Weekly U.S. Electric Generation Output and Temperatures

Source: Derived from EEI and NOAA data.

Updated November 7, 2008
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 7, 2008
Renewable Energy Portfolio Standards (RPS)

28 states plus 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 of 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

**NV**: 20% by 2020; co-ops 10%

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

**MT**: 15% by 2015

**MN**: 25% by 2025; Xcel 30% by 2020

**IA**: 1,105 MW by 2011*

**KS**: 20% wind by 2020

**OK**: studying RPS, RE transmission, cost-recovery

**AR**: utilities to include RE in IRPs

**WI**: 10% by 2015; proposed for 2009: 25% by 2025

**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

**KY**: recommended goal

**ME**: 40% by 2017

**NH**: 23.8% by 2025

**VT**: 25% by 2025

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

**RI**: 16% by 2019

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

**NY**: 24% by 2013

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

**NJ**: 22.5% by 2020; 2% solar; MEP proposes increases

**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**: examining renewable and clean energy potential*

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

**FL**: PSC postponed vote on draft RPS to Jan 2009 for more study

**AR**: utilities to include RE in IRPs

**OK**: studying RPS, RE transmission, cost-recovery

**HI**: 20% by 2020, and goal of 70% RE by 2030

**HI**: 20% by 2020, and goal of 70% RE by 2030

**HI**: 20% by 2020, and goal of 70% RE by 2030

**HI**: 20% by 2020, and goal of 70% RE by 2030

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, and the Union of Concerned Scientists.

Updated November 7, 2008

November 2008
Renewable Energy Portfolio Standards

- **A Renewable Portfolio Standard (RPS)** requires a percent of energy sales or installed capacity to come from renewable resources.
- **28** states plus D.C., have renewable energy standards.
- Recent state policy developments include:
  - **New Jersey** released its Master Energy Plan in October. The MEP calls for exceeding NJ’s RPS with 30% of state electricity from renewables by 2030 and changing the solar goal from 2% of sales to 2120 GWh by 2020. Proposed renewable resources include 900 MW of biomass; 3,000 MW from offshore- and 200 MW from onshore-wind; and supporting emerging energy technologies.
  - **Florida** presented a draft RPS to PSC Commissioners at their October meeting. A vote on the RPS was deferred to a Jan 9 special PSC agenda to allow time for more study. When the PSC approves it, the RPS must be submitted to the legislature by Feb 2009 for ratification.
  - **Hawaii**: Hawaii Electric (HE) signed an agreement with the Governor and other stage agencies setting forth the Hawaii Clean Energy Initiative (HCEI) goals. It agreed to a goal of 70% of HI’s electricity and ground transportation energy from RE and EE by 2030. HCEI will try to amend the RPS from 20% to 25% RE by 2020 and add a further goal of 40% by 2030.
- **Six** states have renewable goals without financial penalties: UT, ND, KS, MO, KY, VA, VT.
- **Thirteen** states include energy efficiency in their RPS or renewable goals; more are considering energy efficiency additions or companion bills.
- **Ballot propositions** on renewables were on state and local elections on Nov 4:
  - **Missouri** voters passed Prop C by 66%, repealing the voluntary renewable goal and substituting a RPS. MO utilities must meet a goal of 15% renewables by 2021, including a 2% solar carve-out. They can meet the goal by generating or buying renewable energy or by buying renewable energy credits. In-state resources count 1.25 times more than out-of-state energy or credits.
  - **California** voters turned down two propositions: Prop 7 would have increased the RPS to 50% by 2025. A bond initiative that would have funded alternative-energy vehicles and renewable research also failed.
  - **Boulder, CO** voters passed Issue 1A by 65%, authorizing the county to issue special bonds to offer low-interest financing for residential and commercial energy efficiency improvements or for installing solar PV or other renewable energy systems.
# Energy Efficiency Resource Standards (EERS)

**ID**: Energy Plan puts conservation – DR and EE – as priority resource  
**MT**: state agency reduction initiative: save 20% by 2010  
**WA**: must pursue all cost-effective conservation  
**OR**: IOUs required to have EE in IRP & assess cost-effectiveness  
**CA**: IOUs reduce MW 10%, peak demand (MWh) 12% by 2013; munis 10% by 2017  
**NV**: use EE for up to 25% of RPS by 2015  
**UT**: EE incentives in RPS goal  
**CO**: save 40 MW and 100 GWh annually to 2013  
**NM**: use EE and DR to save 10% of 2005 retail electric sales by 2020  
**KS**: studying for E&G utilities  
**OK**: PSC approved quick-start DSM programs, including EE  
**TX**: 10% of load growth, beyond 2004, based on prior 5 years  
**HI**: 20% of MWh sales by 2020; up to 50% of RPS  
**MN**: reduce fossil fuel use 15% by 2015 through EE, RE  
**IA**: utilities must establish EE goals by end of 2008  
**WI**: RPS requires utility EE  
**MI**: annual incremental savings: 1% of prior year’s sales by 2012  
**IL**: reduce energy 2% by 2015 (EE) and 0.1% from prior year (DR)  
**OH**: reduce peak-demand 8% by ‘18; 22% energy savings by ‘25  
**ME**: 10% new EE by 2017; in RPS goal as 2nd priority  
**VT**: EE & RE to meet 2007-12 growth  
**MA**: meet 25% of capacity and energy with DSR by 2020  
**NY**: 15% electric use reduction by 2015; doubles EE funding  
**CT**: 4% savings by 2010; a Tier III RPS resource  
**NJ**: reduce consumption 20%, and peak demand 5,700 MW by 2020  
**DE**: EE, RE, DG, and DR are priority resources before new gen  
**PA**: reduce energy consumption 3% and peak demand 4.5% by 2013  
**DC**: reduce peak demand and energy consumption  
**MD**: reduce peak demand and per cap electricity use 15% by 2015  
**VA**: reduce 10% of 2006 sales by 2022 with EE, DR  
**NC**: EE to meet up to 25% of RPS to 2011; later to 40%  
**TVA**: reduce peak demand 1,400 MW by 2012 with EE, DR *  
**FL**: PSC to adopt goals to reduce electric consumption, peak demand  


* TVA’s “EE and DR Plan” is from the Public Power Authority, and is not a state policy.  
**Abbreviations**: CHP – Combined heat & power; DG – distributed generation; DR - demand response; DSM - demand side management; DSR – demand-side resources; EE - energy efficiency; E&G: electric and gas utilities; IRP – integrated resource plan; RPS: Renewable Portfolio Standard  
**Sources**: ACEEE, EPA, Regulatory Assistance Project, Union of Concerned Scientists, State regulatory and legislative sites, trade press
Energy Efficiency Resource Standards (EERS)

- An EERS – energy efficiency resource or portfolio standard – aims to reduce or flatten electric load growth through energy efficiency (EE) measures. Goals may specify reductions in energy (MWh), demand (MW), or both. Many specify both overall energy reductions and peak-load reductions.
- Twenty-three states have an EERS or goal; at least 15 include EE as part of a renewable standard or goal.
- States that enacted significant energy efficiency legislation in 2008 include: DC, FL, HI, IA, MA, MD, MI, NJ, NM, NY, PA, OH, OK, UT, and VT.
- Pennsylvania passed a conservation bill in Oct. It requires utilities to work with consumers to cut overall electric consumption 3%, and peak consumption 4.5% by 2013. To help meet these targets, HB2200 requires utilities to deploy advanced meters and offer customers a choice of time of use rates.
- Hawaii issued a Clean Energy Initiative in Oct. To help Hawaii Electric meet advanced energy efficiency goals, it will seek PUC approval for immediate deployment of advanced meters and time of use rates. These EE measures are in addition to a greatly enhanced RE goal.
- States issued plans that look at the interaction of their goals and actions relative to energy efficiency, renewable energy, greenhouse gas (GHG) reduction, including California, New Jersey, and Oregon:

  - California adopted a “Long-Term Energy Efficiency Strategic Plan” in September, covering EE goals from 2009 to 2020. It includes multiple-sector energy-saving actions for government, utilities, and the private sector. The plan integrates EE savings with the achievement of CA’s GHG and other resource goals, while keeping EE as CA’s highest priority energy resource.
  - New Jersey issued its Master Energy Plan” (MEP) in October. The MEP identified challenges in supply reliability; in rising electric, natural gas, and home heating fuel oil prices; and in the contribution of power generation and fuels to climate change. The MEP incorporates action items to meet these challenges and identifies three encompassing goals:
    - reduce peak power demand
    - reduce overall electricity and fuel consumption
    - increase locally-available clean energy supply
  - Oregon’s Governor announced his 2009 legislative package. Its goals are guided by OR’s goal to reduce GHG to 10% less than 1990 levels by 2020. EE and conservation proposals include:
    - create energy performance certificates to guide renters or buyers on a building’s energy performance.
    - increase EE in residential and commercial building codes 30% and 50%, respectively.
    - enhance government financing for EE and increase EE tax incentives
    - provide EE assistance to low income households.

Abbreviations: CHP – Combined heat & power; DR - demand response; DSM - demand side management; DSR – demand-side resources; EE - energy efficiency; GHG – greenhouse gases; RGGI – Regional Greenhouse Gas Initiative; RE – renewable energy; RPS - Renewable Portfolio Standard

Updated November 7, 2008

November 2008
**Collaborative Regional GHG Programs:**

- Three North American groups with goals to lower regional GHG emissions were initiated by state Governors.
- 32 U.S. states, D.C., eight Canadian provinces, and six Mexican states are Participants or Observers.
- Observer jurisdictions do not commit to group GHG reduction goals, but participate in proceedings should they opt to join later.

**Western Climate Initiative (WCI):**

- Created February 2007
- Partners: 7 states, 4 provinces; Observers: 5 states, 1 province*
- WCI announced its design for a market-based, multi-sector cap-and-trade program, Sept 2008:
  - 15% CO₂ reduction below 2005 levels by 2020
  - Phase I to take effect Jan 2012

**Midwest Greenhouse Gas Reduction Accord:**

- Established November 2007
- Participants: 6 states, 1 province; 3 Observer states, 1 province
- Preliminary GHG policy recommendation: 15 – 25% reductions by 2020, 60 – 80% by 2050

**Regional Greenhouse Gas Initiative (RGGI):**

- Takes effect Jan 2009
- 10 Participant states; Observers: 1 state, D.C., 3 provinces.
- Market-based cap-and-trade effort to reduce power-sector CO₂ emissions.
- 10% CO₂ reduction by 2018 covers over 200 plants
- 188 million allowances to be sold in 6 auctions

**Auctions:**

1. 9/25/08: 12.5 million allowances cleared at $3.07/allowance, raising $38.5 million.
   - 6 states participated: CT, MA, ME, MD, RI, VT; these 6 will offer 1/6 of allowances at next 5 auctions
2. 12/17/08: first 6 states plus NY, NJ, NH, DE to participate
   - 31.5 million allowances
3 to 6: All ten states on same percent basis as prior auctions.
   - 2009 dates: 3/18, 6/17, 9/16, 12/16

Updates at: [http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-ghg.pdf](http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-ghg.pdf)

Notes: Kansas is a MGGRA participant and WCI observer. Ontario is a Partner to WCI and MGGRA Observer.


Updated November 7, 2008

November 2008
Collaborative Greenhouse Gas Programs

Regional Greenhouse Gas Initiative (RGGI):
- First U.S. mandatory cap-and-trade program for CO₂ emissions and targets only power plants
- Cooperative effort by northeastern states to reduce CO₂ emissions:
  - Participants: CT, DE, ME, MD, MA, NH, NJ, NY, RI, VT
  - Observers: PA, D.C., and 4 Canadian provinces.
- Allowances will be auctioned, not allocated, although sources may trade allowances. One allowance is the right to emit 1 ton of CO₂.
- States’ allowance shares apportioned from overall cap.
- By law, at least 25% of auction proceeds must support consumer benefit programs such as renewable energy, energy efficiency, or low-income energy assistance. In fact, 4 states will so allocate 100%; the rest at least 75%.
- Auction timing: two pre-compliance auctions in 2008, four quarterly auctions in 2009. There will be quarterly auctions in subsequent years.

Second RGGI auction, December 17, 2008:
- Six participating states from 1st auction will auctioned 1/6 of allowances: CT, MA, ME, MD, RI, VT.
- DE, NH, NJ, and NY will also participate in Auction 2, having passed necessary legislation or regulations.
- Four new states will auction 20% of allowances in 5 auctions
- 31.5 million allowances in auction
- Base price of $1.86/allowance, same as 1st auction.

Midwest Greenhouse Gas Regional Accord:
- Signed Nov 2007 at Midwestern Governors Association Energy Summit to establish emission reduction targets consistent with members’ policies.
  - Participants: IA, IL, KS, Manitoba, MI, MN, WI
  - Observers: IN, OH, Ontario, SD
- Expects to release draft design in Dec. To be decided:
  - Which sectors should cap-and-trade cover?
    - electric power and large industrials (nearly ½ of regional emissions)
    - or include transportation, too (1/4)
  - Target reductions from 2005 levels:
    - 15% - 20% - 25% reductions by 2020
    - 60% - 80% reductions by 2050
  - recommendations subject to modeling outcomes conducted by ICF on costs and other impacts of cap-and-trade under different scenarios, including complementary policies in sectors outside the cap.

Western Climate Initiative (WCI):
- Launched by Western Governors Association Feb 2007 to reduce regional GHG collectively and cooperatively.
- Partners: seven U.S. states and four Canadian provinces: AZ, British Columbia, CA, Manitoba, MT, NM, Ontario, OR, Quebec, UT, WA
- Observers: AK, CO, ID, NV, Sask., WY
- WCI announced design for a market-based, multi-sector cap-and-trade program (Sept 2008):
  - 15% CO₂ reduction below 2005 levels by 2020
  - Covers 90% of regional emissions
  - Phase I to take effect Jan 2012
  - Phase II will begin 2015
Electric Market Overview: Summer Heat Rates

June-August Implied Heat Rates, 2008 vs. 2007

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

Updated September 9, 2008
Electric Market Overview: On-Peak Spot Electric Prices

Average On-Peak Spot Electric Prices 2007

Source: Derived from Platts data.

Updated March 20, 2008
# Regional Spot Prices: 2005-2007

<table>
<thead>
<tr>
<th>Region</th>
<th>On-Peak Spot Prices</th>
<th>Off-Peak Spot Prices</th>
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</thead>
<tbody>
<tr>
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<td>% Change 05 % Change 06</td>
<td>% Change 05 % Change 06</td>
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<tr>
<td><strong>Northeast</strong></td>
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<td>Mass Hub</td>
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<td>Ny Zone G**</td>
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<td>Cinergy</td>
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<td>Michigan Hub*</td>
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<td>SP15</td>
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**Notes:**  * As of April 1, 2005.  ** Off Peak as of April 2, 2007.

Source: Derived from Platts data.

Updated March 20, 2008
# Regional Electric and Input Prices: 2005-2007

## Electric Market Overview: Electric and Input Prices

**Table 2: Electricity Prices and Input Prices, 2005-07**

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tr>
<td><strong>Electric Spot Prices</strong></td>
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<tr>
<td>Mass Hub</td>
<td>$89.87</td>
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<td>Cinergy</td>
<td>$63.76</td>
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<td>SP-15</td>
<td>$73.04</td>
<td>$61.95</td>
<td>$66.48</td>
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<tr>
<td><strong>Input Prices</strong></td>
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<tr>
<td>Natural Gas ($ per MMBtu)</td>
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<tr>
<td>Henry Hub</td>
<td>$8.69</td>
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<td>New York</td>
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<td>Southern California</td>
<td>$7.56</td>
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<td>Coal ($ per ton)</td>
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<td>Central Appalachian (Eastern)</td>
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<td>Powder River Basin (Western)</td>
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<td>Emissions ($ per ton)</td>
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<td>SO₂ Allowances</td>
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<td>NOₓ allowances</td>
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<td>WTI (Crude - $ per barrel)</td>
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<td>Residual Fuel, New York ($ per barrel)</td>
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<td>Distillate Fuel, New York ($ per gallon)</td>
<td>$1.86</td>
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<td>$2.22</td>
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</table>

Source: Derived from Platts & Bloomberg data.

Updated March 20, 2008

November 2008
Central Appalachian and Powder River Basin Coal Prices

Source: Derived from Bloomberg data.

Updated November 7, 2008
SO₂ and NOₓ Allowance Spot Prices

Source: Derived from Cantor Fitzgerald data.

Updated November 7, 2008
Brief Overview of the SO2 and NOx Emissions Markets

The electric power industry is a major source of sulfur dioxide emissions (SO2) and nitrogen dioxide emissions (NOx) emissions – 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 NOx emissions.

Reduction in SO2 and NOx emissions can be obtained through a cap-and-trade program, which is a market-based compliance option that also provides an emitting source with relative flexibility in compliance options. These options include pollution control technology such as flue gas desulfurization (FGD) for SO2 and selective catalytic reduction (SCR) for NOx (i.e., scrubbers), fuel switching, and/or participating in their respective cap-and-trade markets. Compliance measures can be capital-intensive and the decision to use pollution controls and/or emission allowances is primarily driven by the regulatory environment, fuel input type and the level of emission output by emitting sources. The associated costs with this decision contribute to the price of wholesale power and ultimately, the retail price.

**The Acid Rain Program**


EPA’s Acid Rain Program (ARP), established under the 1990 Clean Air Act Amendments, required reductions of SO2 and NOx emissions from the electric power industry. The Acid Rain Program was the first cap and trade program implemented nationwide to reduce SO2 emissions. 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 then it can “bank” those unused allowances for future use or sell the leftover allowances to other emitting sources.

**The NOx Budget Trading Program**

[http://www.epa.gov/airmarkets/cap-trade/docs/nox.pdf](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) NOx 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, NOx sources must surrender one allowance to emit one ton of NOx.

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

Source – EPA

Updated October 14, 2008
### Electric Market Overview: Wind Capacity Additions

#### Growth of U.S. Installed Wind Capacity (MW)

- **Midwest** includes: IL, IA, KS, MI, MN, MS, NE, ND, OH, OK, SD, WI
- **East** includes: ME, MA, NH, NJ, NY, PA, RI, TN, VT, WV

**Source:** American Wind Energy Association (AWEA)

**Updated March 7, 2008**
2007 Review of Wind Generation

- Installed wind capacity grew 5,244 MW from 11,603 MW in 2006 to 16,818 MW in 2007, a 45% increase.
- More new wind capacity was added in 2007 than any prior year:
- Just over half of new capacity – 2,704 MW – was installed in states with the highest wind potential. 59 percent of that – 1,588 MW – was in Texas.
- Installed capacity grew 150% from 2004 to 2007, while:
  - the number of states (including D.C.) with a renewable portfolio standard grew from 21 to 27, and
  - the wind production tax credit did not lapse.
- The top five states by capacity added in 2007 were: Texas (1,618 MW), Colorado (776), Illinois (592), Oregon (447), and Minnesota (405). Texas moved into 1st place in installed wind capacity in 2006, passing long-time leader California.
- The top 10 states by cumulative installed capacity have 14,366 MW of wind, or 85% of U.S. capacity. Nine of them had a Renewable Portfolio Standard (RPS) in 2007.
- The rapid growth of wind generating capacity has led to a backlog in many interconnection queues. The Commission held a Technical Conference on December 11, 2007 (AD08-2-000) to re-examine the Large Generator Interconnection Rule. Many ISO/RTOs reported that the queuing procedures specified by Order 2003 impede the timely interconnection of wind resources.