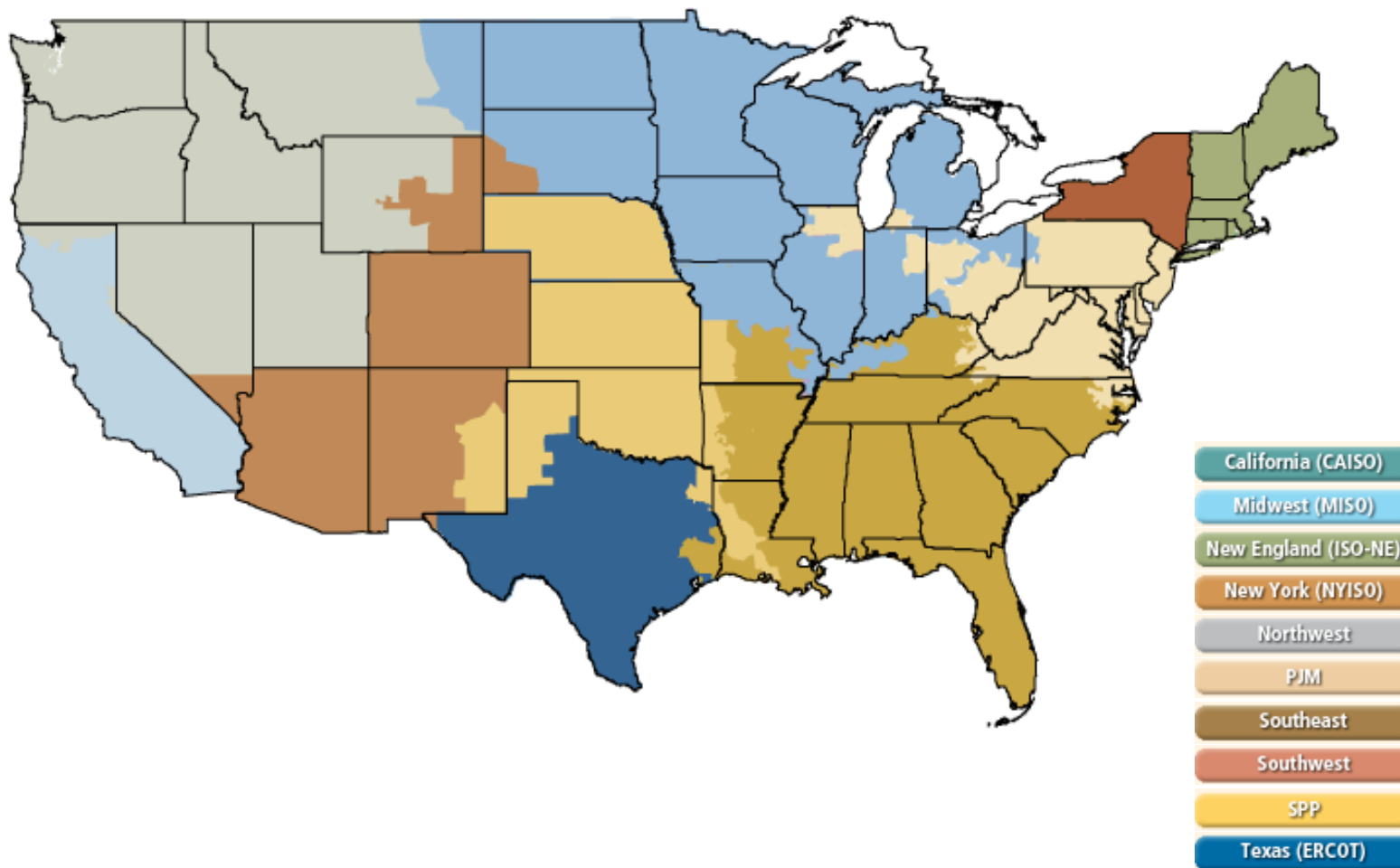
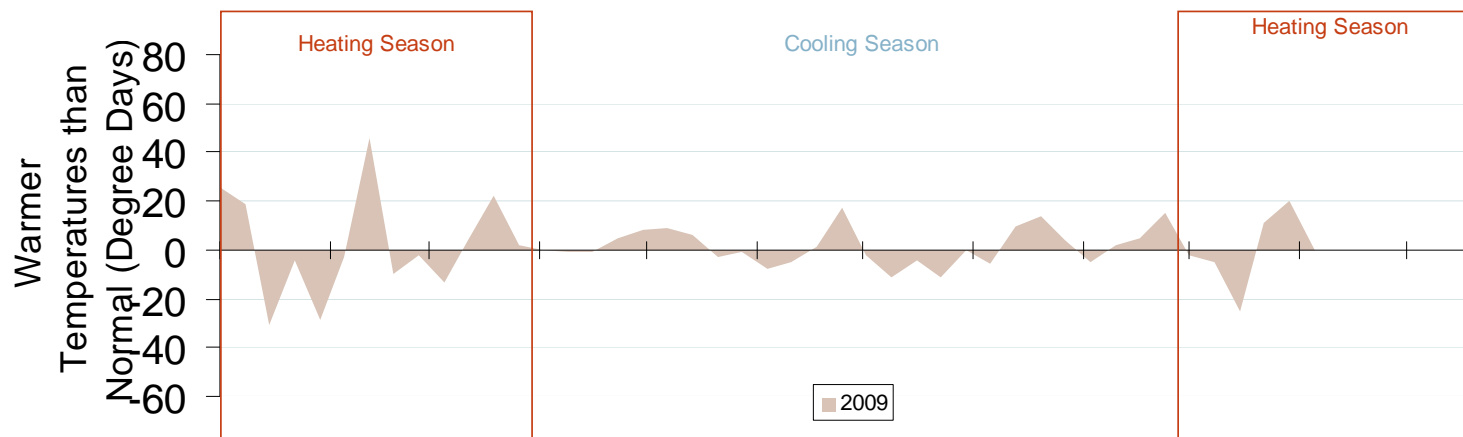
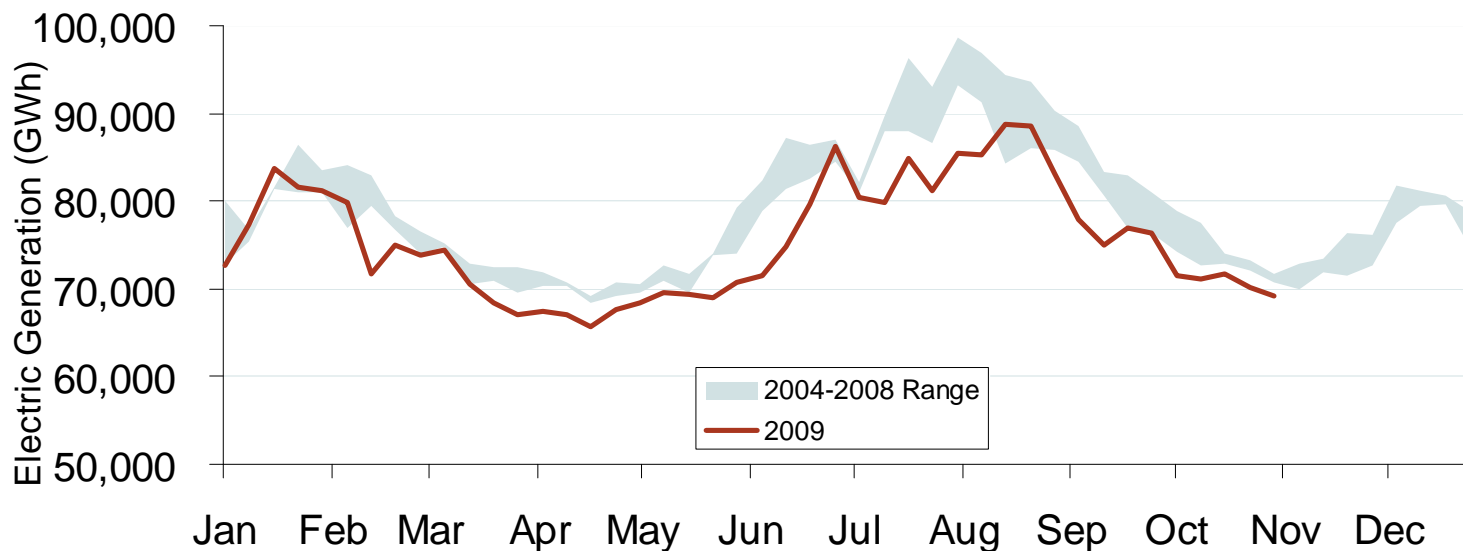


# Electric Market National Overview





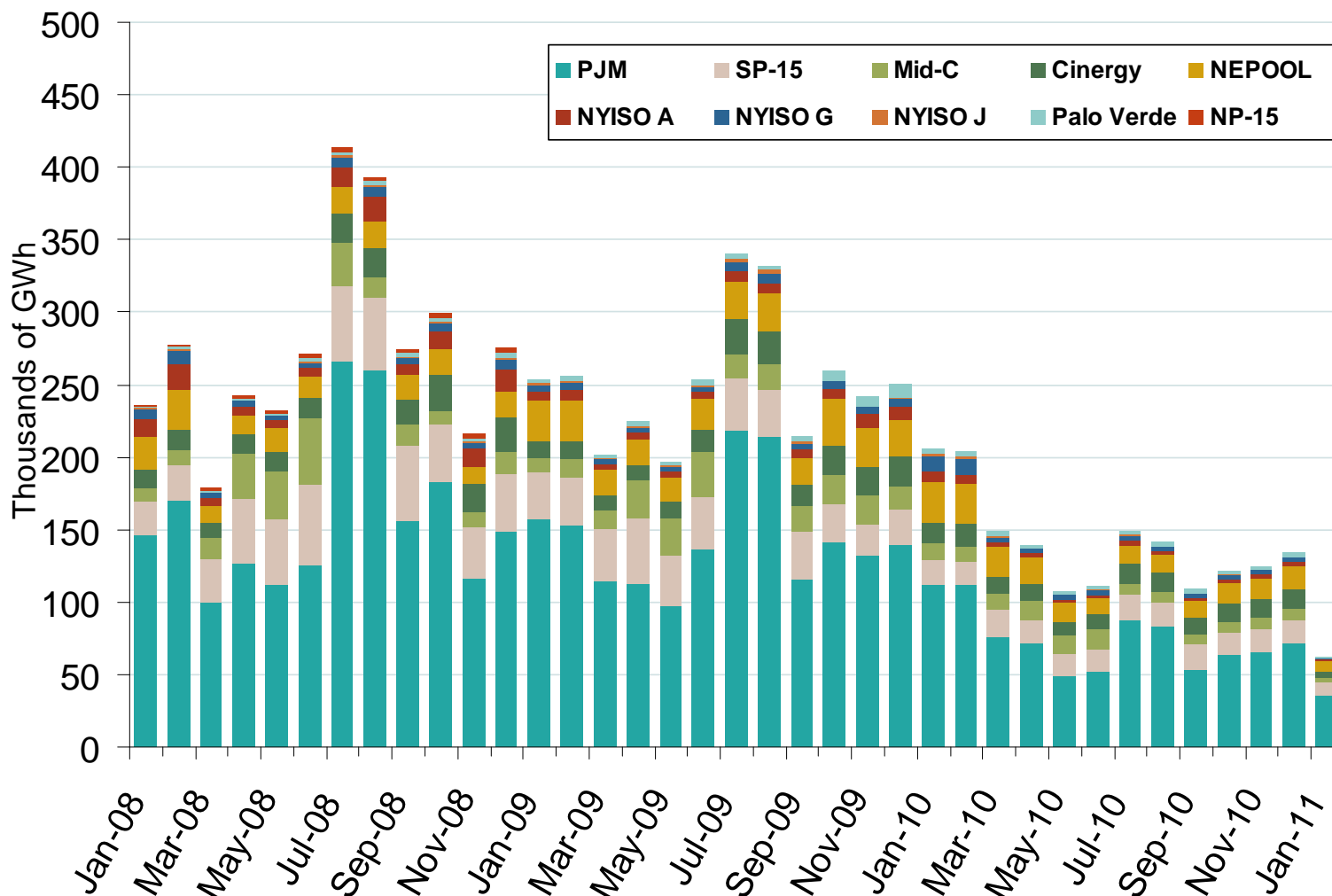
# Weekly U.S. Electric Generation Output and Temperatures



Source: Derived from EEI and NOAA data.

Updated November 6, 2009

## Financial Trading on ICE by Contract Month



Source: Derived from ICE data. ICE on-peak swaps (financial) volume include monthly, dual monthly, quarterly, and calendar year contracts traded for each month.

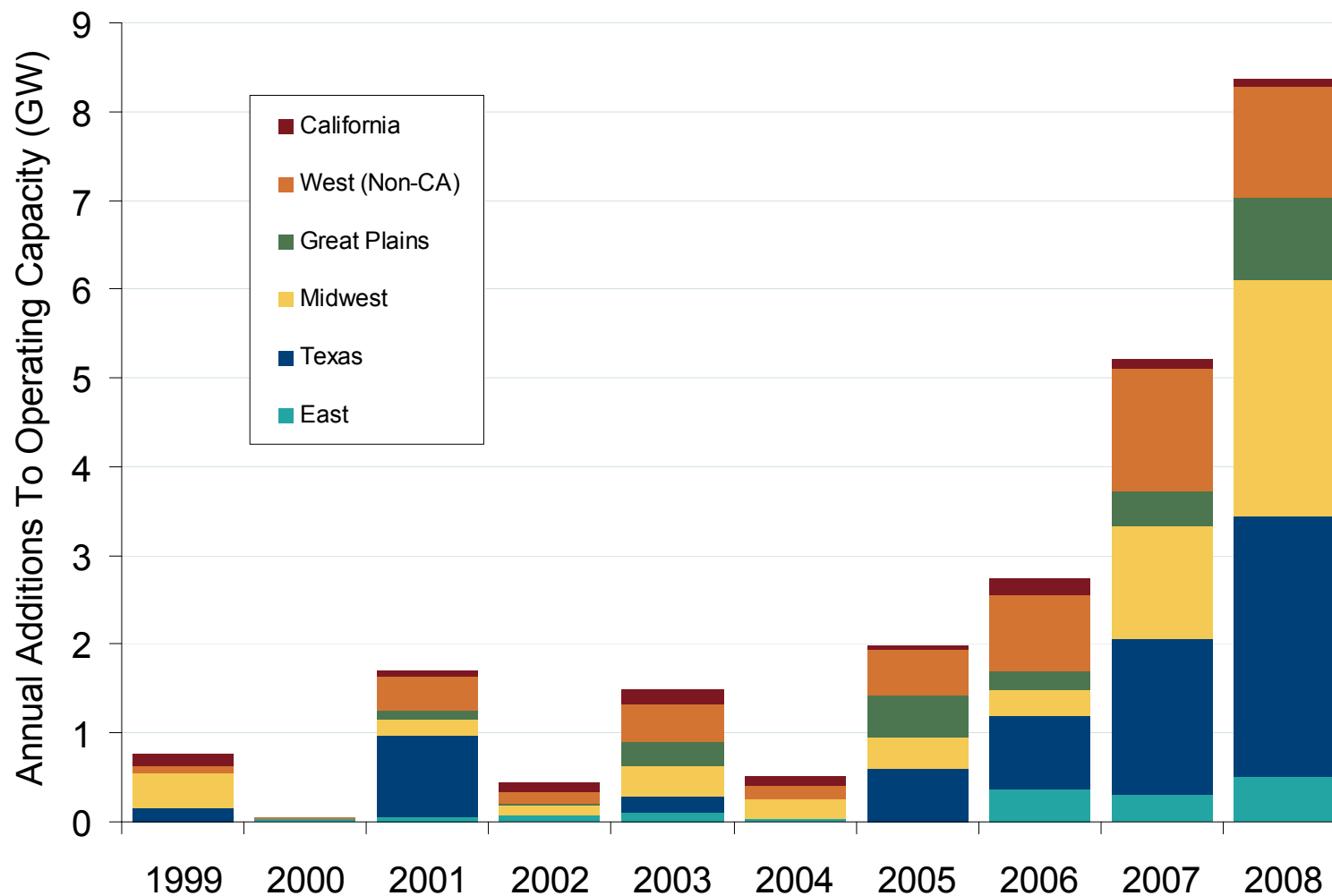
Updated November 6, 2009

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## Electric Market Overview: Wind Capacity Growth

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

## 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:** ME, MA, NH, NJ, NY, PA, RI, TN, VT

Source: Energy Velocity Generating Unit Capacity Dataset

Updated April 7, 2009

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## 2008 Review of Wind Capacity and Generation

- Installed wind capacity grew 8,358 MW to 25,170 MW in 2008 from 16,818 MW in 2007, a 50% increase. Wind power was 43% of new U.S. new electric capacity in 2008, surpassing gas-fired generation.
- Installed capacity grew at a compound annual growth rate (CAGR) of 39% from 2004-08, compared to 28% for 2003-07

### National wind policy and developments included:

- Congress extended the production tax credit (PTC) through Dec 2009. Indexed to inflation, it is now worth 2.1¢ per kWh for the first ten years a project operates.
- In Feb. 2009, Congress extended the credit through 2012, its longest renewal ever. This extension provides developers and equipment companies better long-term assurance to invest in projects and manufacturing facilities. The three times the PTC lapsed this decade were followed by declines in new capacity in subsequent years: 2000, 2002, and 2004 (see next chart, “Growth in Installed U.S. Capacity”).
- Foreign turbine, tower, and component manufacturers have opened U.S. facilities with the PTC’s steady renewal, lowering equipment transportation costs. In 2008, 30 facilities were announced, 10 opened, and 18 existing facilities expanded; 9 came online and 11 were announced in 2007.
- The economic turndown has led to some facility cutbacks, employee layoffs, project delays, and equipment order postponements.

### State policies encouraged wind’s growth:

- 16 of the top 25 states by cumulative MW had an RPS (14 in 2007), 3 had renewable goals (3 in 2007) while 6 had neither.
- 34% of 2008 capacity additions – 7,454 MW – were in the 20 states with the highest wind potential; 86% of total U.S. wind capacity – 21,741 MW – is in those states.

### State policies (continued):

- 80% of total U.S. wind is in the top ten states. The top 5 states by installed capacity (new 2008 MW) are:
  - Texas: 7,116 MW (2,670)
  - Iowa: 2,790 MW (1,519)
  - California: 2,517 MW (78)
  - Minnesota: 1,752 MW (454)
  - Washington: 1,375 MW (212)
- Texas kept its lead as the state with the most wind capacity; Iowa passed California for 2<sup>nd</sup> place. Oregon and Colorado each have more than 1,000 MW installed.

### The Commission acted to improve wind interconnection:

- Wind’s rapid capacity growth created a backlog in many interconnection queues. FERC held a technical conference in December 2007 (AD08-2) to re-examine its Large Generator Interconnection Rule (Order 2003). ISOs and RTOs reported that queuing procedures specified in the Order impeded their timely interconnection of wind resources.
- In March 2008, FERC directed RTOs and ISOs to report on the status of their efforts to improve the processing of projects in their queues; it offered guidance on reforms including increased staffing, more efficient modeling, or clustering requests.\*\* Queue reform Orders were subsequently approved for the Midwest ISO (2008), California (2008), and ISO-New England (2009).
- FERC accepted the tariff provisions NYISO proposed, which allowed it to implement a centralized program to incorporate wind output into its day-ahead and real-time energy markets. Ongoing costs are recovered from wind plant operators.\*\*\*

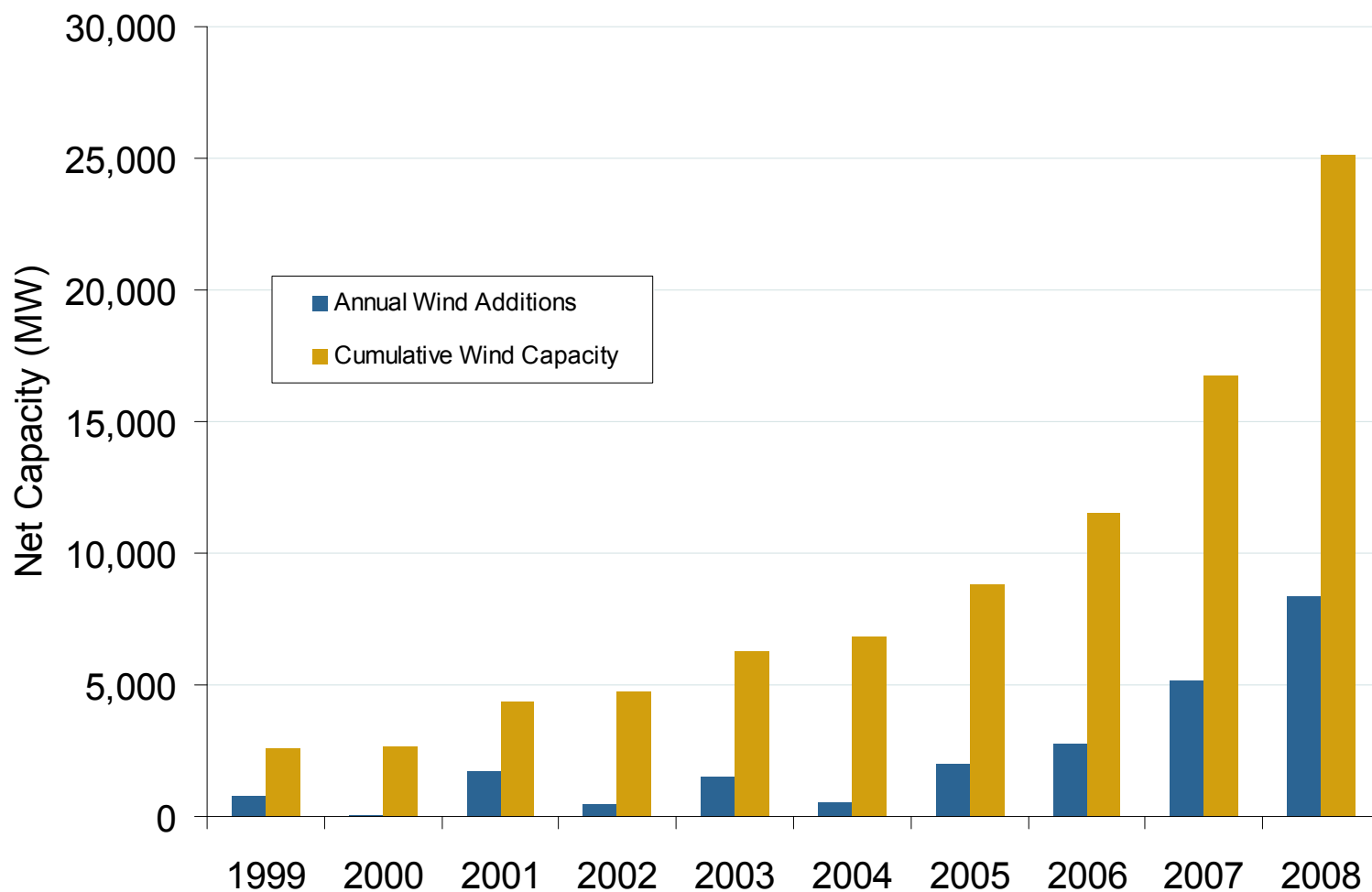
\* CAGR is a better indicator of growth rates over time than a straight percent.

\*\* *Interconnection Queuing Practices*, 122 FERC ¶ 61,252 (2008)

\*\*\* *New York Independent System Operator*, 123 FERC ¶ 61,267 (2008)

**Source:** OE analysis, derived from data in Commission filings; American Wind Energy Association (AWEA); DOE, *Annual Report on U.S. Wind Power*; Energy Velocity; Lawrence Berkeley National Laboratory; and trade press.

## U.S. Wind Capacity Growth, 1999 – 2008



Source: Energy Velocity Generating Unit Capacity Dataset

Updated April 7, 2009

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## 2008 Review of Wind Capacity and Generation

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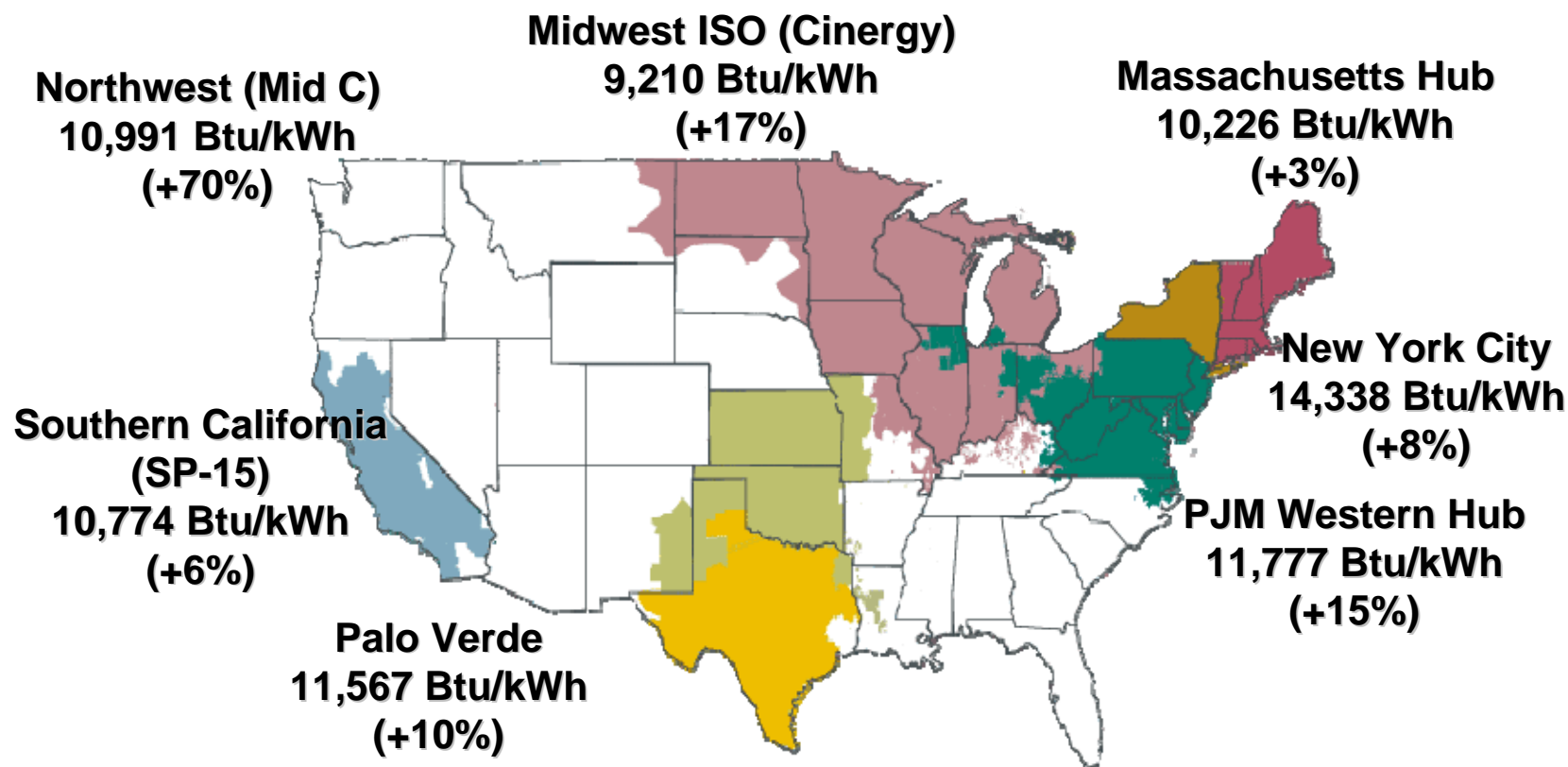
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**Source:** OE analysis, derived from data in Commission filings; American Wind Energy Association (AWEA); DOE, *Annual Report on U.S. Wind Power*; Energy Velocity; Lawrence Berkeley National Laboratory; and trade press.



## June-August Implied Heat Rates, 2009 vs. 2008



Source: Implied heat rates derived from Platts *Megawatt Daily* data.

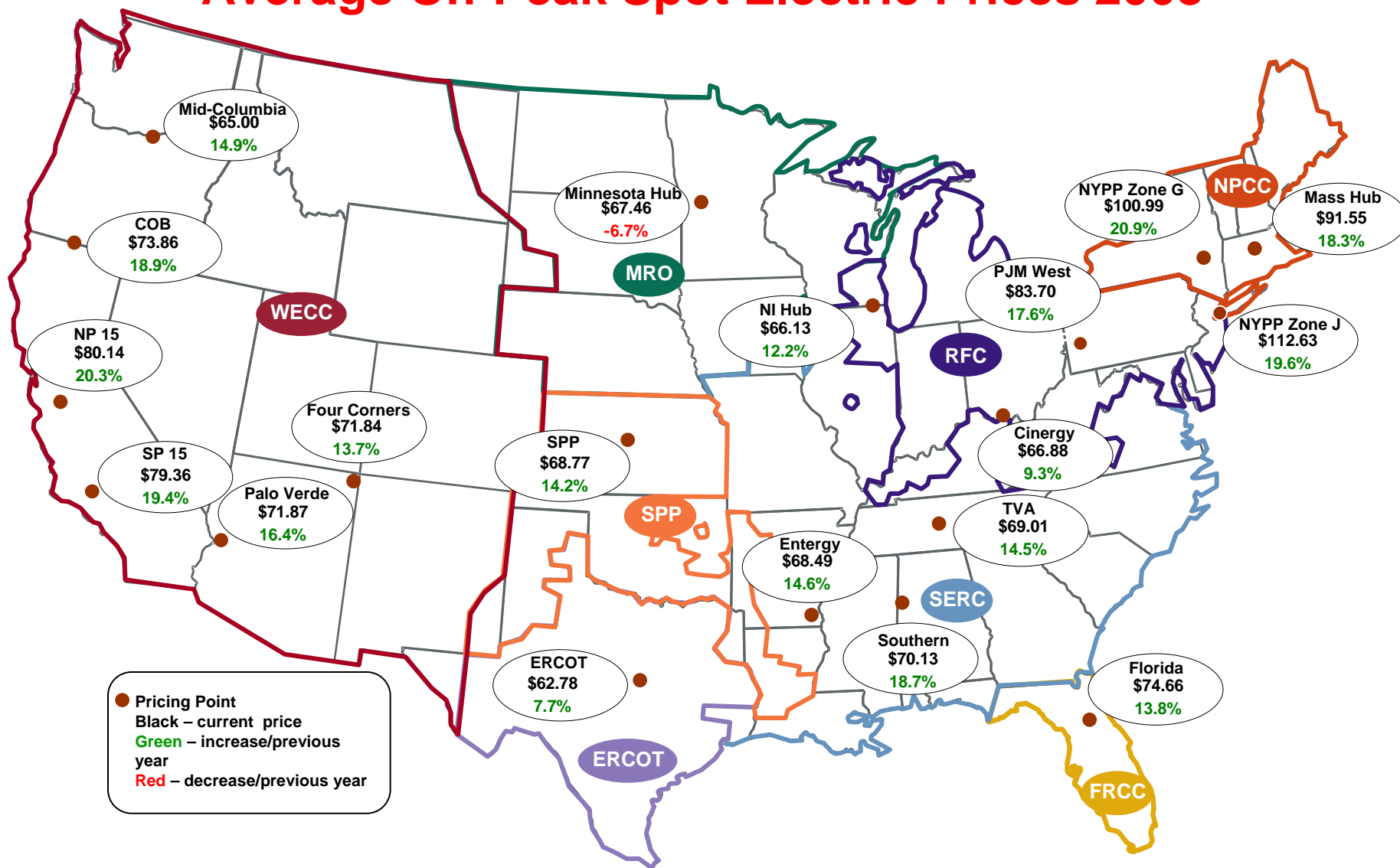
Updated October 7, 2009

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Electric Market Overview: On-Peak Spot Electric Prices

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

# Average On-Peak Spot Electric Prices 2008



Source: Derived from *Platts* data.

Updated February 6, 2009

## Electric Market Overview: Regional Spot Prices

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

## Regional Spot Prices: 2006-2008

	On-peak Spot Prices					Off-peak Spot Prices				
	2006	2007	2008	% Change 06-07	% Change 07-08	2006	2007	2008	% Change 06-07	% Change 07-08
<b>Northeast</b>										
Mass Hub	69.85	77.39	91.55	10.8%	18.3%	47.93	54.73	66.50	14.2%	17.7%
Ny Zone G*	75.95	83.51	100.99	10.0%	20.9%		48.86	67.32		27.4%
NY Zone J*	85.96	94.15	112.63	9.5%	19.6%		53.66	70.29		23.7%
NY Zone A*	58.70	64.02	68.34	9.1%	6.7%		41.26	50.68		18.6%
PJM West	61.90	71.15	83.70	14.9%	17.6%	37.45	42.23	51.21	12.8%	17.5%
<b>Southeast</b>										
VACAR	56.34	60.52	70.86	7.4%	17.1%	34.98	33.67	39.36	-3.7%	14.4%
Southern	55.50	59.10	70.13	6.5%	18.7%	34.02	33.03	39.82	-2.9%	17.1%
TVA	53.48	60.28	69.01	12.7%	14.5%	33.08	33.56	38.61	1.5%	13.1%
Florida	64.02	65.59	74.66	2.5%	13.8%	39.79	35.80	41.35	-10.0%	13.4%
Entergy	56.28	59.74	68.49	6.2%	14.6%	34.20	31.88	35.26	-6.8%	9.6%
<b>Midwest</b>										
Cinergy	51.81	61.20	66.88	18.1%	9.3%	27.66	28.94	31.14	4.6%	7.1%
Michigan Hub	55.29	64.43	69.15	16.5%	7.3%	30.20	31.04	31.81	2.8%	2.4%
Minnesota Hub	59.47	72.32	67.46	21.6%	-6.7%	27.57	29.32	25.76	6.4%	-13.8%
NI Hub	52.52	58.93	66.13	12.2%	12.2%	29.09	29.32	31.24	0.8%	6.1%
Illinois Hub	51.32	59.88	62.52	16.7%	4.4%	26.41	27.40	26.29	3.8%	-4.3%
MAPP South	55.11	61.18	69.18	11.0%	13.1%	32.73	30.80	34.00	-5.9%	9.4%
<b>South Central</b>										
SPP North	55.84	60.21	68.77	7.8%	14.2%	33.96	31.24	33.66	-8.0%	7.2%
ERCOT	57.83	58.27	62.78	0.8%	7.7%	39.03	38.83	38.36	-0.5%	-1.2%
<b>Southwest</b>										
Four Corners	58.52	63.21	71.84	8.0%	13.7%	37.91	40.19	49.40	6.0%	18.7%
Palo Verde	57.59	61.74	71.87	7.2%	16.4%	38.21	41.94	52.16	9.8%	19.6%
Mead	59.93	64.49	75.63	7.6%	17.3%	39.92	44.15	54.90	10.6%	19.6%
<b>Northwest</b>										
Mid-C	50.18	56.57	65.00	12.7%	14.9%	38.71	44.00	53.70	13.7%	18.1%
COB	55.58	62.14	73.86	11.8%	18.9%	40.71	46.38	55.81	13.9%	16.9%
<b>California</b>										
NP15	61.08	66.59	80.14	9.0%	20.3%	40.77	47.10	59.22	15.5%	20.5%
SP15	61.95	66.48	79.36	7.3%	19.4%	41.62	46.76	57.86	12.4%	19.2%

Note: \* Off Peak as of April 2, 2007.

## Regional Electric and Input Prices: 2006-2008

Electricity and Input Prices, 2006-08			
	2006	2007	2008
<b>Electric Spot Prices (On-Peak \$ per MWh)</b>			
Mass Hub	\$69.85	\$77.39	\$91.55
Cinergy	\$51.81	\$61.20	\$66.88
SP-15	\$61.95	\$66.48	\$79.36
<b>Input Prices</b>			
<b>Natural Gas (\$ per MMBtu)</b>			
Henry Hub	\$6.74	\$6.94	\$8.85
New York	\$7.37	\$8.46	\$10.13
Southern California	\$6.10	\$6.41	\$7.80
<b>Coal (\$ per ton)</b>			
Central Appalachian (Eastern)	\$51.64	\$45.00	\$92.37
Powder River Basin (Western)	\$13.21	\$10.24	\$13.62
<b>Emissions (\$ per ton)</b>			
SO <sub>2</sub> Allowances	\$738.12	\$527.58	\$280.43
NO <sub>x</sub> allowances	\$1,862.03	\$815.87	\$786.64
<b>Oil</b>			
WTI (Crude - \$ per barrel)	\$66.12	\$72.45	\$99.63
Residual Fuel, New York (\$ per barrel)	\$55.07	\$64.35	\$91.94
Distillate Fuel, New York (\$ per gallon)	\$2.04	\$2.22	\$3.08

Source: Derived from *Platts & Bloomberg* data.

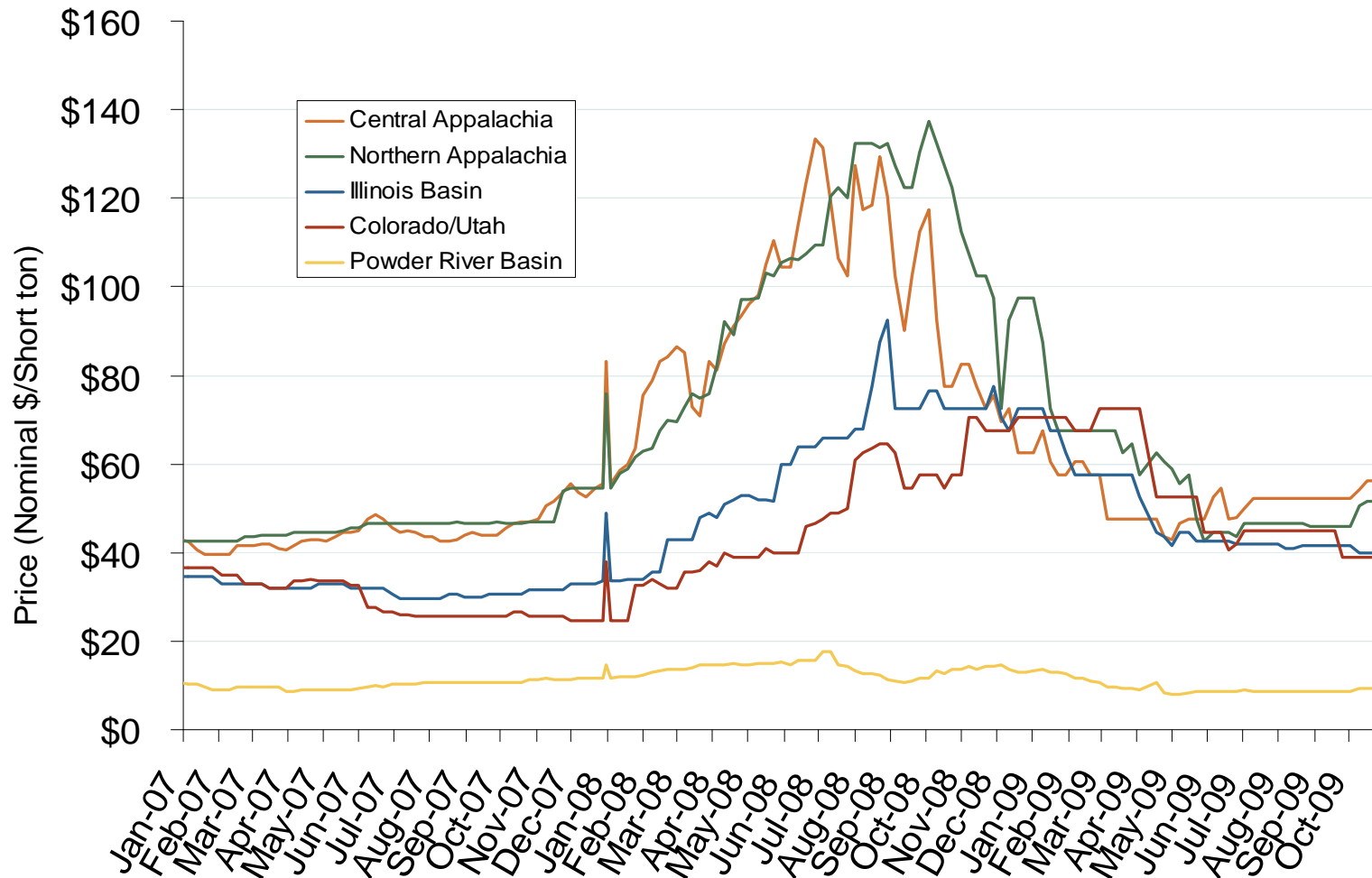
Updated February 6, 2009

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## National Electric Market Overview: Coal Prices

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

# Central Appalachian and Powder River Basin Coal 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.

Updated November 6, 2009

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