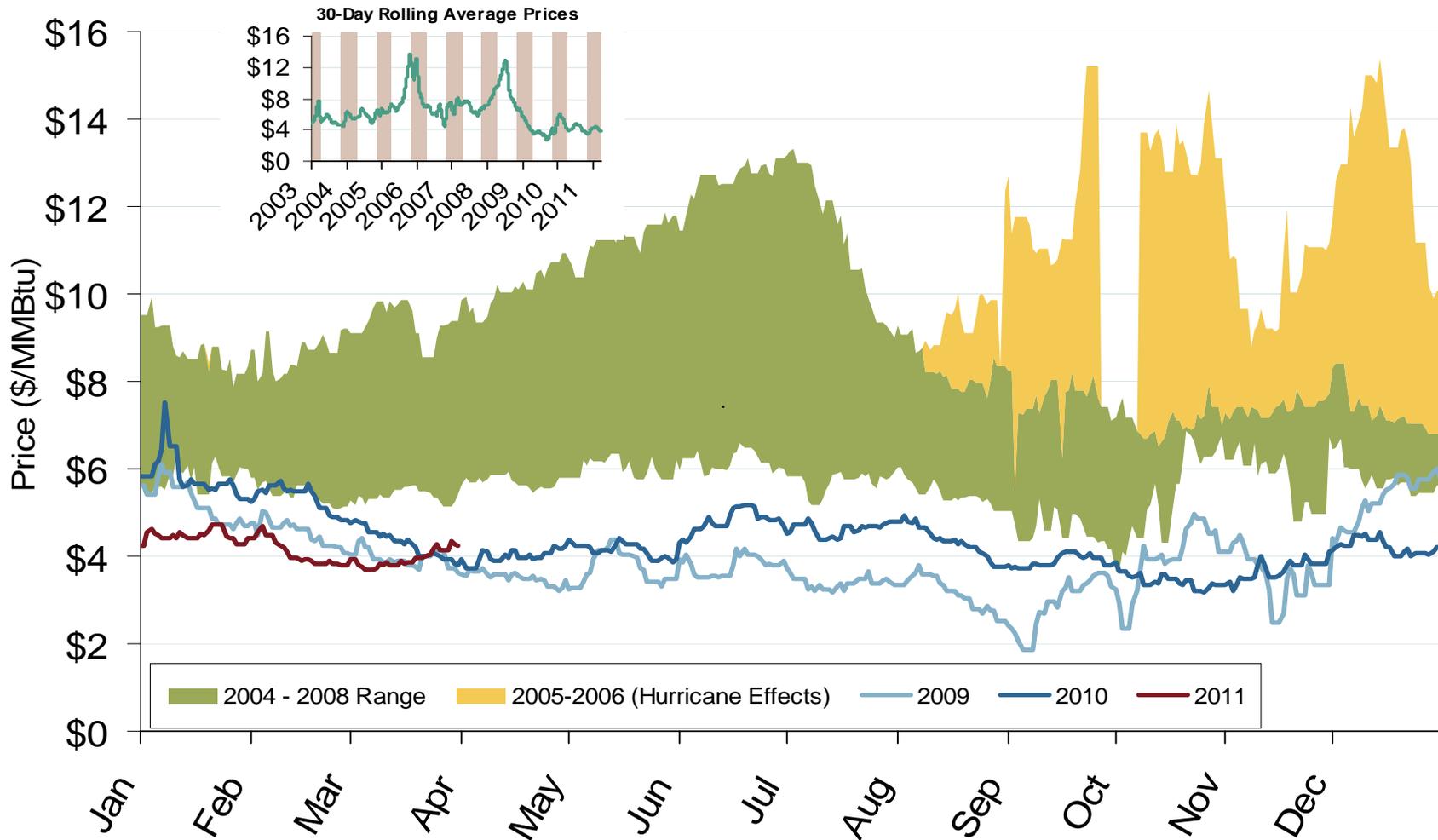


# Natural Gas and Fuel Markets

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

Federal Energy Regulatory Commission • Market Oversight • [www.ferc.gov/oversight](http://www.ferc.gov/oversight)

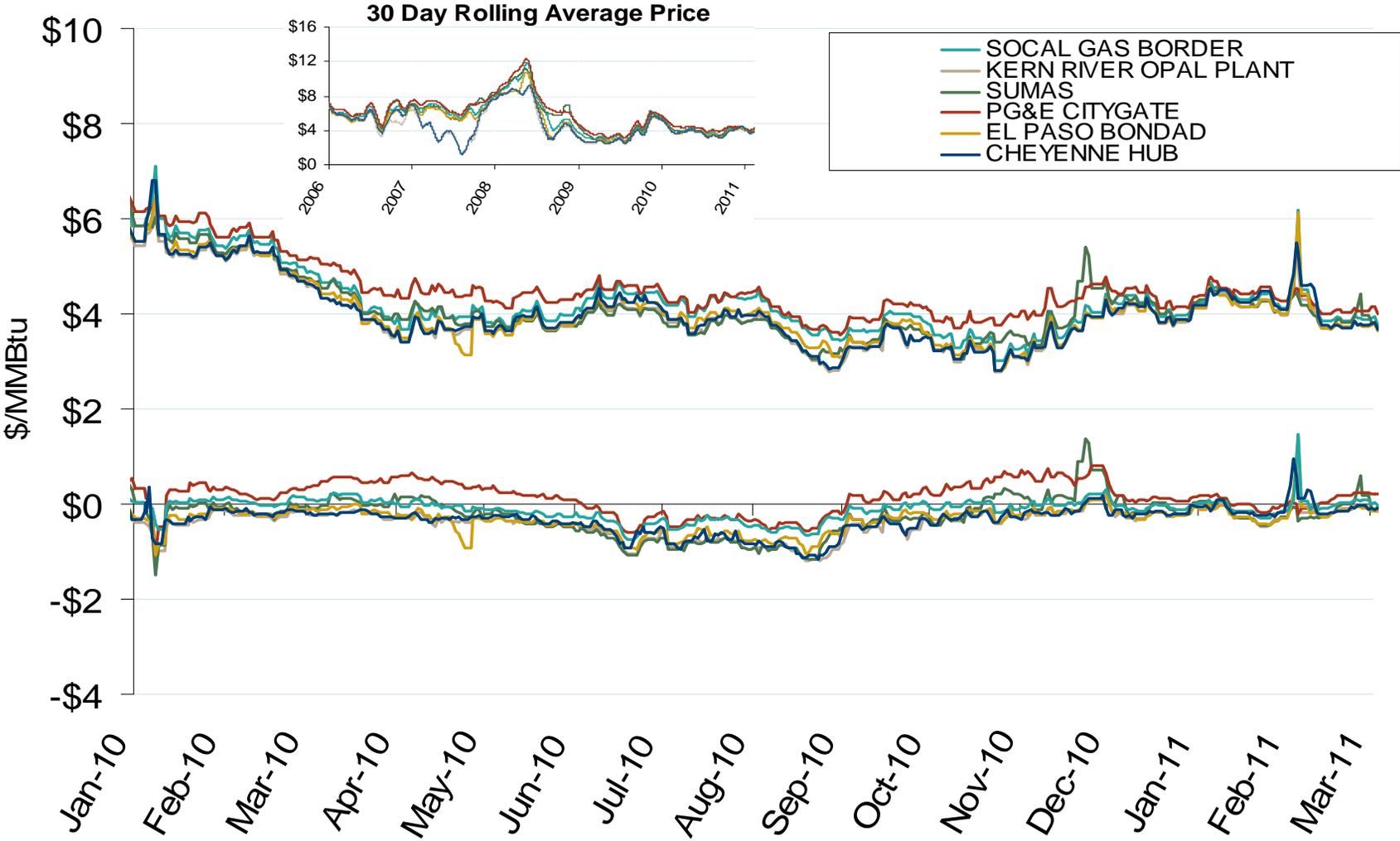
# Henry Hub Natural Gas Daily Spot Prices



Source: Derived from *Platts* data.

Updated April 8, 2011

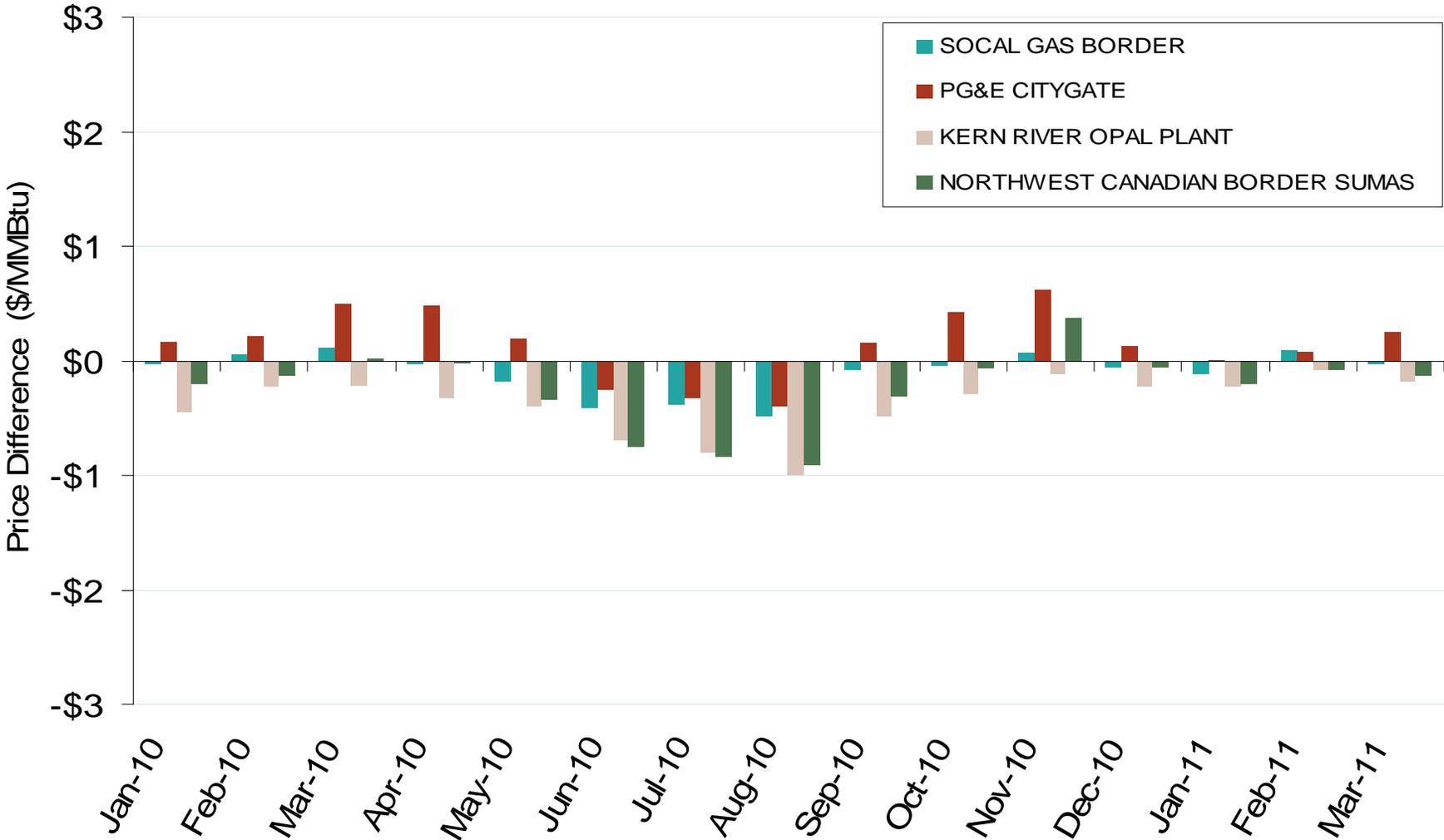
# Western Day-Ahead Hub Spot Prices and Basis



Source: Derived from *Platts* data.

Updated April 8, 2011

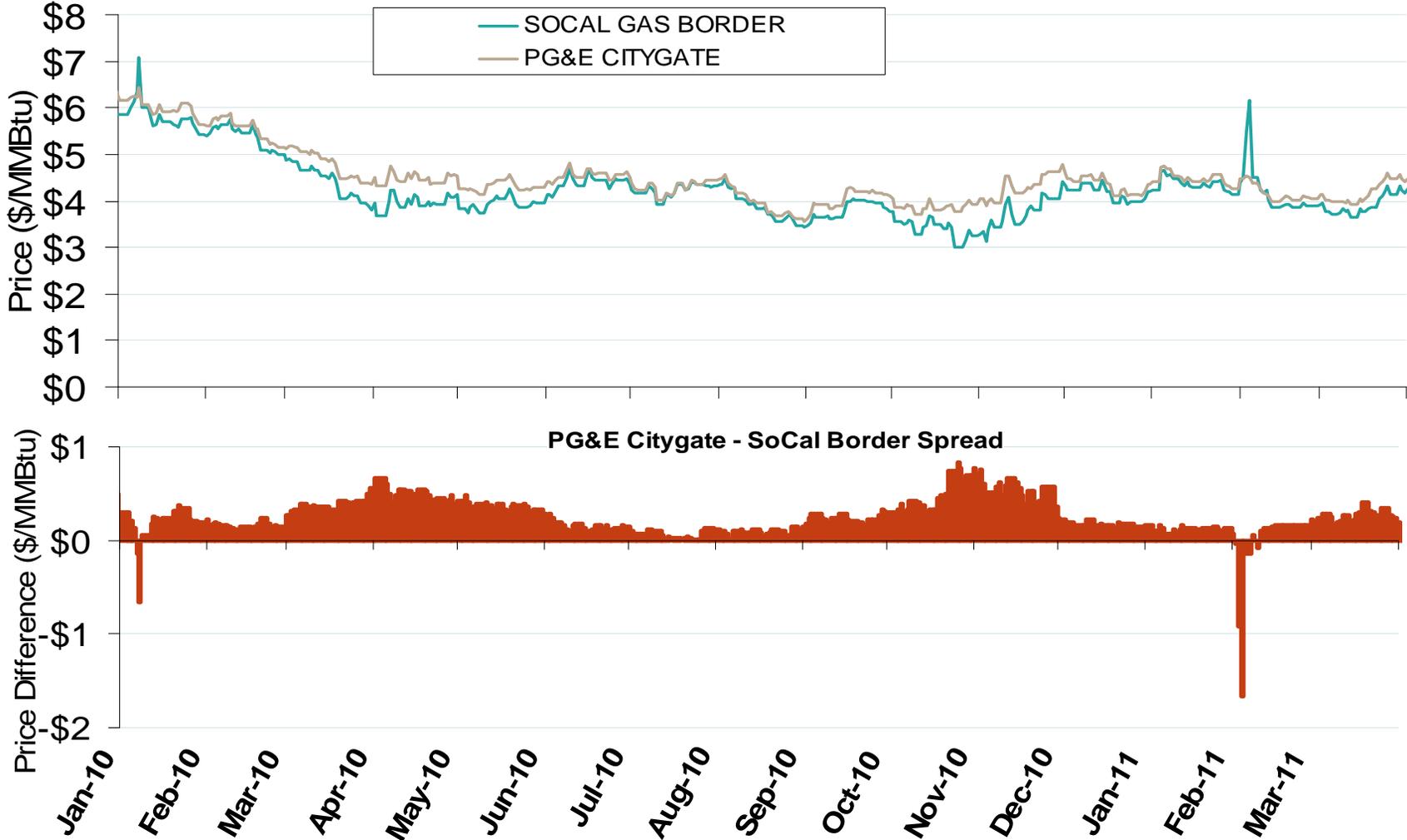
# Western Monthly Average Basis Value to Henry Hub



Source: Derived from Platts data.  
April 2011 Western Snapshot Report

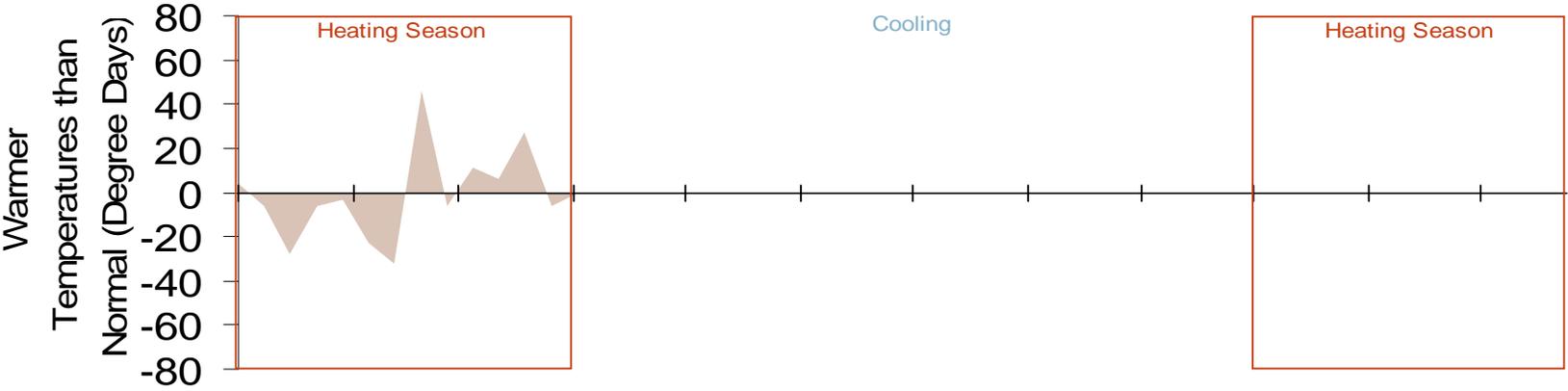
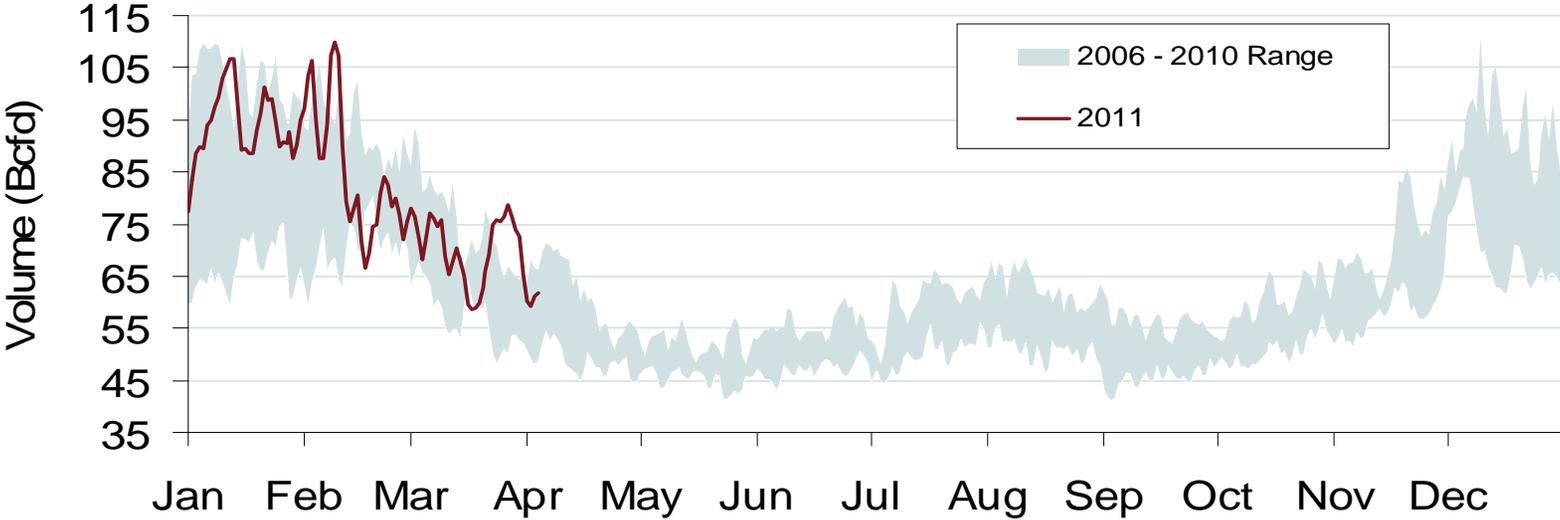
Updated April 8, 2011

# Difference in Northern and Southern California Daily Spot Prices



Source: Derived from *Platts* data.

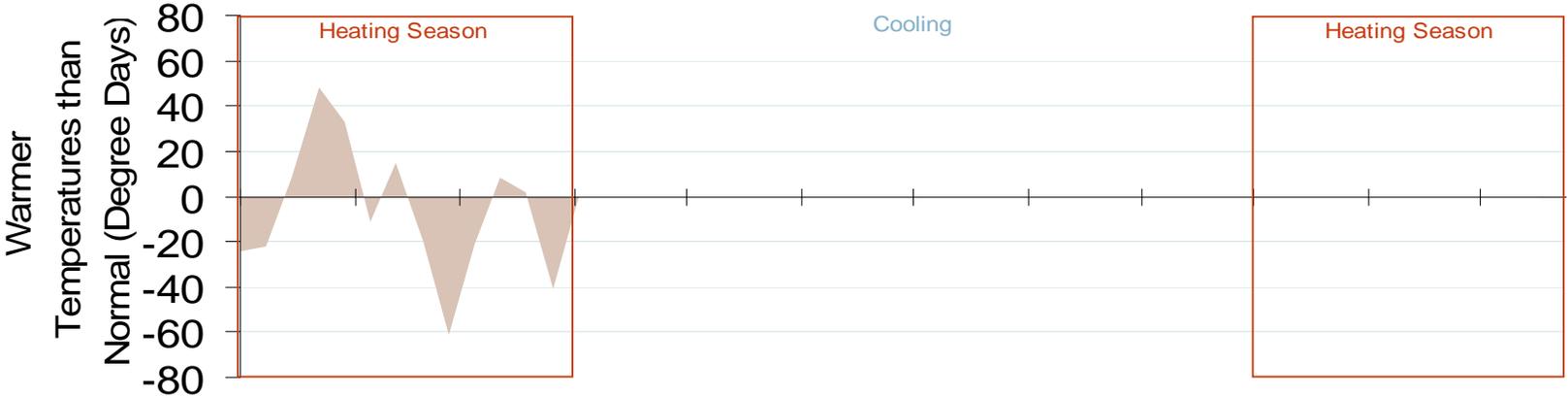
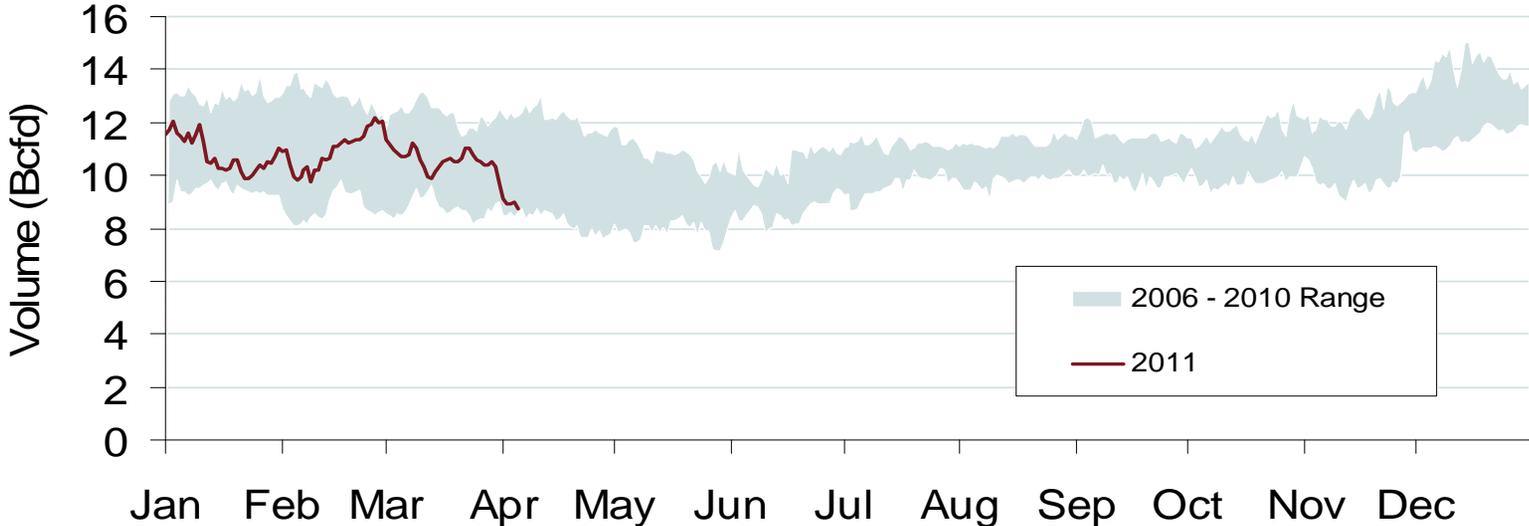
# Total U.S. Natural Gas Demand (All Sectors) and Temperatures



Source: Derived from *Bentek Energy* and *Weekly NOAA* data.

Updated April 8, 2011

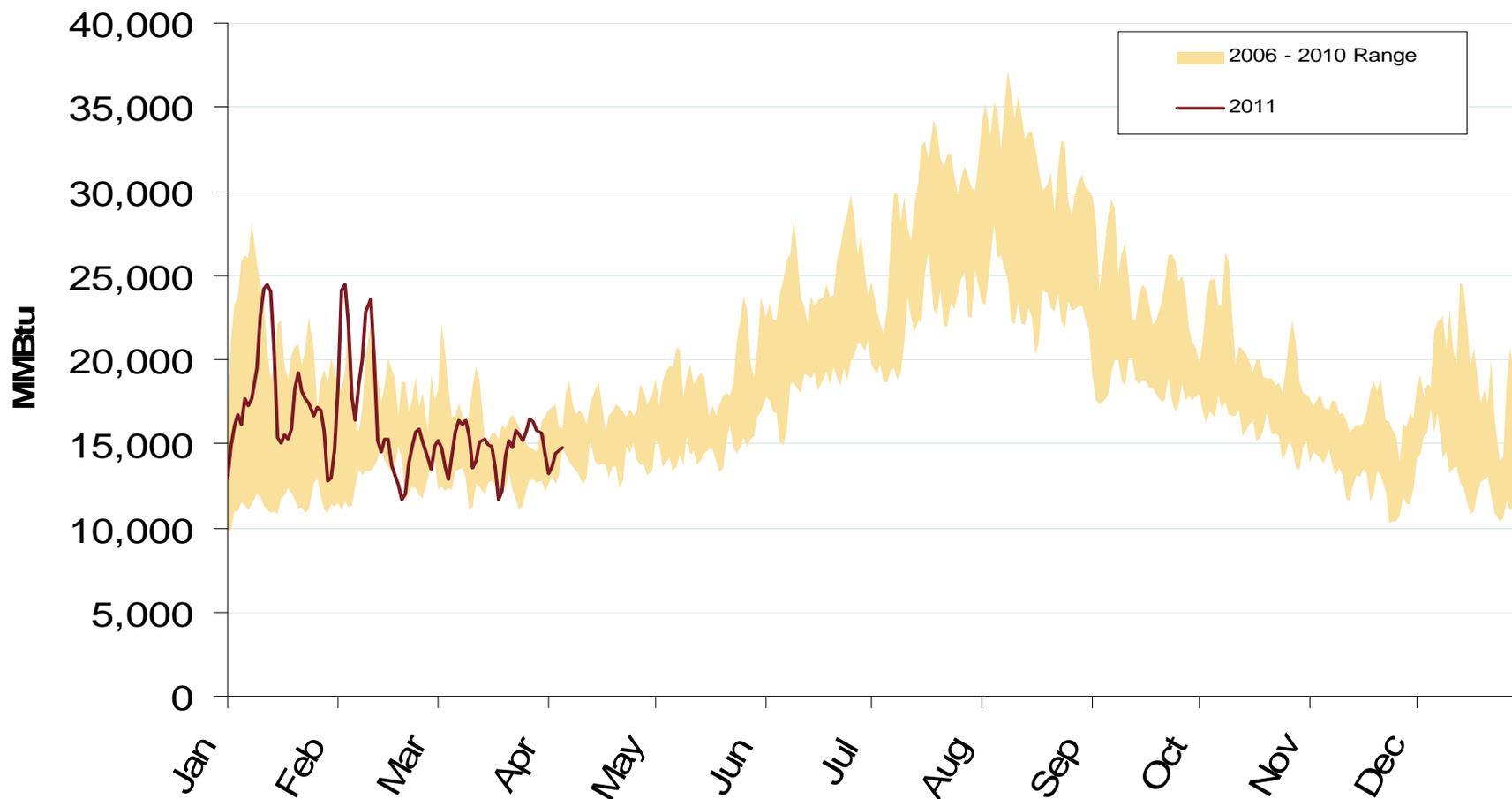
# Daily Western Natural Gas Demand - All Sectors



Source: Derived from *Bentek Energy* and *Weekly NOAA* data.

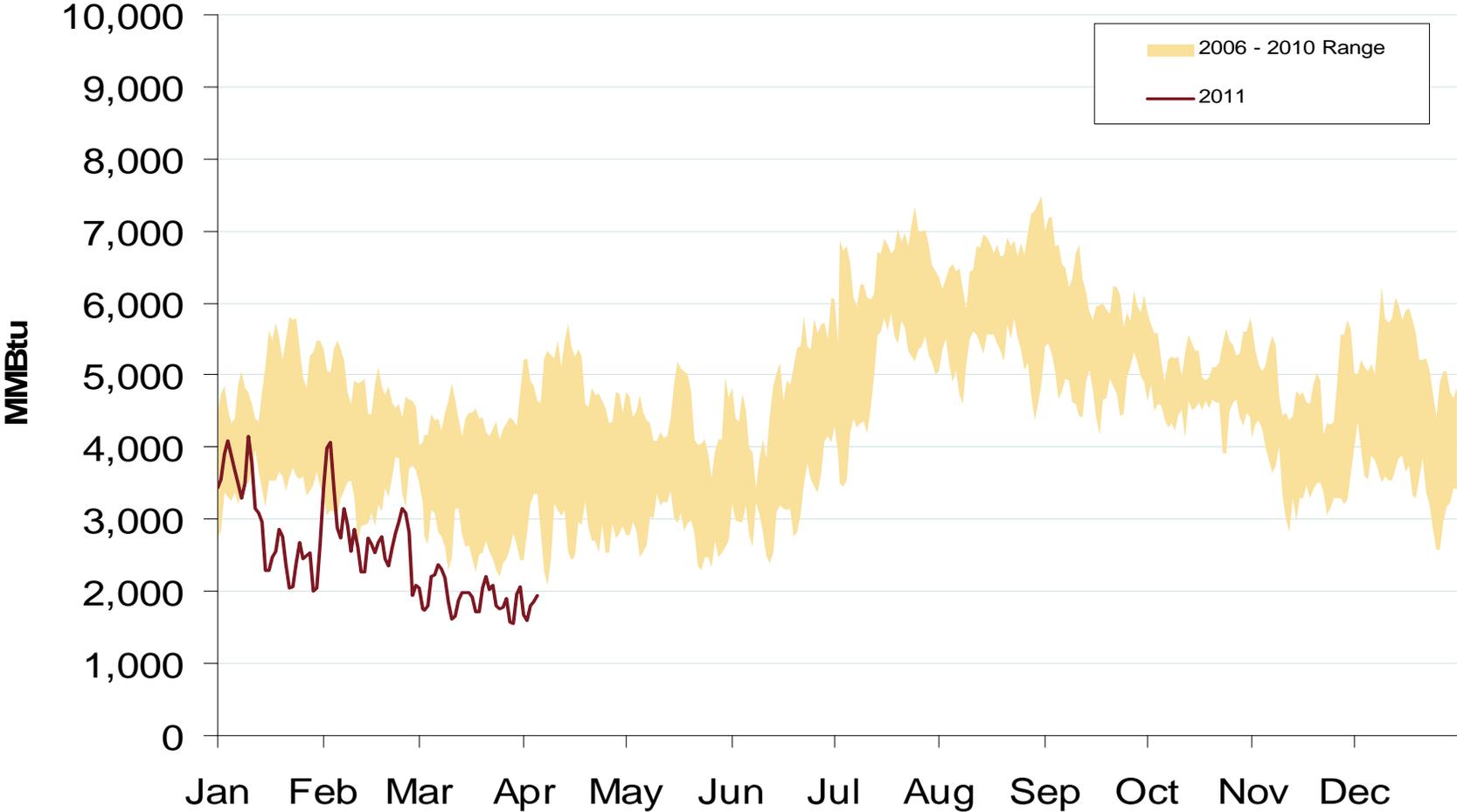
Updated April 8, 2011

## U.S. Natural Gas Consumption for Power Generation



Source: Derived from *Bentek Energy* data.

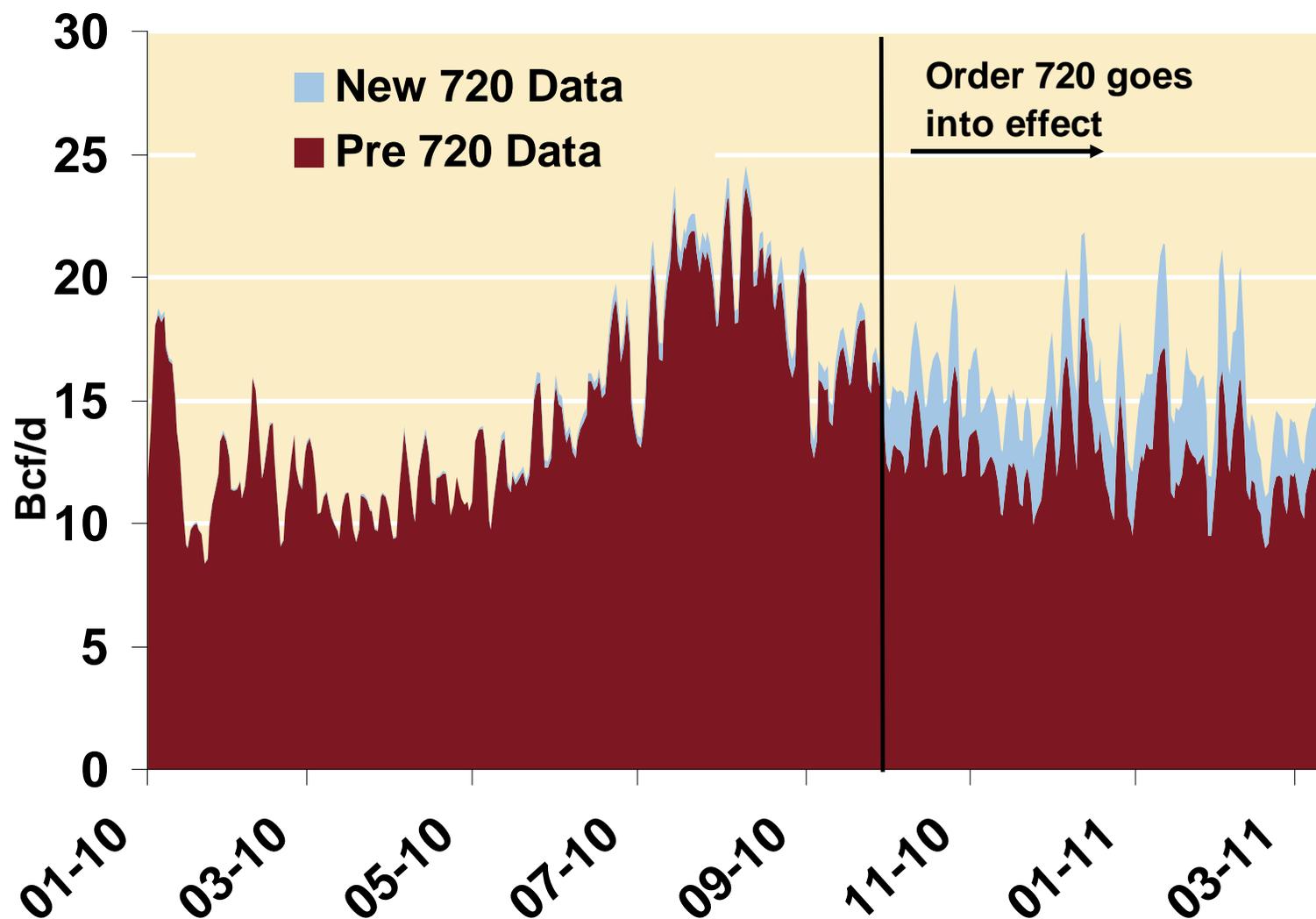
# Western Natural Gas Consumption for Power Generation



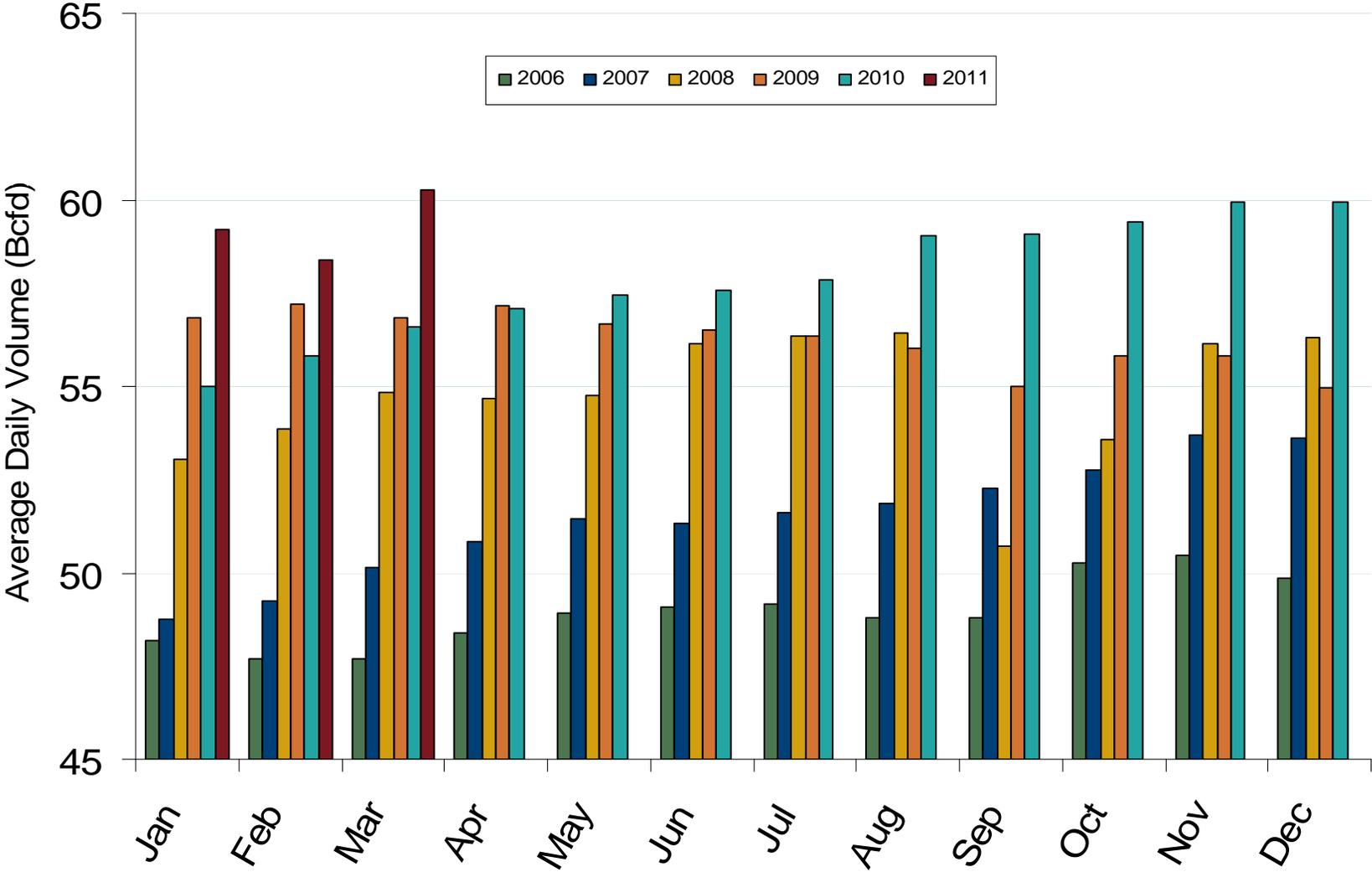
Source: Derived from *Bentek Energy* data.

Updated April 8, 2011

## Order 720 Data on Gas Demand by Power Generators



# U.S. Dry Gas Production



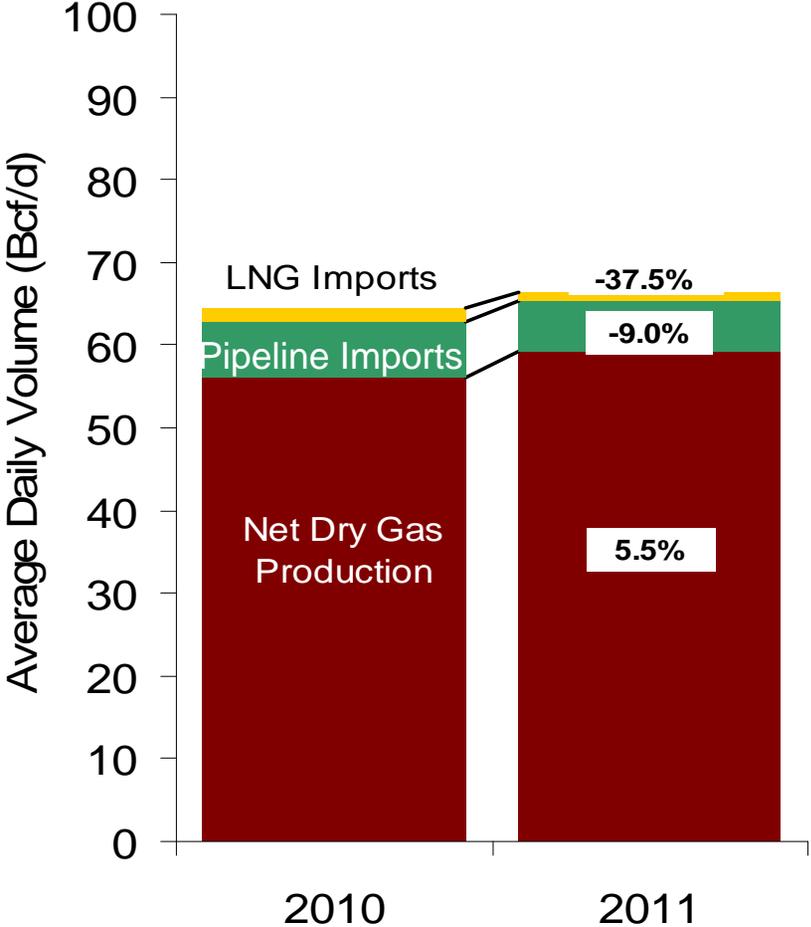
Source: Derived from EIA and Bentek data.  
April 2011 Western Snapshot Report

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# U.S. Natural Gas Supply and Demand 2010 vs. 2011: January - March

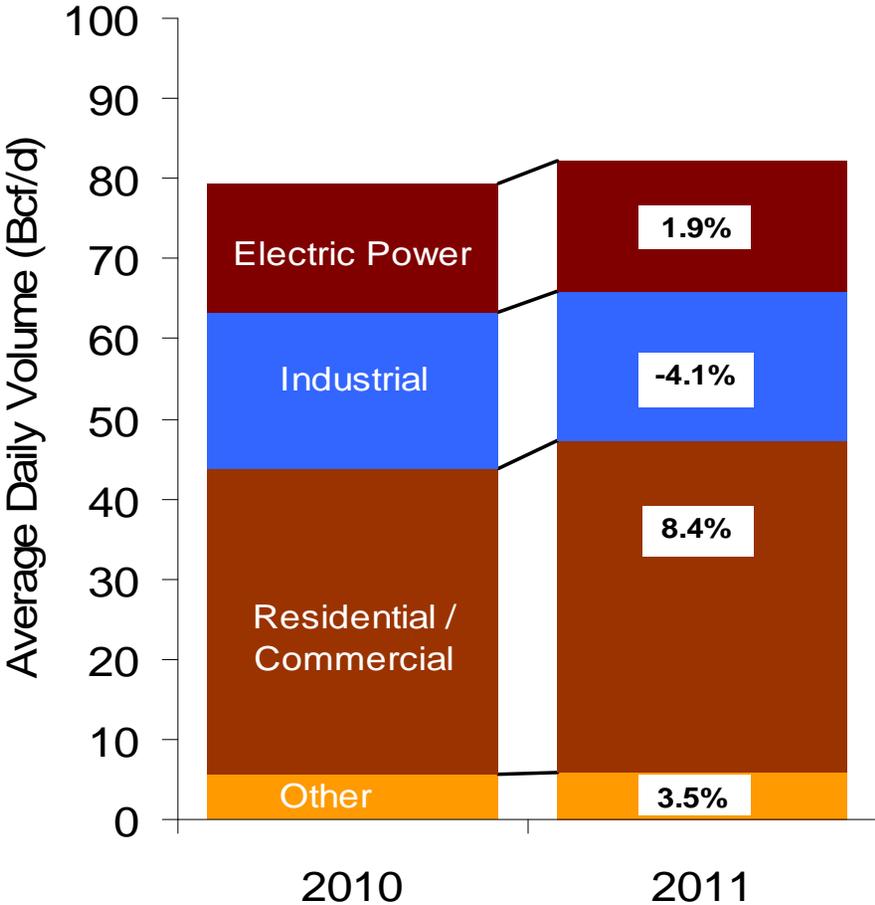
### US Natural Gas Supply

Total Change in Supply 3.4%



### US Natural Gas Demand

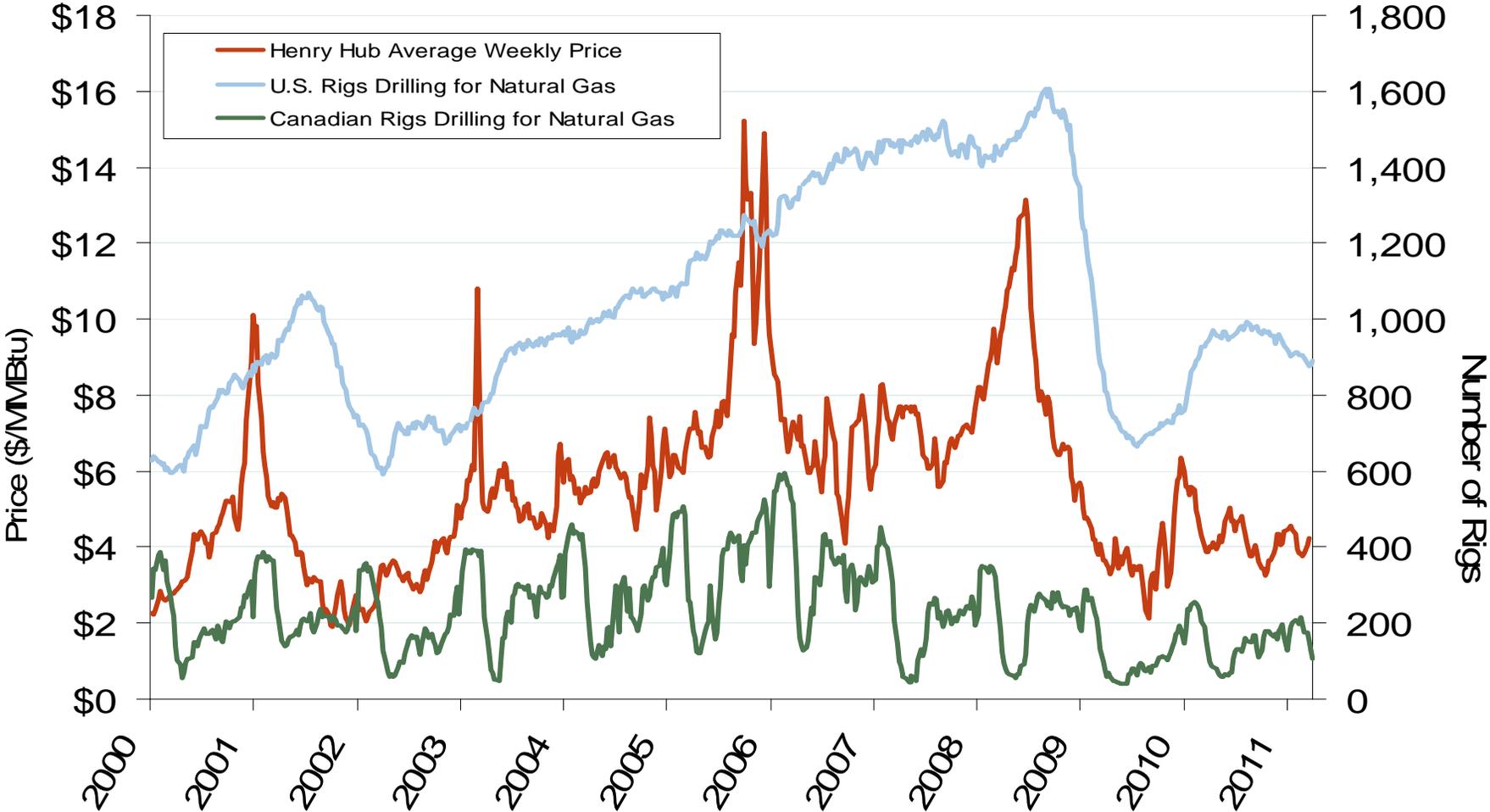
Total Change in Demand -12.8%



Source: Derived from *Bentek* data.  
April 2011 Western Snapshot Report

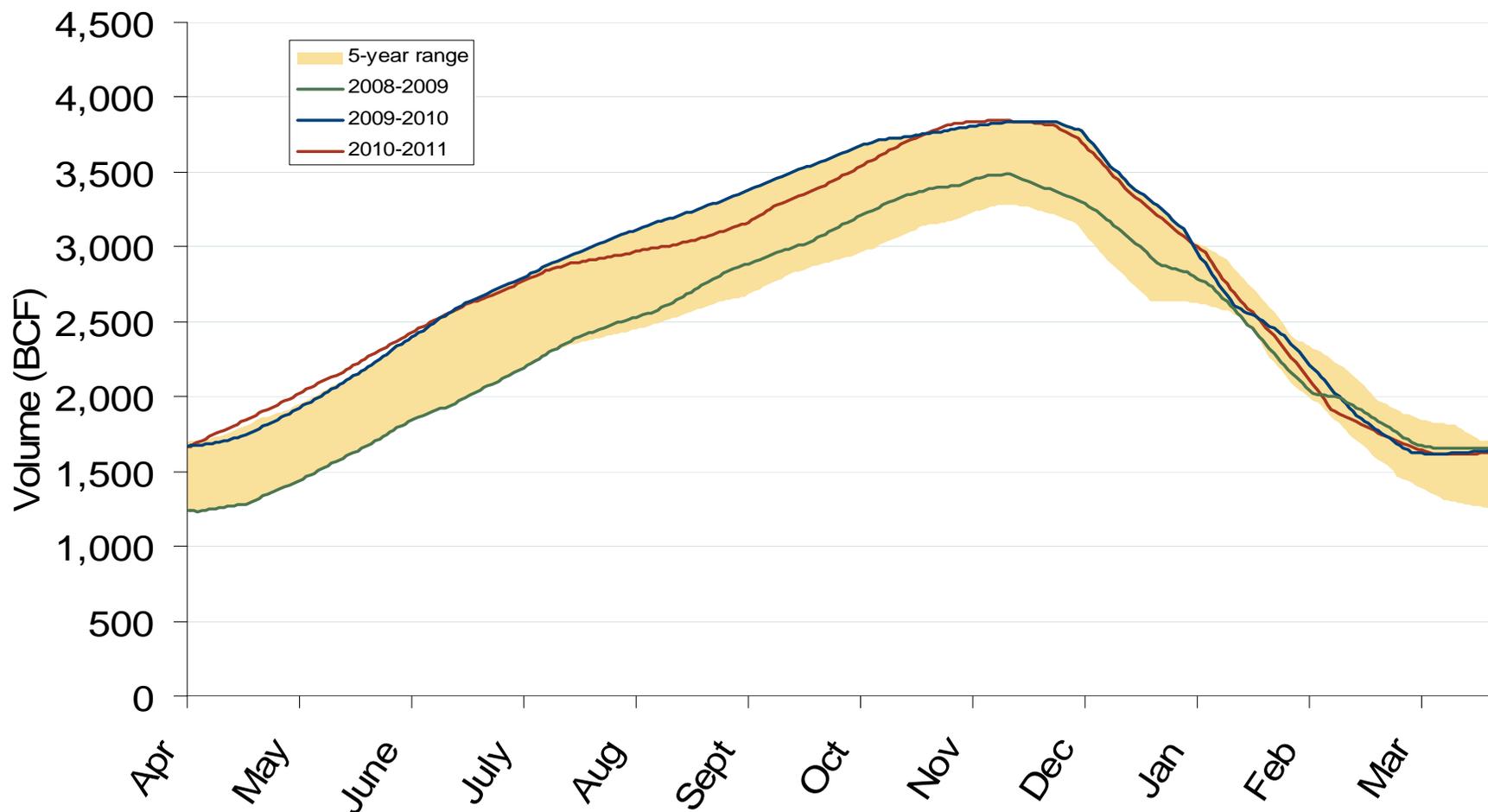
Updated April 8, 2011

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

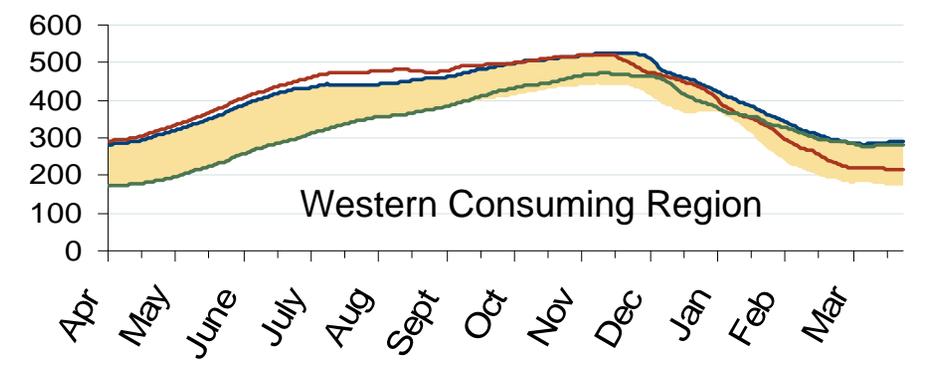
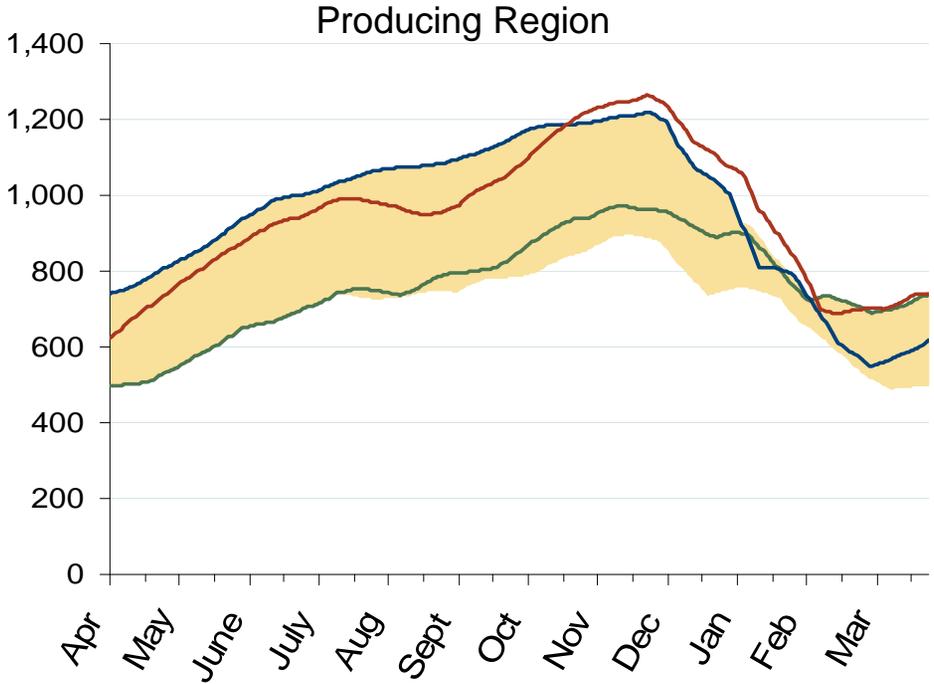
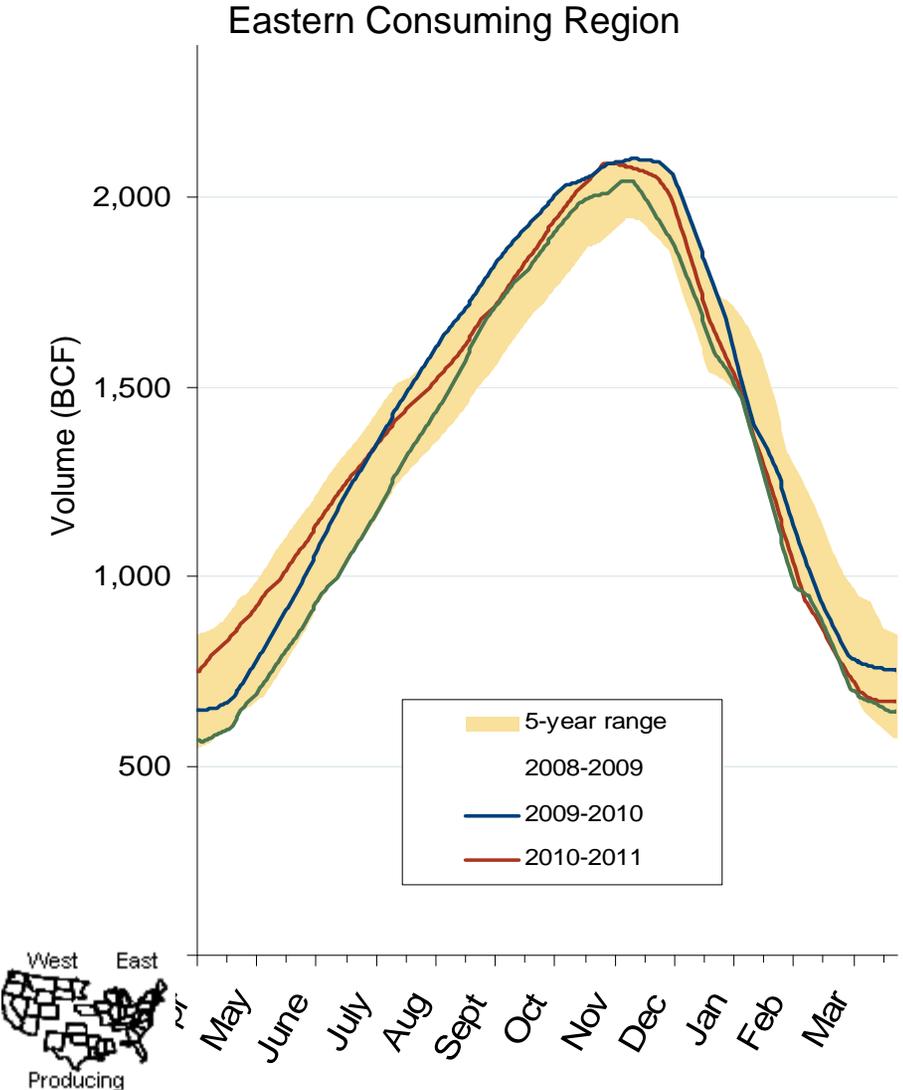


Source: Derived from *Platts* and *Baker Hughes* data.

## Total U.S. Working Gas in Storage



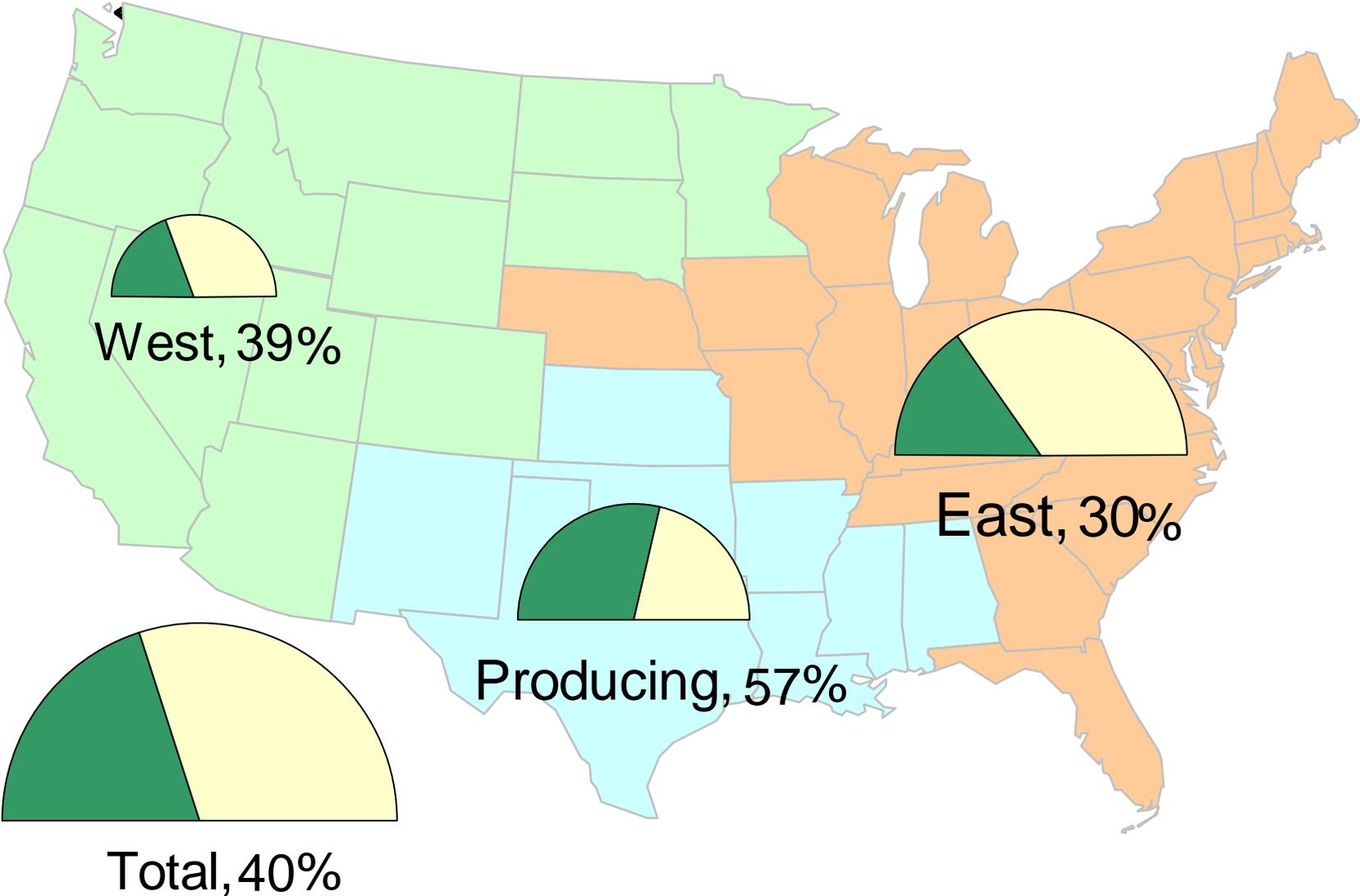
# Regional Totals of Working Gas in Storage



Source: Derived from EIA data.  
April 2011 Western Snapshot Report

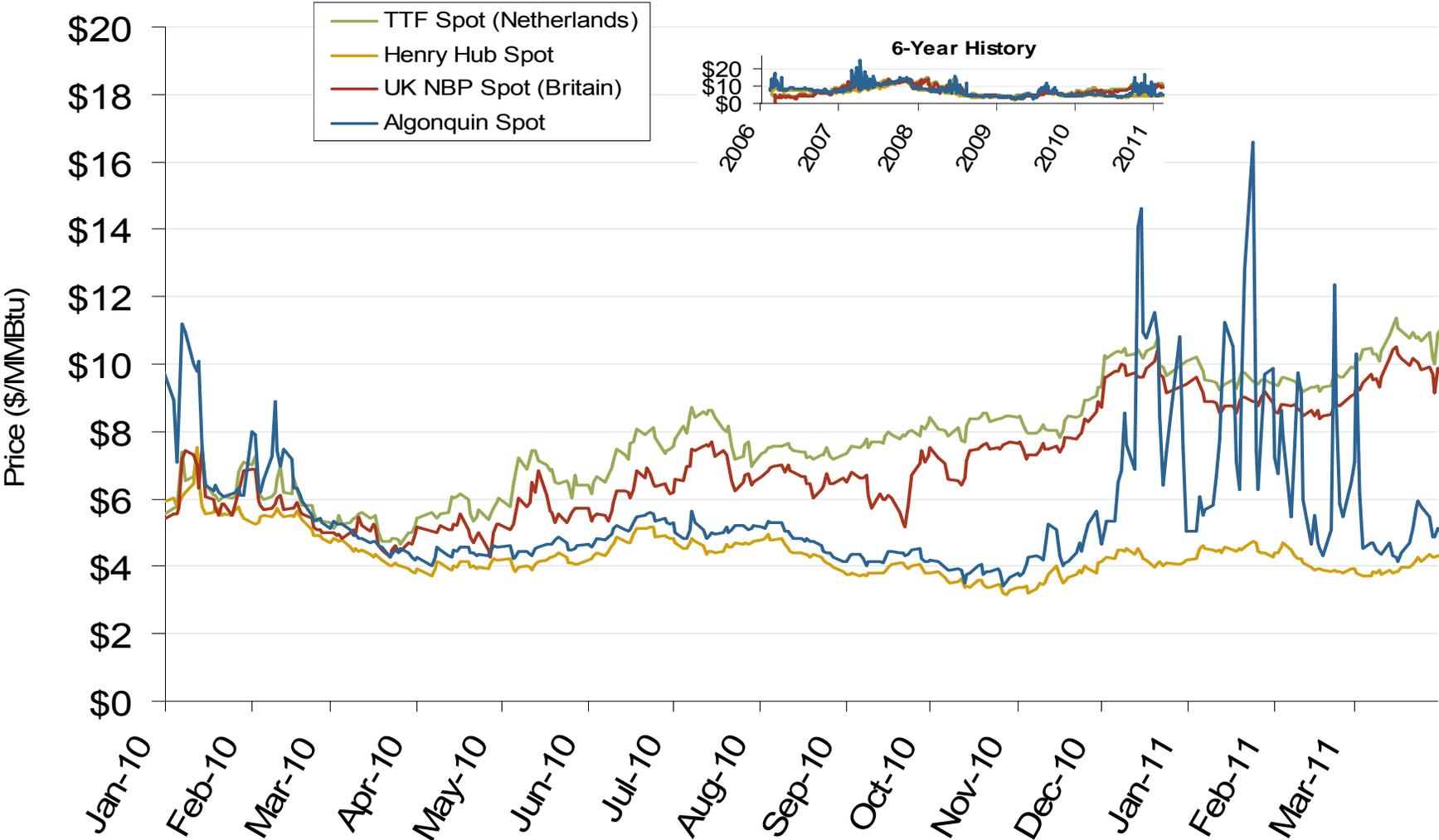
Updated April 8, 2011

# Natural Gas Storage Inventories – March 25, 2011



Source: Derived from *EIA Storage and Estimated Working Gas Capacity* data.  
April 2011 Western Snapshot Report

# Atlantic Basin European and US Spot Natural Gas Prices



Source: Derived from Bloomberg and ICE data.

Updated: April 07, 2011

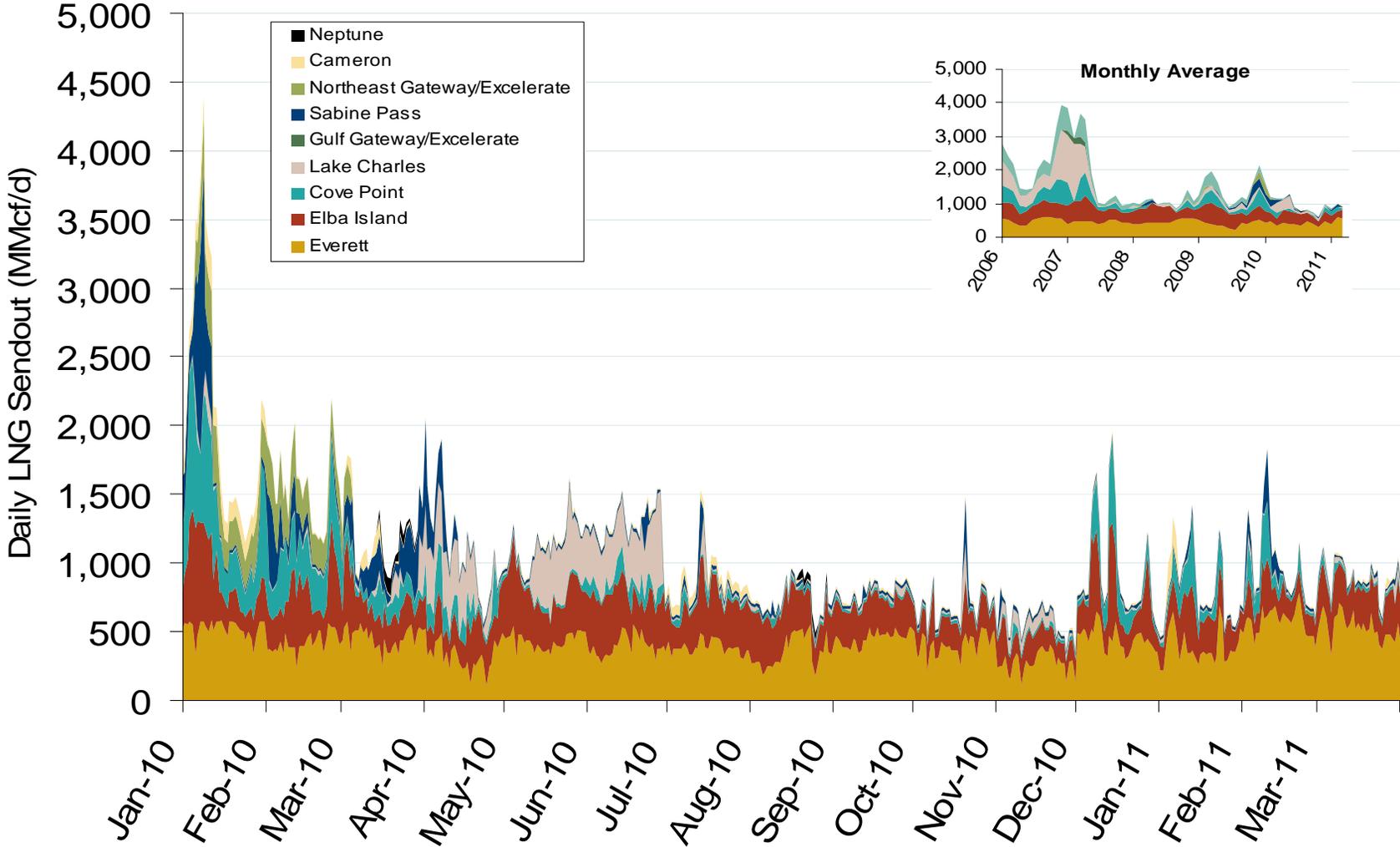
# World LNG Estimated May 2011 Landed Prices



Source: *Waterborne Energy, Inc.* Data in \$US/MMBtu.  
April 2011 Western Snapshot Report

Updated April 8, 2011

# Daily Gas Sendout from Existing U.S. LNG Facilities

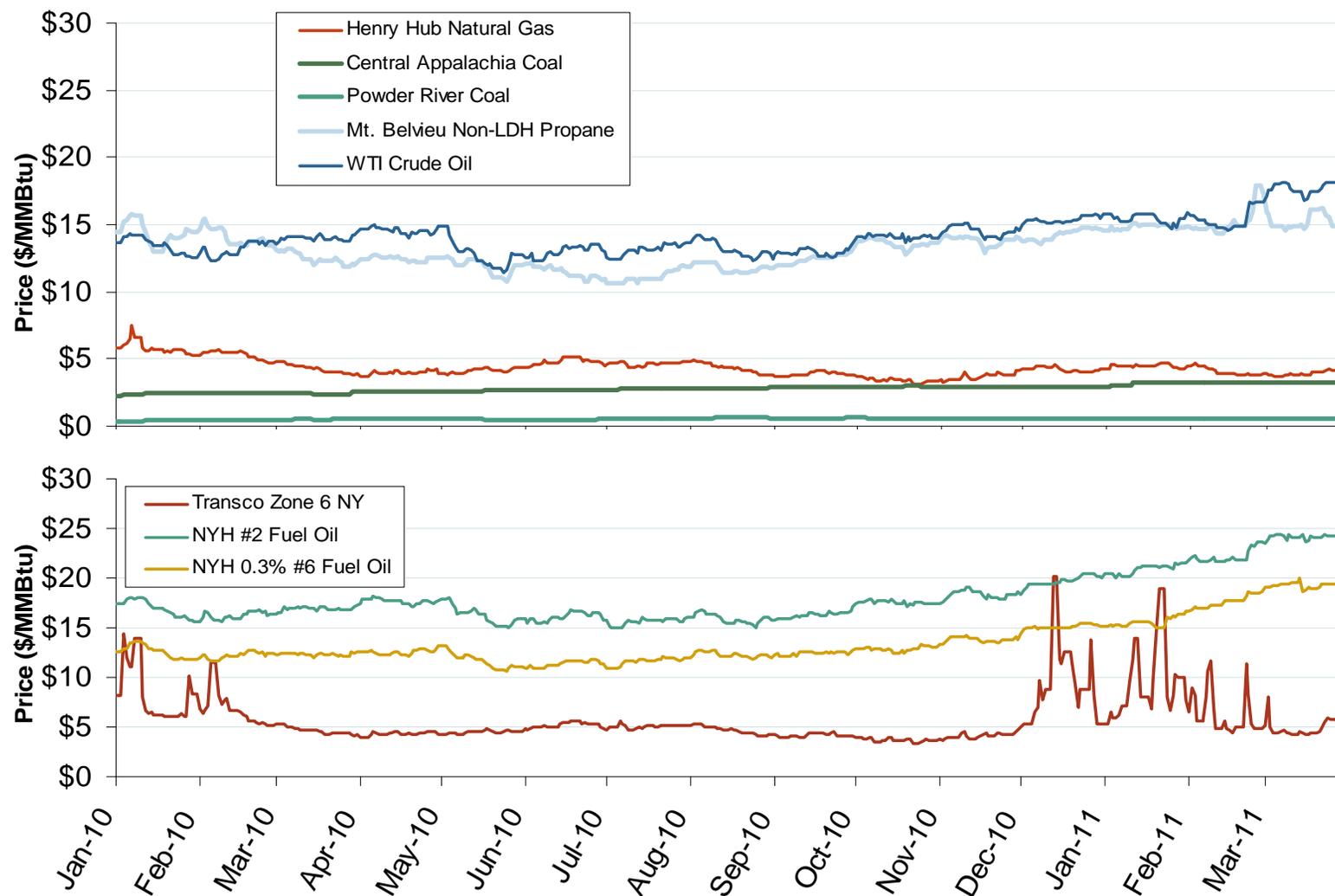


Source: Derived from *Bentek* data.

\* 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.

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## Oil, Coal, Natural Gas and Propane Daily Spot Prices

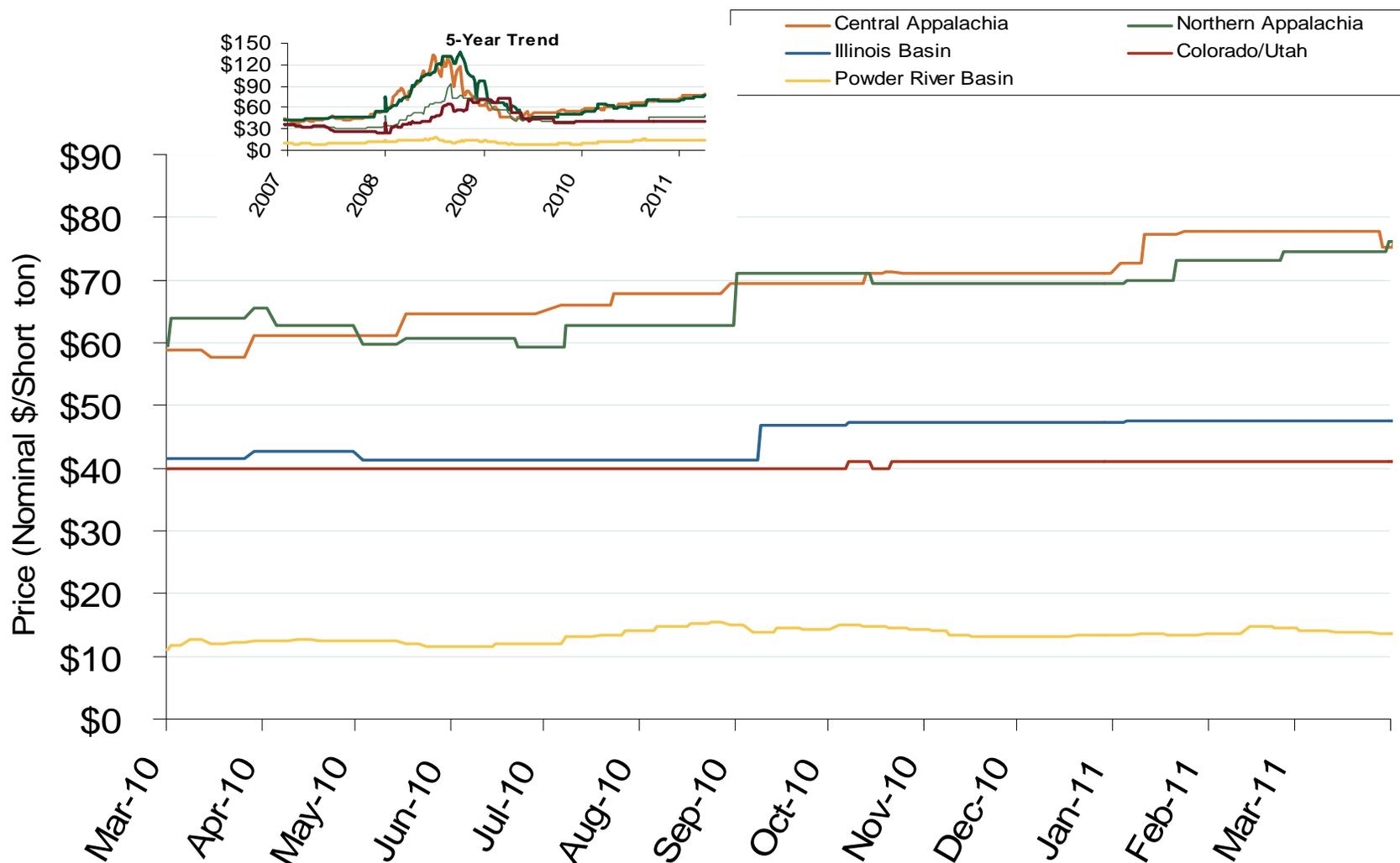


Source: Derived from ICE and Bloomberg data.

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.

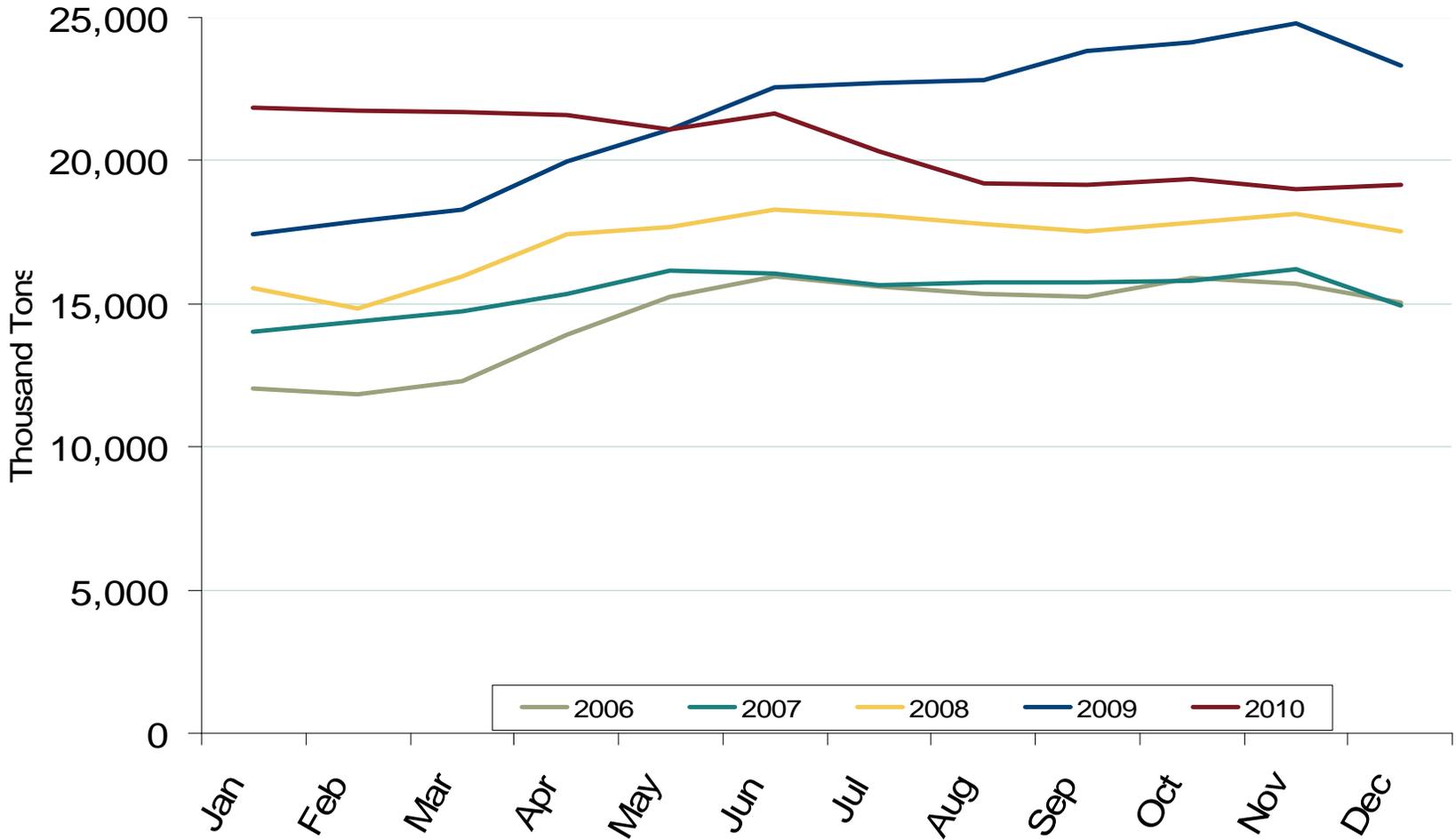
Updated: April 07, 2011

## Regional Coal Spot Prices



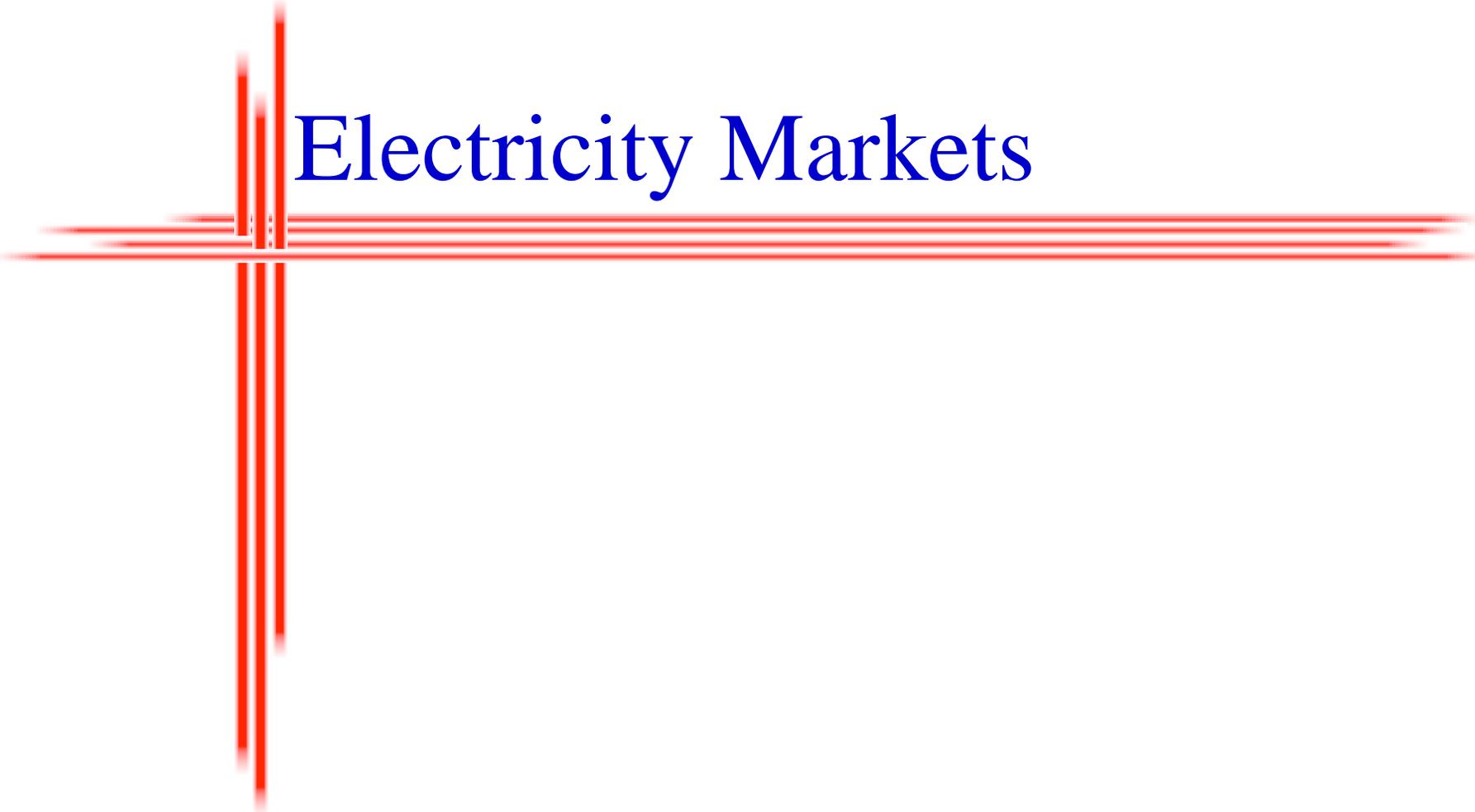
Note: the Central Appalachian (CAPP) coal is priced at Big Sandy. All others are mine mouth prices. Prices do not include transportation costs to a plant, as those can vary widely by contract specifications. Prices exclude incremental cost of emissions allowances.

# Western Coal Stockpiles at Electric Power Generating Facilities



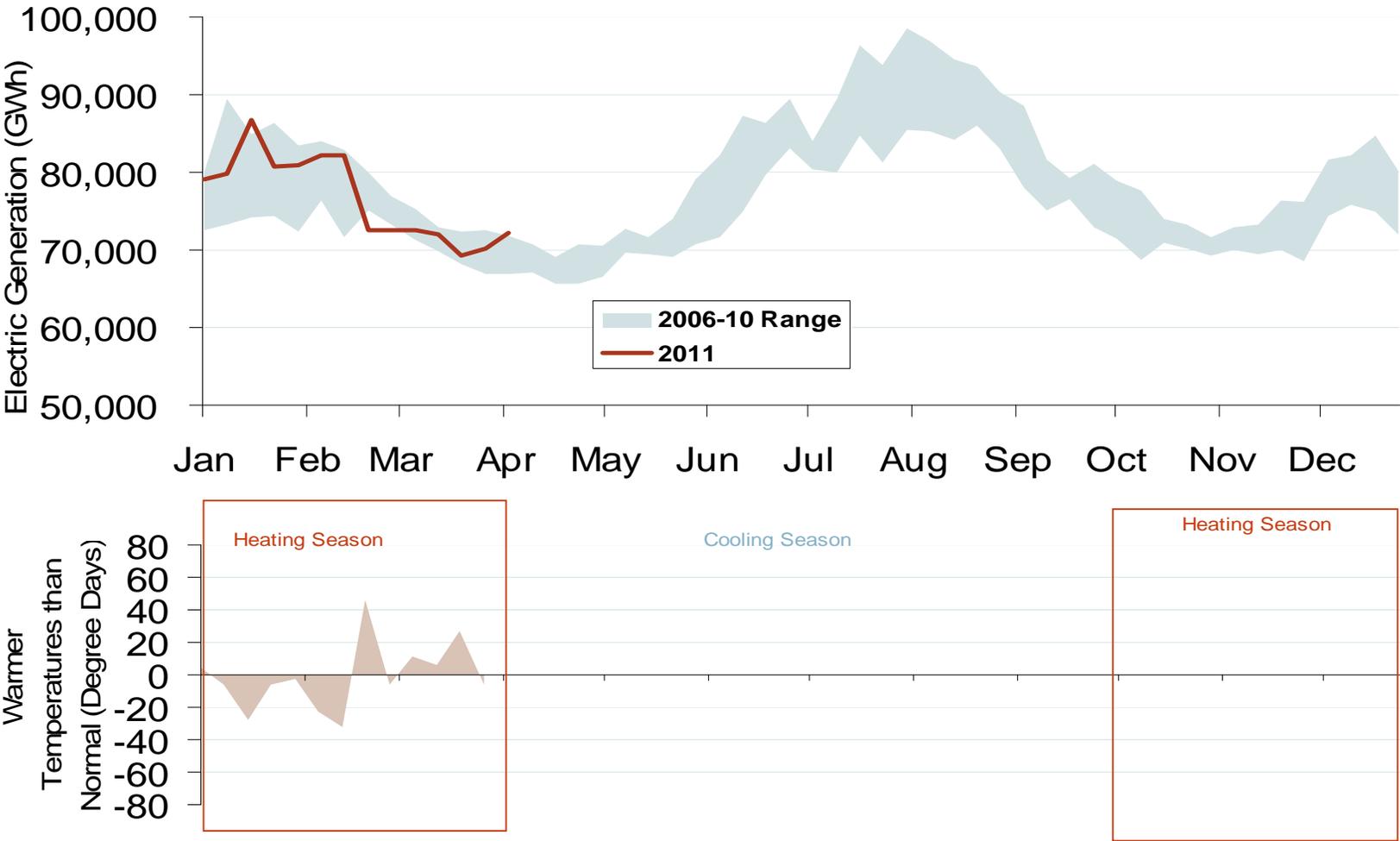
Source: Derived from Energy Information Administration. Excludes Industrial and Commercial Plants.

Updated: April 07, 2011



# Electricity Markets

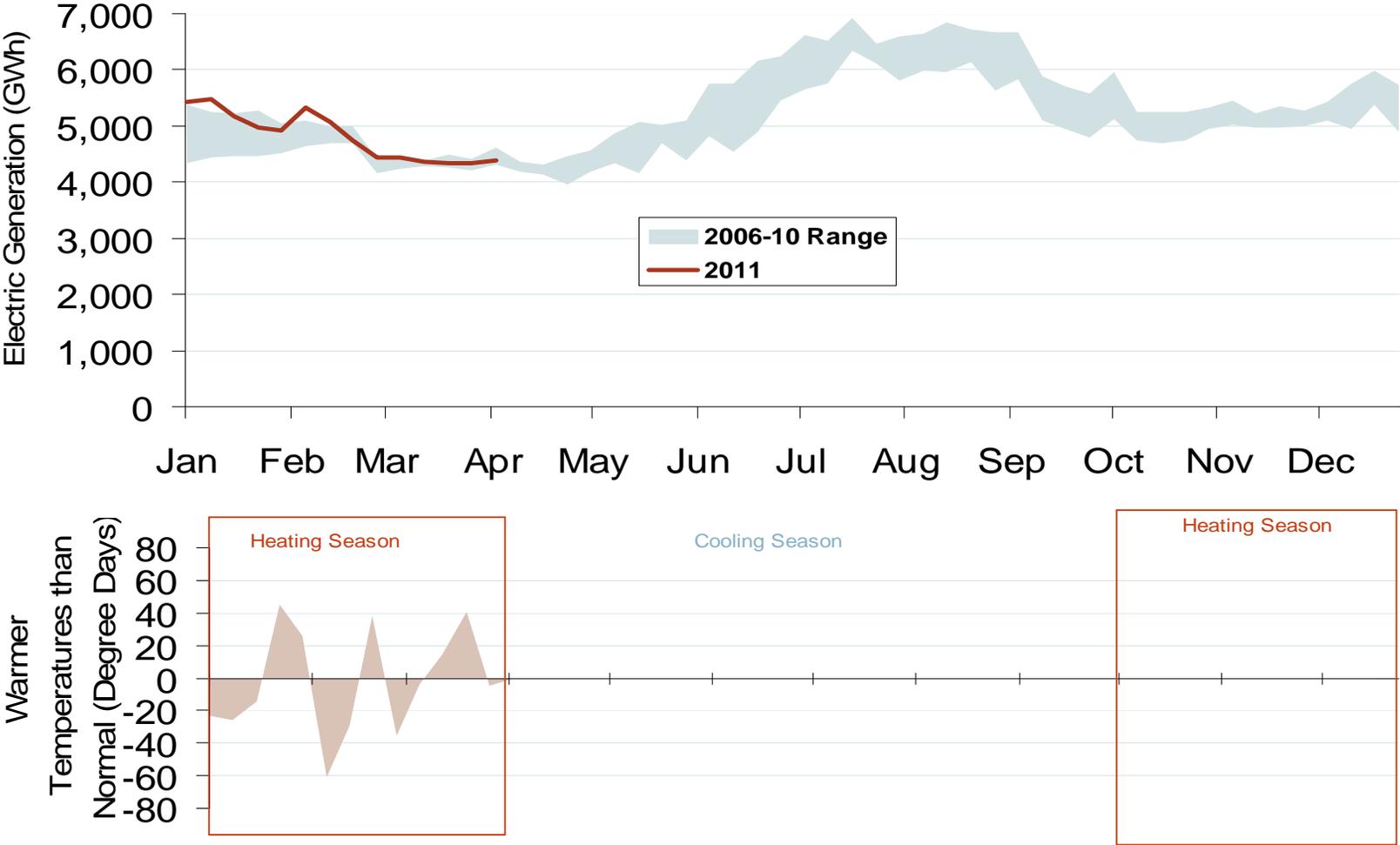
# Weekly U.S. Electric Generation Output and Temperatures



Source: Derived from EEI and NOAA data.

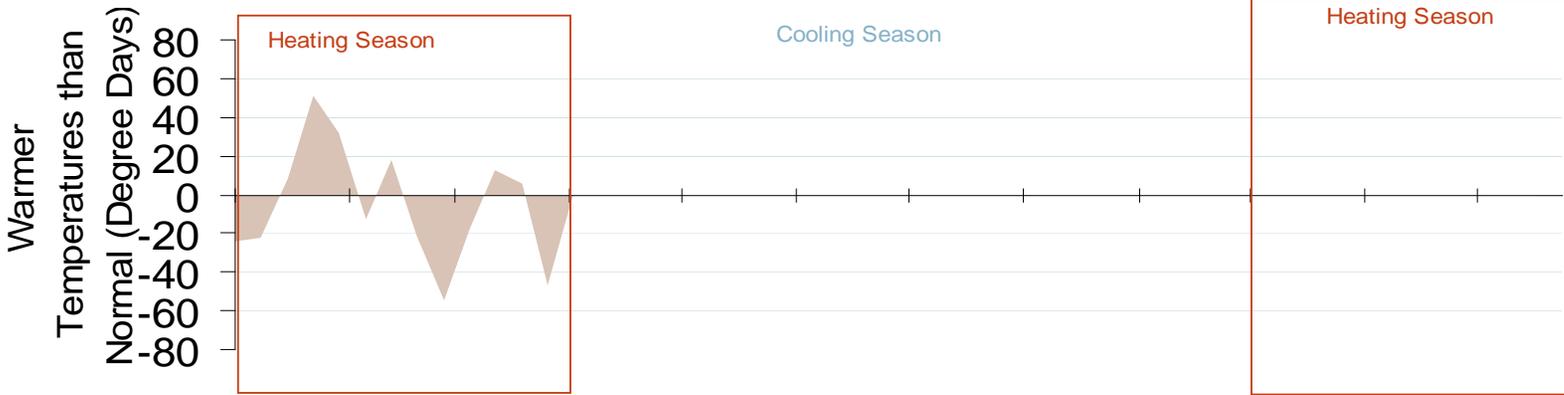
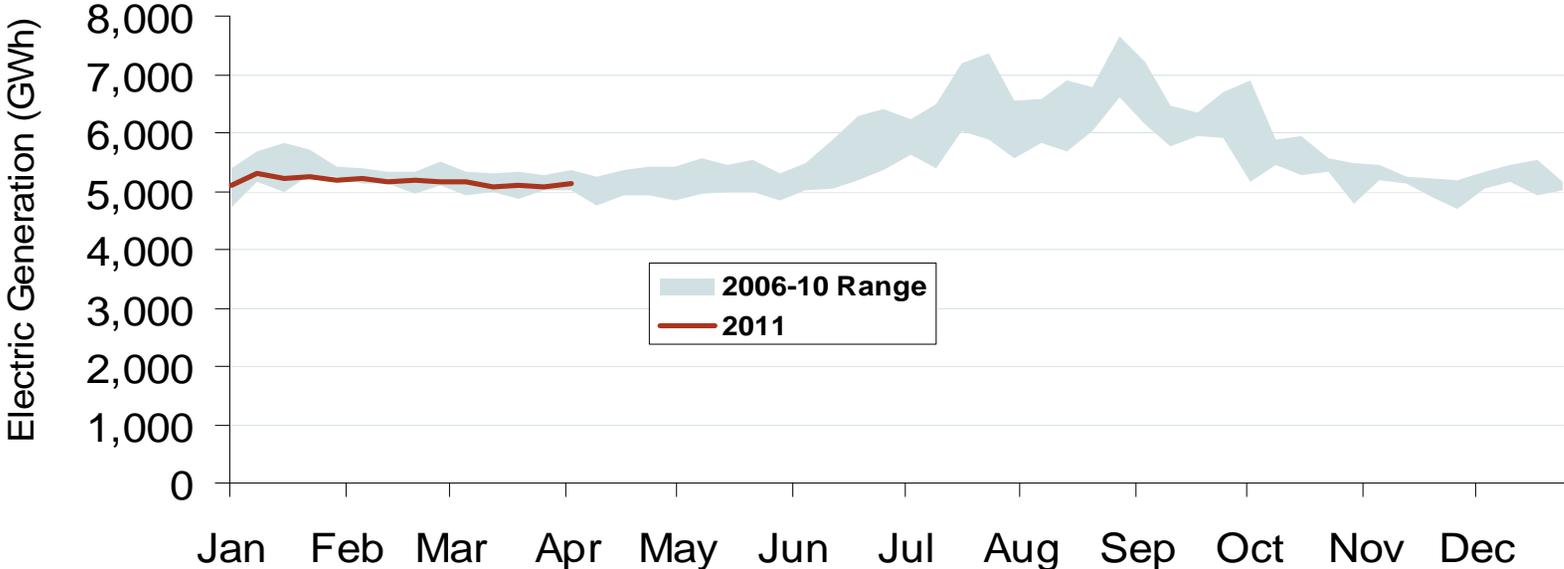
Updated April 8, 2011

# Weekly Electric Generation Output and Temperatures Rocky Mountain Region



Source: Derived from EEI and NOAA data.

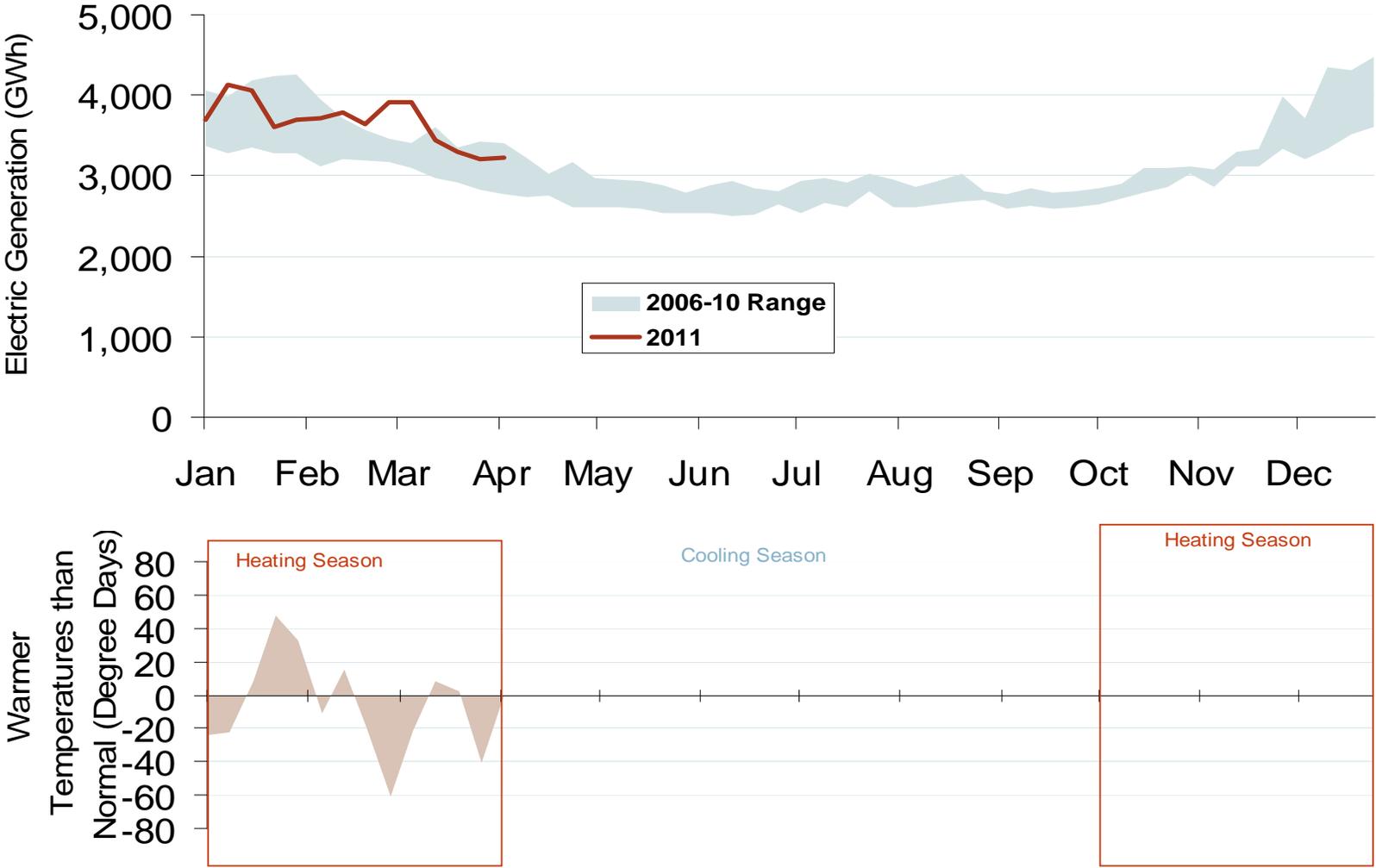
# Weekly Electric Generation Output and Temperatures California



Source: Derived from *EI* and *NOAA* data.  
April 2011 Western Snapshot Report

Updated April 8, 2011

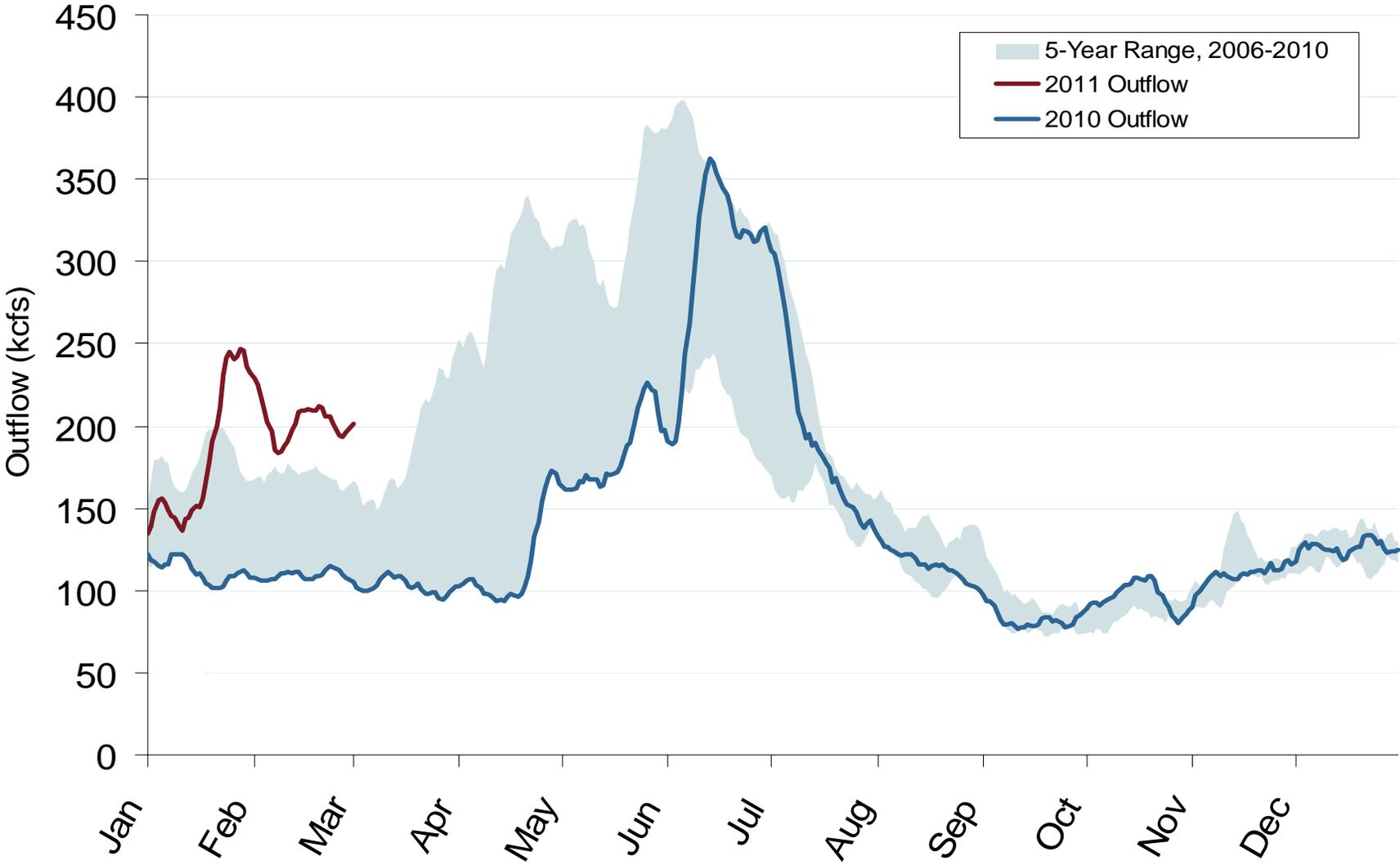
# Weekly Electric Generation Output and Temperatures Pacific Northwest Region



Source: Derived from *EI* and *NOAA* data.  
April 2011 Western Snapshot Report

Updated: March 08, 2011

# Stream Flow at The Dalles Dam



Source: Derived from USACE data.

Trend lines are 7-day moving averages.

April 2011 Western Snapshot Report

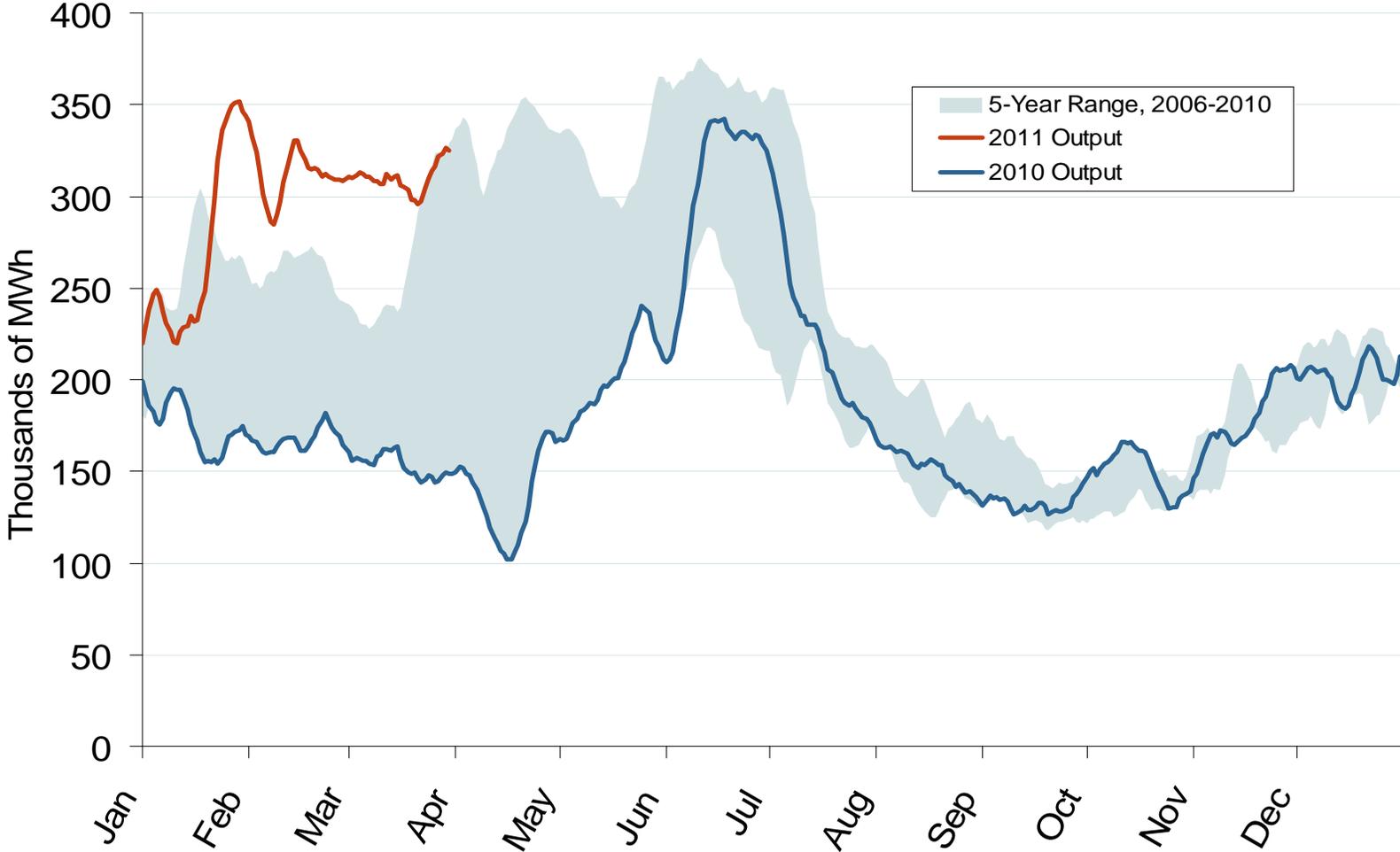
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## Pacific/Northwest Hydro and Snowpack Levels

	Hydro Generation		Snow Water Equivalent <sup>3</sup>		
	In-State Capacity (MW) <sup>1</sup>	Additional Capacity Created Downstream (MW) <sup>2</sup>	One Year Ago (4/1/10) (% of historical average)	Current (3/30/11) (% of historical average)	% Change from One Year Ago
<b>Washington</b>	<b>21,500</b>	<b>0</b>	<b>72%</b>	<b>112%</b>	<b>+40%</b>
<b>Oregon</b>	<b>9,100</b>	<b>0</b>	<b>67%</b>	<b>130%</b>	<b>+63%</b>
<b>California</b>	<b>10,400</b>	<b>0</b>	<b>106%</b>	<b>166%</b>	<b>+60%</b>
<b>Idaho</b>	<b>2,700</b>	<b>19,700</b>	<b>67%</b>	<b>116%</b>	<b>+49%</b>
<b>Montana</b>	<b>2,700</b>	<b>16,200</b>	<b>64%</b>	<b>119%</b>	<b>+55%</b>
<b>British Columbia</b>	<b>10,000</b>	<b>16,200</b>	<b>80%</b>	<b>106%</b>	<b>+26%</b>

- <sup>1</sup> Net summer capacity in megawatts by state (EIA).
- <sup>2</sup> 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.
- <sup>3</sup> 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).

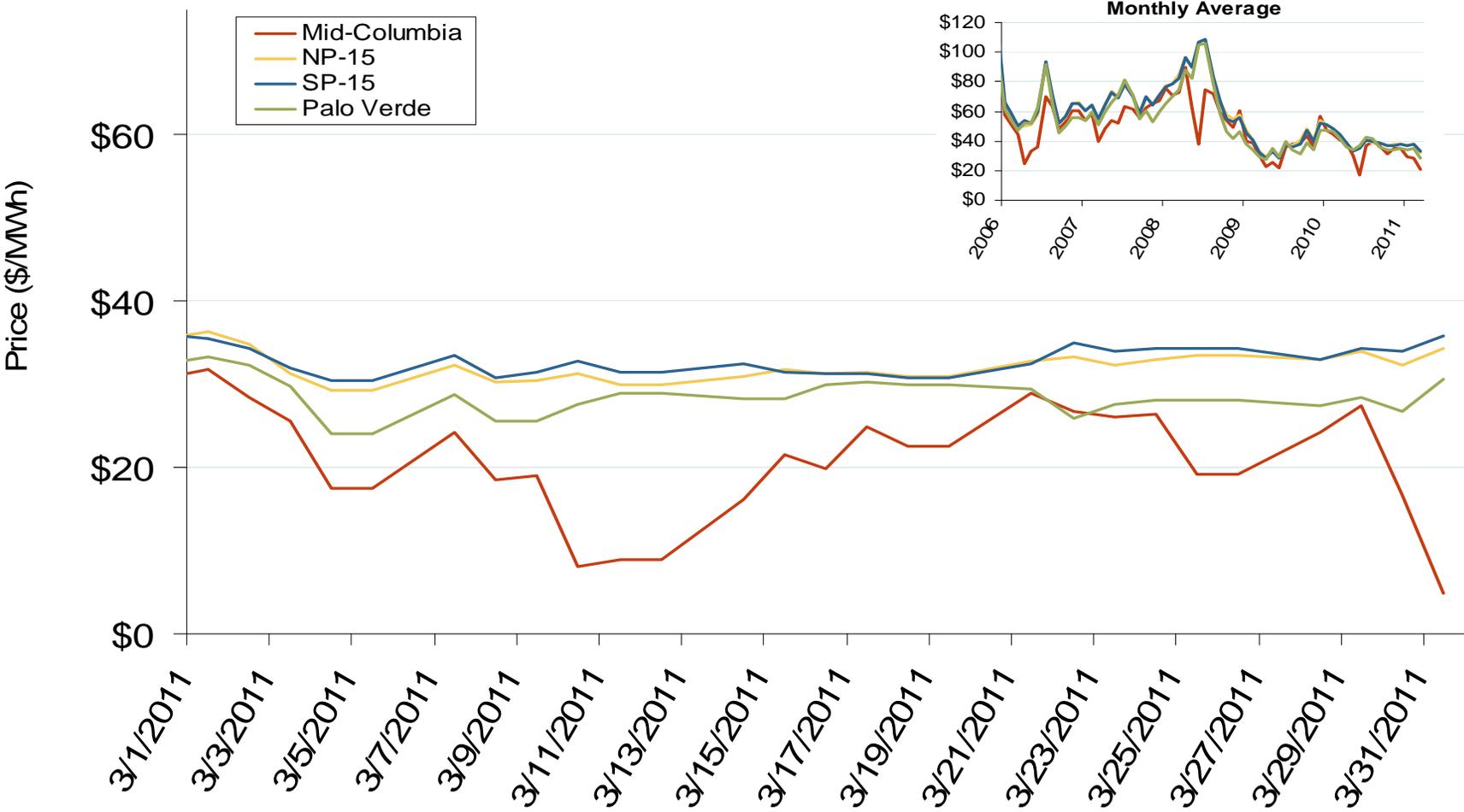
# Pacific Northwest Hydroelectric Production



Source: Derived from USACE data reflecting the output of the 24 largest facilities.

Note: Trend lines are 7-day moving averages.

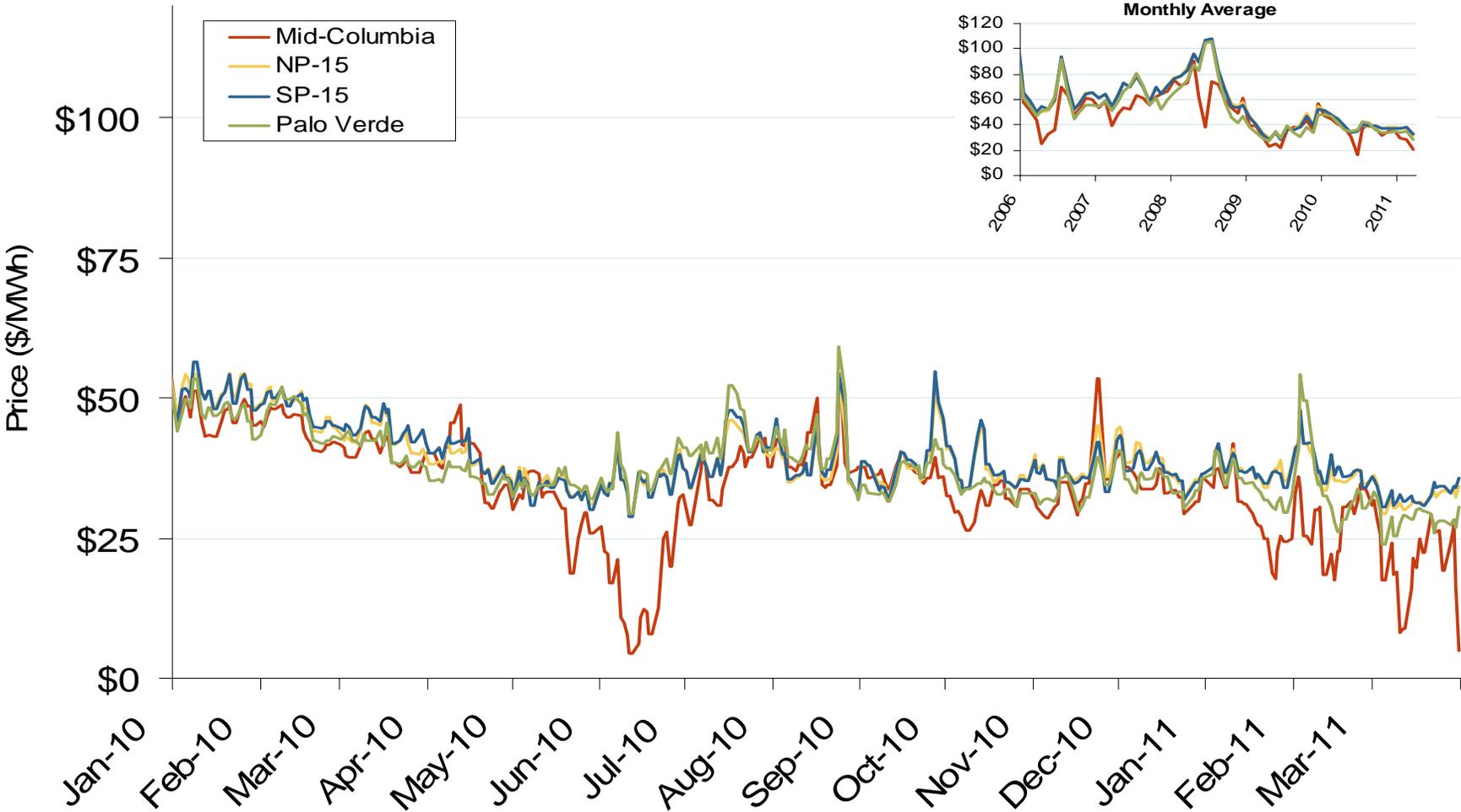
# Western Daily Bilateral Day-Ahead On-Peak Prices



Source: Derived from *Platts* data.

Updated April 8, 2011

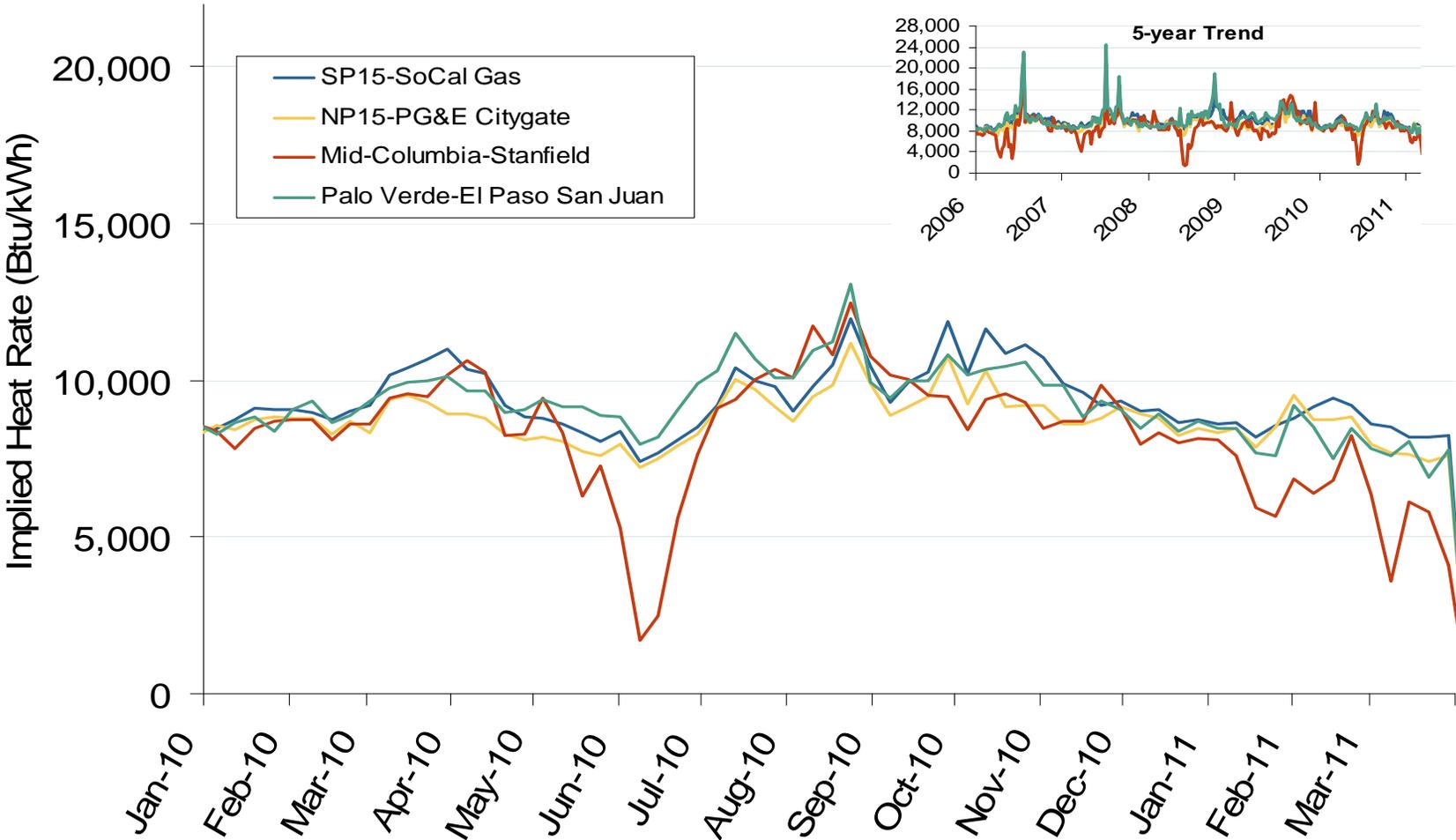
# Western Daily Bilateral Day-Ahead On-Peak Prices



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Updated April 8, 2011

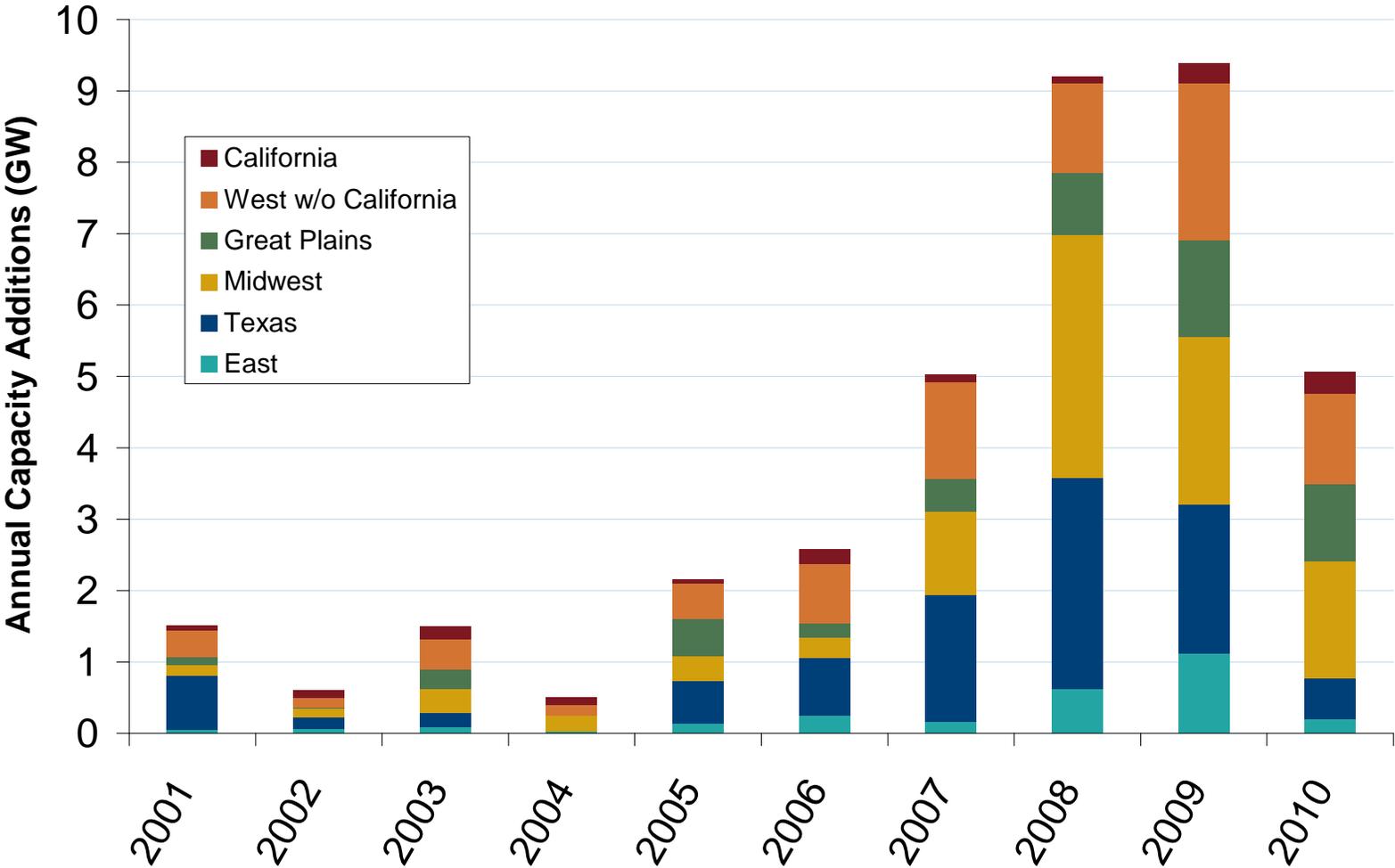
# Implied Heat Rates at Western Trading Points Weekly Averages



Source: Derived from *Platts* on-peak electric and natural gas price data.

Updated April 8, 2011

# Regional Wind Capacity Growth



West w/o CA: CO, HI, ID, MT, NM, OR, UT, WA, WY

Great Plains: KS, NE, ND, OK, SD

Midwest: IL, IN, IA, MI, MN, MO, OH, WI

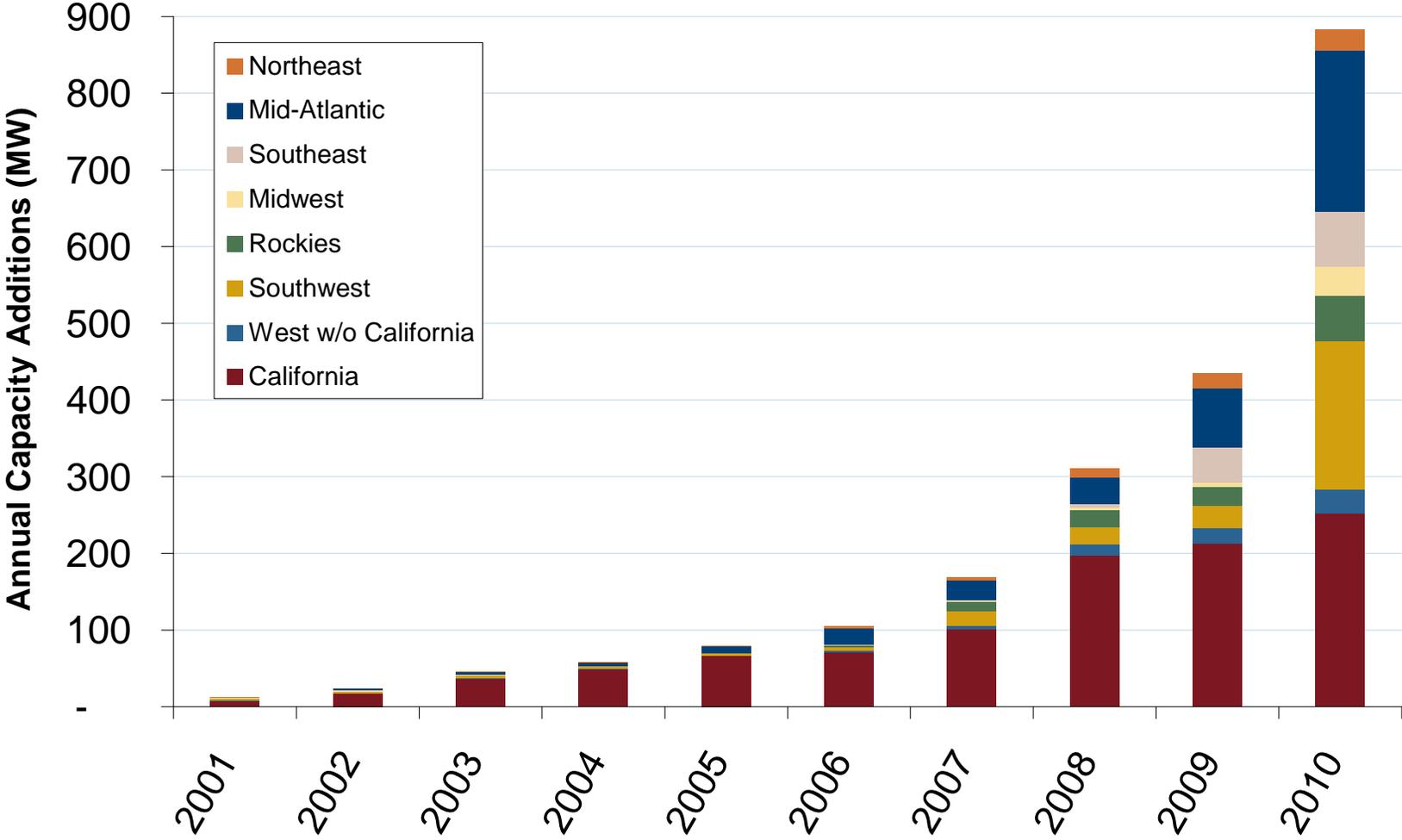
East: DE, ME, MA, NH, NJ, NY, PA, RI, TN, VT, WV

Source: Energy Velocity Generating Unit Capacity Dataset

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# Regional Grid-Connected Photovoltaic Capacity Growth



**Northeast:** CT, ME, MA, NH, RI, VT  
**Southeast:** AL, AR, FL, GA, LA, MS, NC, SC, TN, VA  
**Rockies:** CO, ID, MT, UT, WY  
**West w/o California:** HI, OR, WA

**Mid-Atlantic:** DE, DC, MD, NJ, NY, PA  
**Midwest:** IL, IN, IA, KY, MI, MN, MO, OH, OK, WI  
**Southwest:** AZ, NV, NM, TX

## Renewable Portfolio Provisions for Solar and Distributed Generation

16 States and D.C. use set-asides, 3 use multipliers to encourage these technologies

**WA:** double credit for DG

**OR:** 20 MW PV by 2020;  
\* 2 utility PV credit

**CA:** 3 GW, of which 1,940 MW distributed solar by 2016

**NV:** 1.5% solar by 2025  
\* 2.4 central PV;  
\* 2.45 distributed PV

**UT:** \* 2.4 solar-electric

**CO:** DG as 3% of retail sales by 2020; ½ customer-sited

**AZ:** 4.5% DG by 2025;  
half residential

**NM:** 4% solar-electric,  
0.6% DG by 2020

**TX:** double credit for non-wind;  
non-wind goal: 500 MW

**MO:** 0.3% solar-electric by 2021

**IL:** 1.5% solar PV by 2025

**MI:** triple credit for solar-electric

**OH:** 0.5% solar-electric by 2025

**NH:** 0.3% solar-electric by 2014

**NY:** customer-sited is 7% of RPS increments, 0.5% of 2015 sales

**MA:** 400 MW PV by 2020

**RI:** 3 MW solar by 2013

**NJ:** 5,316 GWh solar-electric by 2026

**PA:** 0.5% PV by 2020

**WV:** various multipliers

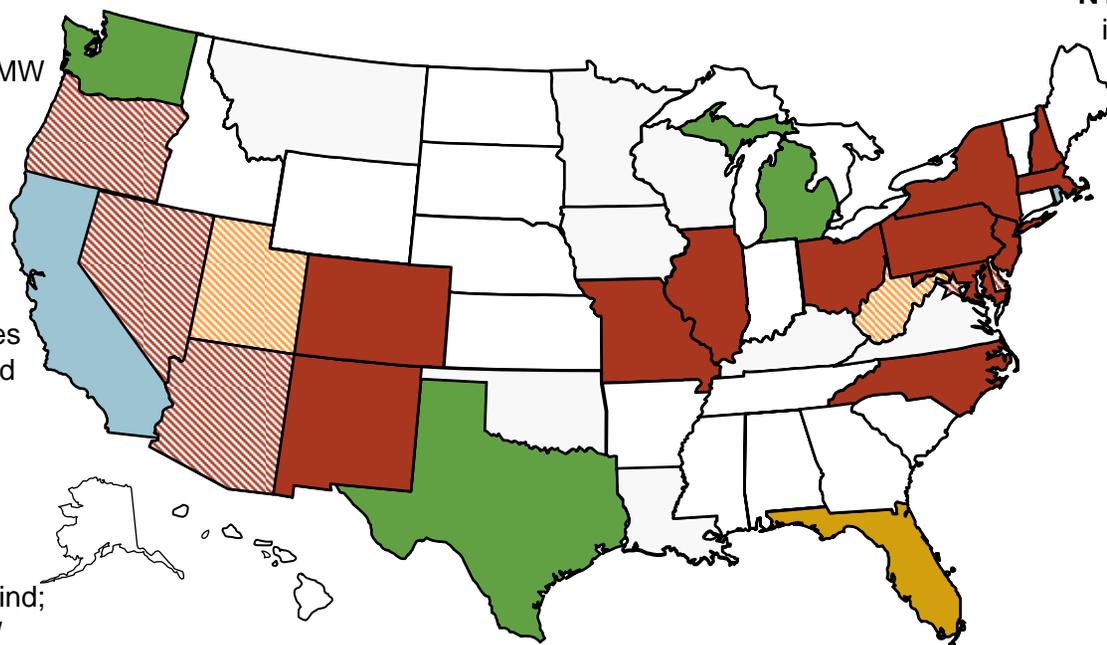
**DE:** 3.5% PV by 2026

**DC:** 0.4% solar by 2021 ★

**MD:** 2% solar-electric in 2022

**NC:** 0.2% solar by 2018

**FL:** solar pilot 2010 - 2014



- MI, TX, and WA use RPS multipliers only
- AZ, DC, DE, NV, and OR have RPS set-asides and multipliers
- CA, RI, UT, and WV have solar targets outside an RPS

- Solar / DG set-aside in RPS
- Solar / DG in other renewable program
- RPS credit multiplier for solar / DG
- Multiplier and set-aside in an RPS
- Multiplier and set-aside in renewable goal
- Pilot or study

**Updates at:** <http://www.ferc.gov/market-oversight/othr-mkts/renew/othr-rnw-rps-solar-DG.pdf>

**Notes:** Multipliers (\*) receive extra credit towards RPS compliance. Set-asides specify technology targets in an RPS.

**Abbreviations:** DG – distributed generation; PV – solar photovoltaic; RPS – Renewable Portfolio Standard

**Sources:** Derived from data in: LBNL, State Legislative and Public Utility web sites, California Solar Initiative, and the Database of State Incentives for Renewables and Energy Efficiency: <http://www.dsireusa.org>

Updated April 7, 2011

34003

## 2010 Review of RPS Provisions for Solar and Distributed Generation

### Policies incent solar and DG development:

- **16 states** and D.C. have solar or distributed generation (DG) set-asides in their Renewable Portfolio Standards (RPS), to encourage higher-cost technologies so they can move closer to cost parity with other renewable resources.
- **Set-asides** specify what portion of an RPS should come from a specific technology. **Multipliers** increase the value of renewable energy certificates (RECs) awarded for each MWh produced by eligible technologies. Some states have separate solar RECs (SRECs) that can be traded.
- **Three states** have solar targets or programs outside an RPS or renewable goal: California, Florida, and Rhode Island.
- Lawrence Berkeley (LBNL) projected that existing solar carve-outs require 560 MW of solar through 2010 and 8,447 MW by 2025. That development is exclusive of non-RPS goals, such as California's "million roofs" program. LBNL found that multipliers have been less effective in stimulating solar development than set-asides.

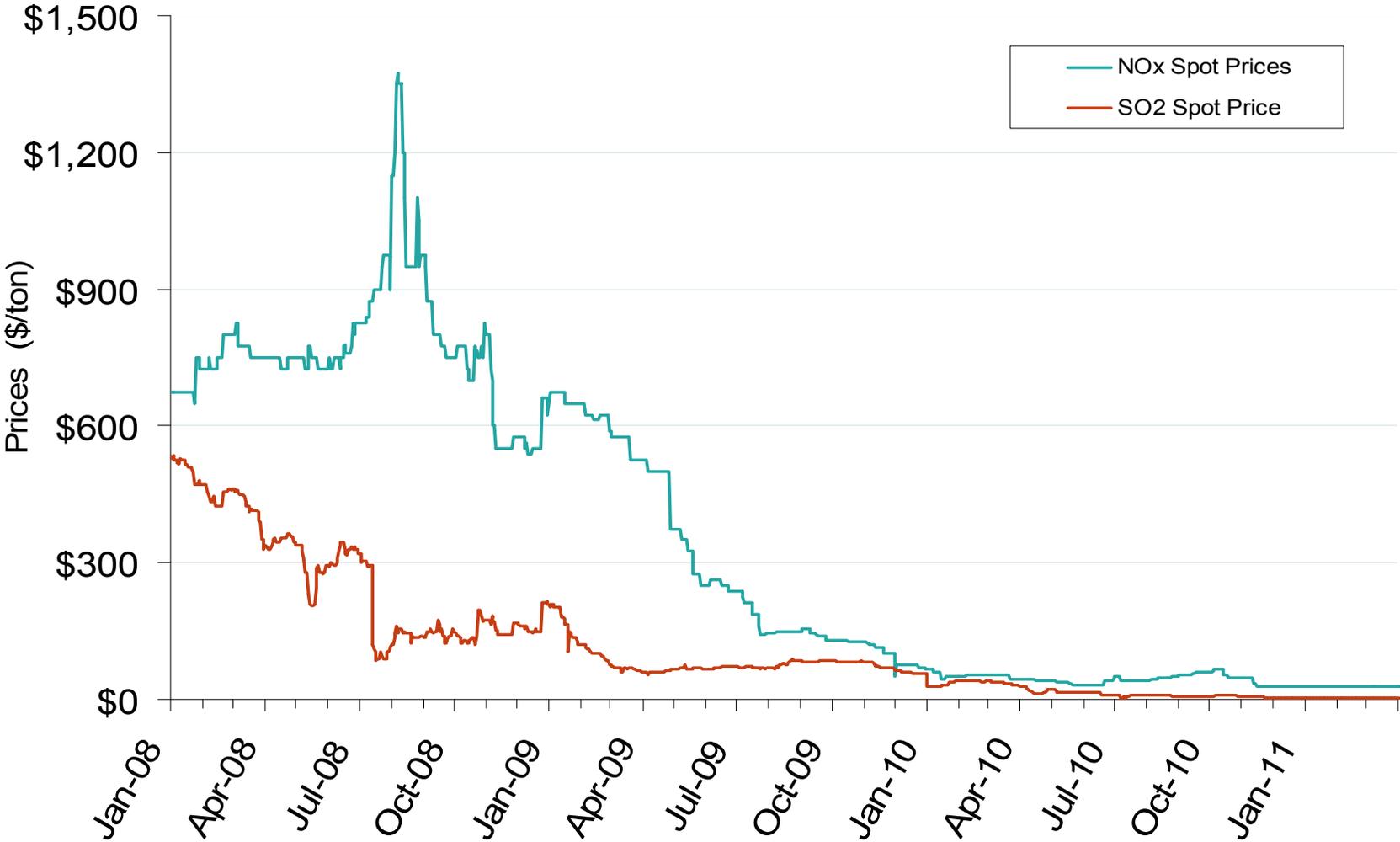
### 2010 results and status:

- Photovoltaic (PV) solar additions were double those in 2009. 883 MW of grid-connected PV were added compared to 435 MW. Solar set-asides played a role in that capacity growth.
- **64%** of 2010 PV additions were in five states: California, New Jersey, Nevada, Arizona, and Colorado. Each of the top 10 states (85% of additions) has a solar policy (as depicted on the solar provisions map).
- **Seven** states added, accelerated or expanded solar policies.
- **43** states, D.C., Puerto Rico and the Virgin Islands offer financial incentives for solar PV. These include tax credits or deductions, rebates, and cash incentives, or property-tax incentives.

### State Activities:

- **Texas' PUC** proposed a rule to set targets for renewable technologies, now covered in its RPS by a 500 MW non-wind goal. It includes a solar carve-out that starts at 5 MW in 2014 and rises to 187 MW in 2018. It would also set targets for new biomass and geothermal technologies. (Dec 2010) The PUCT is evaluating comments submitted through March 7, 2011.
- **Massachusetts** revised its solar carve-out, applicable to all retail suppliers. The changes permit out-of-state projects contracted prior to January 2010 and lowered 2010 shortfall compliance payments. Eligible customer-sited projects up to 6 MW must be in-state. MA will hold a clearinghouse auction for surplus SRECs until its 400 MW solar target is met. (Dec 2010)
- **Missouri's** PSC adopted RPS regulations, which passed by ballot in Nov 2008. The solar carve-out is 2% of incremental RPS obligations, which translates to 0.3% of retail sales by 2021. Utilities must offer minimum rebates of \$2/watt for customer-sited solar systems up to 25 kW. (July 2010). Regulations allow, but no longer require, utilities to offer standard-offer contracts for SRECs. (Sept 2010)
- **Delaware** extended and increased its RPS to 25% by 2025, from 20% by 2019. The law raised the solar PV carve-out to 3.5% by 2025, or about 250 new MW. (July 2010)
- **Florida's PSC** established solar pilots in the 2009 proceedings that set long-term energy savings and peak reduction targets for seven utilities. Compliance utilities submitted plans for solar hot water and PV pilot programs, which will run from 2010 to 2014. (March 2010)
- **New Jersey** restructured its solar carve-out, changing it from a percent of the total energy to a set megawatt-hours target. The intent is to not have future solar capacity decline as conservation policies lower total energy use. (Jan 2010)

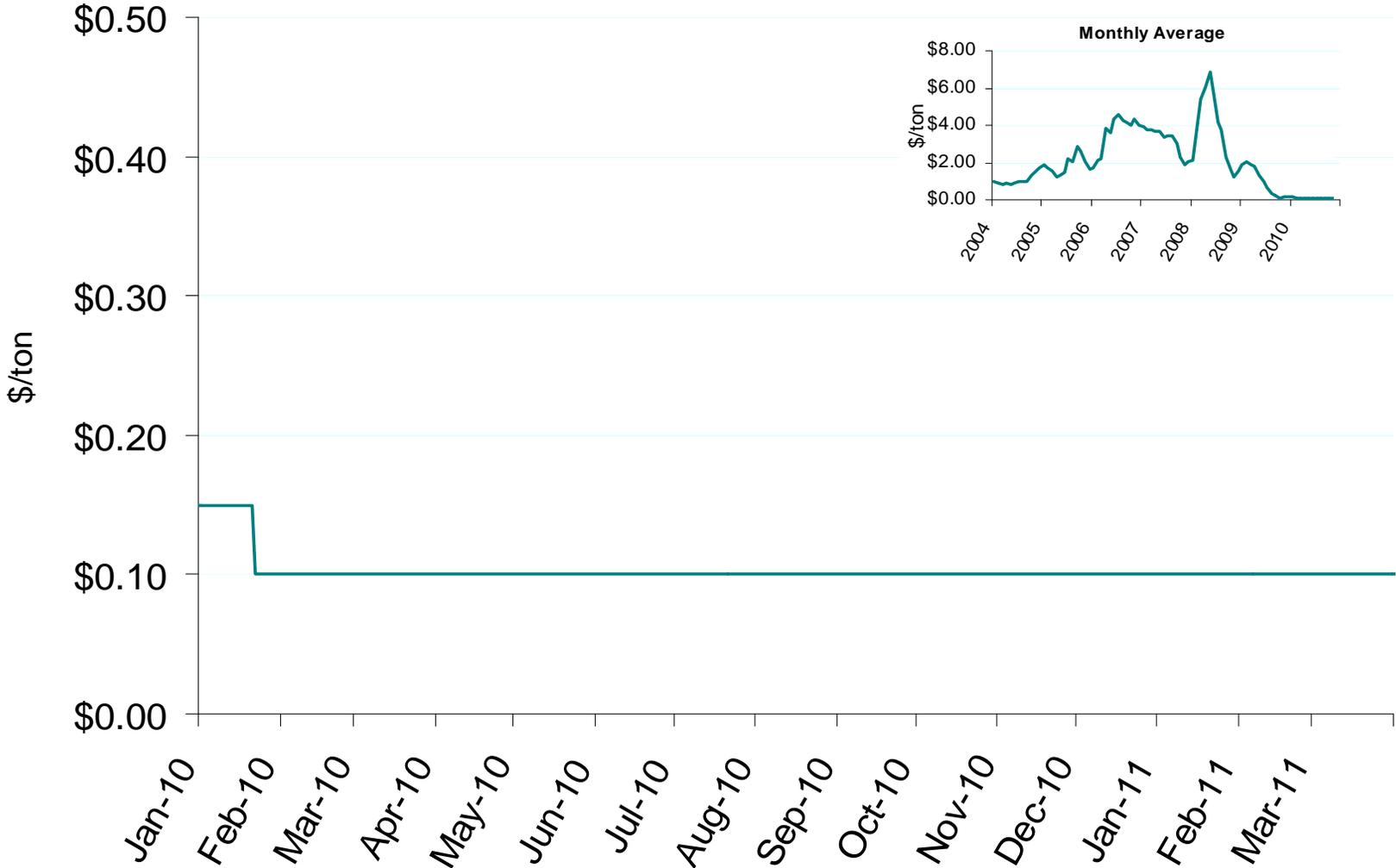
# SO2 Allowance Spot Prices and NOx Seasonal Allowance Spot Prices



Source: Derived from *Bloomberg data*.

Updated: April 7, 2011

# Chicago Climate Exchange CO2 Index



Source: Derived from *Bloomberg*.  
April 2011 Western Snapshot Report

Updated April 8, 2011