

# 2011

## **Renewable Electricity - Tracking projects and progress in U.S. Renewable Portfolio Standards March 2011**



# Tracking projects and progress in U.S. Renewable Portfolio Standards March 2011

## Progress against headwinds

Despite a tough investment environment over the last two years, development momentum has driven a continued increase in production from renewable energy, making solid progress toward state-mandated renewable energy goals. Where SNL Energy in 2009 estimated renewable contribution at 5.3% of electricity sales in states with mandatory Renewable Portfolio Standards (RPS), new facilities have pushed this percentage contribution up to 6.6% since that time. Part of this growth is attributable to flat-to-declining electricity sales in many RPS states since 2007. A return to historic sales growth would put greater pressure on current RPS targets. Figure 1 summarizes SNL Energy's assessment of the current status of renewable energy in states with mandatory RPS programs. Since 2009 three states (District of Columbia, Hawaii, and Vermont) have adopted standards, while congressional debate regarding a federal standard has languished. SNL Energy also finds that sufficient project activity exists to more than meet RPS goals in every state, although bringing these projects to market will depend on supportive project economics and continued encouragement from federal and state policymakers.

Twenty-nine of the 50 states (and the District of Columbia) have a mandatory RPS. Of eligible generation applied to these standards, wind and hydroelectricity ("hydro") are the most prominent renewable resources. Planned renewable energy investments over the next 10 years, is cumulatively 198,194 MW. Planned renewable investment in wind is 63.1% of this cumulative amount. Over the same period 14.5% is in hydro, while 22.4% is comprised of solar PV and solar, biomass, anaerobic digesters (landfill gas) biofuel, geothermal, and several lesser impacting renewable and alternative energy technologies. The significance of wind and hydro within RPS as a long-term investment cannot be underestimated. In the nine states highlighted in this paper that have the greatest amount of planned renewable energy investments in the U.S., six states have extensive planned renewable generation in wind and hydro.

Overall, construction of renewable projects slowed significantly in the wake of the 2008 financial crisis and subsequent recession. In many cases, the Production Tax Credit (PTC) associated with renewable energy facilities became less attractive in the face of operating losses due to low power prices, a financial gap that was only partly offset by Section 1603 cash grants enacted as part of the federal stimulus package. These headwinds notwithstanding, project activity appears sufficient to keep pace with RPS goals. Between now and 2012, SNL Energy estimates interim RPS targets (i.e., targets either stated or inferred from RPS endpoint goals) at 7.4% of electricity sales. The 1.1% gap between current generation shares and the target equates to about 25 TWh of electricity, or 10-15 GW of renewable generation. With 7 GW currently under construction for 2011 (Figure 1), we see a continuation of a modest gap to RPS targets. However, completion rates appear adequate to keep pace with RPS goals. Underneath this aggregate estimate, some states are lagging substantially while other states have over-delivered in terms of renewables development. State policies regarding use of out-of-state renewable generation, creation of Renewable Energy Credit (REC) markets, and opt-out provisions will further influence how renewable energy expands.

This paper summarizes the leading states in terms of RPS contribution, highlighting key policy aspects and technologies relied upon to meet the standard. REC market implementation and monitoring is also discussed briefly, as well as an update on proposed federal renewable energy standards.

## Evolution of Renewable energy policy

The impetus to legislate toward creating an environment of energy efficiency standards and programs was the oil crisis of the 1970s. Renewable energy and energy efficiency was first formally drafted into policy in 1978, a seminal year for energy policy legislation in the United States. The National Energy Act (NEA) along with the Public Utility Regulatory Policies Act (PURPA) and the Natural Gas Policies Act (NGPA) were all passed by the US Congress. Once the NEA had passed, additional national energy policy initiatives followed over the next three decades.

As with most national policy initiatives, implementation was left to the states. In this regard, some states have chosen a more aggressive approach toward renewable energy policy than others. The top nine states in terms of RPS legislation are summarized below. Collectively, these states account for 62% of eligible generation and 51% of the aggregate 2020 target.

### *Texas*

In terms of sheer volume in the use of wind generation, Texas is the leader. In 2010, Texas had nearly 11,000 MW of wind capacity,<sup>1</sup> well exceeding the 2015 goal of 5,880 MW in the state's mandated RPS and even the 2025 goal of 10,000 MW<sup>2</sup>. Currently 34,210 MWs of planned renewable energy over the 2010 to 2020+ timeframe is 95% in new wind generated capacity alone. The Texas RPS also stipulates 500 MW of renewable energy come from non-wind resources. Currently about 2,000 MW are under development. To accommodate even some of this additional generation, the Public Utility Commission of Texas (PUCT) has approved nearly 3,000 miles of new transmission under the Competitive Renewable Energy Zone program.

The PUCT also approved market trading of Renewable Energy Credits between entities with surplus and deficit renewable energy generation. With the surplus of renewable generation in the market, recent indicative prices for Texas RECs have ranged from \$1.00/MWh for 2011 to \$1.21/MWh for 2012, well short of levels that would encourage merchant renewable generation. Additional details regarding the progress of renewable energy in Texas may be found [here](#).

### *Washington*

The RPS for the state is 15% by 2020. While the state has abundant hydro resources, only newly constructed hydro can qualify under the RPS. Of the state's planned 10,677 MWs of renewable generation from 2010 to 2020+, 66% is comprised of hydro and 29% is wind. Much of the wind energy development is driven by California's RPS standard, and the ability to meet that standard in part with RECs created out of

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state. Planners in the Northwest are struggling with balancing wind generation against the existing hydro system, with wind curtailments a possibility in the future. Such curtailments would limit the ability of California buyers to use Northwest RECs.

## *New York*

The RPS for the state is 29% by 2015<sup>3</sup> however, the estimate in Figure 1 presents an incremental tier of the RPS targets. Hydro provides over 18% of energy within the state. Of the state's planned 9,710 MWs of renewable generation from 2010 to 2020+, 62% is comprised of wind and 35% is hydro. With an aggressive target, New York is in the early stages of promoting offshore wind, with 120-500 MW under study in Lake Erie or Lake Ontario, and 350-700 MW under study off the coast of Long Island. It is not immediately clear if New York projects would benefit from interconnection with the proposed Atlantic Wind Connection, a DC intertie that would deliver offshore windpower to Virginia, Maryland, Delaware and New Jersey.

## *California*

California's RPS is significant because of its scope and market potential. The state's RPS by 2020 is 33%<sup>4</sup>. The planned renewable generation from 2010 to 2020+ is 28,887 MWs comprised of 21% wind, 17% hydro and 62% other renewable and alternative energy technologies. Of these other technologies, solar, biomass and biodiesel appear to be of most interest. Presently, over 11% of renewable energy is generated in the state. In addition to other states that participate in RPS, the state actively utilizes Tradable Renewable Energy Certificates (TRECs) which are bundled with the renewable energy delivered, as a means for RPS oversight authorities to monitor renewable energy deliveries within their jurisdictions. As noted above, renewable projects that can provide TRECs to California utilities are being developed in the Northwest and even in Alberta. More details on the TREC program are provided below.

## *Nevada*

The RPS for the state is 25% by 2025.<sup>5</sup> Hydro is significant, providing over 58% of energy within the state. Of the state's planned 12,119 MWs of renewable generation from 2010 to 2020+, 15% is comprised of wind and just 4% is hydro. The other 81% is comprised of solar and geothermal. Implementation of Nevada's RPS law sits with the Public Utility Commission (PUC). To this end, the PUC has proposed regulations creating renewable energy zones similar to the Texas approach, and certification of renewable energy credits similar to the California TRECs proposal.

## *Oregon*

The RPS for the state is 25% by 2025 for the state's investor-owned utilities (PGE and PacifiCorp), with a lower target for smaller utilities.<sup>6</sup> Hydro is by far the greatest utilized renewable energy source, providing over 80% of energy within the state. Of the state's planned 9,506 MWs of renewable generation from 2010 to 2020+, 58% is comprised of wind and 37% is hydro. As is the case in Washington, much of the wind development in the Columbia River Gorge is driven by California's RPS. PGE is soliciting 125 MW of renewable resources this year to comply with Oregon's 2015 standard.

## *Illinois*

The RPS for the state is 25% by 2025.<sup>7</sup> According to the EPA's most recent list of the National Top 50 green power purchasers within its Green Power Partnership, Illinois is ranked second in state governments in the US for green power purchases of RECs. Of the state's planned 10,846 MWs of renewable generation from 2010 to 2020+, 89% is comprised of wind and 3% is hydro. Illinois' RPS provides that the requirement may be fulfilled in Illinois or in contiguous states, a key provision in driving the value of Illinois RECs. This may allow Illinois to meet a portion of its RPS requirement from Iowa, for example, or to benefit from the proposed [Green Power Express](#), a network of 765 kV transmission lines that would bring windpower from the Upper Midwest to Illinois and Wisconsin.

## *Arizona*

The RPS for the state is 15% by 2025. Of the state's planned 10,170 MWs of renewable generation from 2010 to 2020+, 72% is comprised of other sources such as solar, while 20% is comprised of wind. Arizona features the broadest array of utility-scale solar projects, with nearly 7,300 MW proposed for development. The recession has hit Arizona's demand growth hard, leading Arizona Public Service to terminate its Power Purchase Agreement for the 290 MW Starwood project. Development on the project itself is proceeding, however.

## *Minnesota*

The RPS for the state is 30% by 2020 for Xcel Energy, and 25% for Minnesota's remaining utilities. Of the state's planned 7,295 MWs of renewable generation from 2010 to 2020+, 71% is comprised of wind and 29% is comprised of hydro. Minnesota represents a key link in the above-mentioned Green Power Express, both for delivering power to the Twin Cities, and for transfer of power to Iowa, Wisconsin, and Illinois.

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**Figure 1: RPS Goals and the Utilization of Wind, Hydro and Other Renewable Resources**

State	2009 state retail deliveries (MWh)	Pct. of state deliveries subject to RPS	Intrastate RPS eligible generation 2		RPS target (Percent of covered volumes)			Planned renewables (MW)					
			Total (MWh)	As pct. of total deliveries subject to RPS	2010-2012	2014+	2020+	Total	Constr. begun	Under dev. & ann.	Pct. wind	Pct. Hydro	Other
Arizona	73,433,000	61.5%	190,995	0.4%	5.0%	7.0%	15.0%	10,262	39	10,222	19%	8%	73%
California	257,507,000	98.0%	31,630,256	12.5%	20.0%	26.5%	33.0%	28,887	1,327	27,560	21%	17%	62%
Colorado	50,837,000	94.0%	4,225,985	8.8%	10.0%	15.0%	20.0%	4,120	502	3,618	65%	11%	24%
Connecticut	29,677,000	93.4%	1,325,014	4.8%	12.0%	14.0%	23.0%	345	-	345	6%	1%	93%
Delaware	11,258,000	74.7%	53,803	0.6%	8.5%	11.5%	20.0%	1,611	-	1,611	96%	1%	3%
District of Columbia	11,434,000	100.0%	508	0.0%	4.0%	12.0%	20.0%	0	-	0	0	0	100%
Hawaii	10,126,000	100.0%	1,119,049	11.1%	11.0%	19.0%	25.0%	1,087	35	1,052	60%	28%	11%
Illinois	136,197,000	73.0%	2,554,204	2.6%	7.0%	9.0%	20.5%	10,846	389	10,457	89%	3%	8%
Iowa	43,332,000	76.0%	8,919,665	27.1%	0.7%	0.7%	0.7%	5,108	4	5,105	97%	2%	1%
Kansas	38,112,000	69.0%	2,592,456	9.9%	10.0%	15.0%	20.0%	6,902	-	6,902	99%	0%	1%
Maine	11,283,000	95.0%	270,601	2.5%	5.0%	7.0%	10.0%	2,721	60	2,661	59%	39%	2%
Maryland	62,589,000	73.0%	800,684	1.8%	9.0%	17.4%	20.0%	3,653	134	3,519	92%	0%	8%
Massachusetts	54,050,000	85.2%	189,445	0.4%	7.0%	9.0%	15.0%	4,066	19	4,047	95%	1%	5%
Michigan	97,701,000	100.0%	6,822,007	7.0%	2.0%	10.0%	10.0%	5,043	34	5,009	98%	0%	2%
Minnesota	63,398,000	100.0%	7,564,361	11.9%	15.0%	25.0%	30.0%	7,295	862	6,433	71%	29%	0%
Missouri	79,667,000	70.0%	3,301,341	5.9%	2.0%	5.0%	15.0%	2,843	-	2,843	74%	26%	1%
Montana	14,326,000	69.2%	888,094	9.0%	10.0%	15.0%	15.0%	5,352	13	5,339	88%	12%	0%
Nevada	34,252,000	87.7%	1,778,785	5.9%	15.0%	18.0%	20.0%	12,119	187	11,932	15%	4%	81%
New Hampshire	10,687,000	100.0%	1,559,260	14.6%	10.7%	12.8%	20.8%	317	-	317	46%	0%	54%
New Jersey	75,616,000	98.0%	2,185,943	2.9%	10.1%	12.1%	22.5%	4,384	61	4,323	90%	0%	10%
New Mexico	21,647,000	87.9%	1,174,702	6.2%	10.0%	15.0%	20.0%	6,937	133	6,804	74%	13%	13%
New York	139,758,000	82.0%	2,364,642	2.1%	5.8%	6.6%	6.6%	9,710	139	9,571	62%	35%	3%
North Carolina	127,658,000	100.0%	175,606	0.1%	3.0%	6.0%	12.5%	689	38	652	30%	6%	64%
Ohio	146,151,000	87.6%	205,311	0.2%	1.5%	2.5%	12.5%	4,445	312	4,133	51%	36%	13%
Oregon	47,565,000	100.0%	7,404,989	15.6%	5.0%	15.0%	25.0%	9,506	691	8,815	58%	37%	5%
Pennsylvania	143,747,000	97.0%	9,022,011	6.5%	10.7%	11.3%	18.5%	1,818	93	1,725	72%	17%	11%
Rhode Island	7,617,000	99.0%	163,383	2.2%	6.5%	8.5%	16.0%	1,232	-	1,232	91%	0%	9%
Texas	338,678,000	76.0%	22,453,238	8.7%	3.9%	5.3%	9.1%	34,210	485	33,726	95%	0%	5%
Washington	90,165,000	81%	5,893,719	8.0%	3.0%	3.0%	15.0%	10,677	1,293	9,384	29%	66%	5%
Wisconsin	66,286,000	100.0%	4,060,814	6.1%	4.2%	10.0%	10.0%	1,591	184	1,407	91%	2%	7%
<b>Totals</b>	<b>2,294,754,000</b>	<b>86.6%</b>	<b>130,890,871</b>	<b>6.6%</b>	<b>7.4%</b>	<b>10.7%</b>	<b>16.7%</b>	<b>197,777</b>	<b>7,034</b>	<b>190,743</b>	<b>63.1%</b>	<b>14.5%</b>	<b>22.4%</b>

Source: SNL Financial

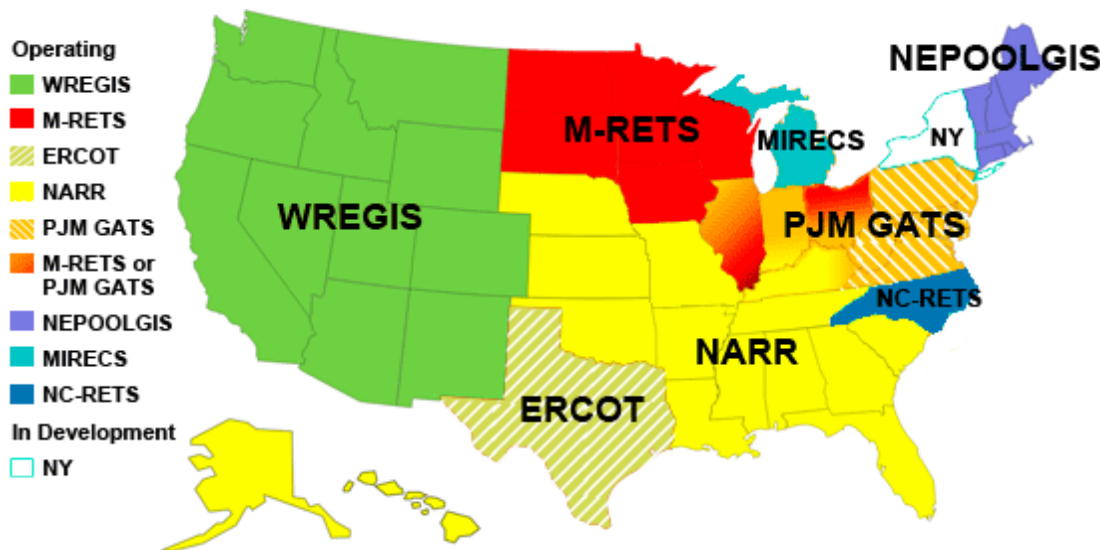
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## Renewable Energy Credits for RPS

A renewable energy certificate or credit (REC) is a certificate authenticating 1 MWh of renewable energy and is bundled with the energy delivered. RECs are traded on the Renewable Portfolio Standards Compliance Market and the Voluntary Market. Prices vary regionally. RECs are monitored by regional market renewable energy tracking systems. According to the EPA:

*"Regional tracking systems have been put in place to monitor electricity generation across the United States. A REC is produced for every megawatt-hour of electricity generated from a renewable resource and is assigned a tracking number within the system. The tracking number stays with the REC and is transferred between buyers and sellers until a final owner makes a claim, at which time the REC is considered "retired" in the system."*<sup>8</sup>

Figure 2 shows the regional renewable energy tracking systems.<sup>9</sup>



## Tradeable Renewable Energy Credits (TRECs)

As discussed earlier, REC purchases in California and Illinois are significant in that they allow for a state to meet part of the RPS by purchasing RECs. Estimates on REC purchases as a percent of RPS vary by state. However, the California PUC in a pending decision on March 17, 2010 (and with additional rulings later in the year) allowed utilities to utilize open market (unbundled) trading of Tradable Renewable Energy Credits (TRECs) in order for utilities to acquire up to 40% of their RPS requirement. The difference between RECs and TRECs is that TRECs are allowed when deliveries do not have a first point of interconnection directly to a balancing authority within a state. The balancing authorities also report directly to the regional market tracking system. The price cap for these TRECs has been set by the CPUC at \$50 until December 31, 2011. The decision still needs to be either formalized in legislation by the state government, or formally agreed to by the CPUC in a final decision. In any event, a formal decision could allow unbundled tradable renewable energy credits from outside the state, to apply toward the state's RPS.<sup>10</sup>

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## Federal Renewable Electricity Standard

The latest attempt to introduce a federal renewable energy standard took place in the previous legislative session. On September 21, 2010, Senator Jeff Bingaman (D-NM), along with 23 sponsors, introduced Senate Bill S. 3813, as an amendment to 1978's PURPA, to create a federal renewable electricity standard that targets 12% of total electricity sales by 2020. The summarized text of Senate Bill S. 3813 defines renewable energy as electric energy generated from the following sources:

- Solar
- Wind
- Geothermal
- Biomass
- Landfill gas
- Hydropower
- Marine/hydrokinetic
- Captured coal mine methane
- Certain types of waste-to-energy
- Other types as designated by the DOE

The bill further provided national targets for the production of renewable energy as a percentage of total electricity sales, as follows:

2012 through 2013 .....	3.0%
2014 through 2016 .....	6.0%
2017 through 2018 .....	9.0%
2019 through 2020 .....	12.0%
2021 through 2039 .....	15.0%

States with mandatory RPS compare favorably with these proposed targets already, as discussed earlier. Senate Bill S. 3813 contemplated that these national targets would form the basis of a federal REC market, as follows from pages 13 (first paragraph); and pages 16 and 17 (second paragraph):

*"Not later than January 1, 2012, the Secretary shall establish a federal renewable energy credit trading program, and a federal energy efficiency credit trading program, under which electric utilities shall submit to the Secretary federal renewable energy credits and Federal energy efficiency credits to certify the compliance of the electric utilities..."*

*"The Secretary may delegate to an appropriate market making entity the administration of a national renewable energy credit market and a national energy efficiency credit market for purposes of creating a transparent national market, for the sale or trade of renewable energy credits and energy efficiency credits and regional entities by the tracking of dispatch of renewable generation."*

Despite bipartisan support expressed at the time, the bill was not taken up in the last session and its prospects for re-introduction in the current session are unclear. A 12% federal target by 2012 might provide impetus to existing projects and allow for 'netting' between states with ample renewable resources and those with less to develop, via the proposed federal REC market. However, the target is not very aggressive compared to current state initiatives. It is possible to envision scenarios where the accretion of state standards results in more aggressive goals than S. 3813 laid out. Given this, the renewable lobby may decide to focus more on continuance of the PTC and direct grants than on implementing a federal RPS.

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## Conclusion

State RPS standards have been growing in scope and ambition over the last two years, with 2020 targets growing from 15% of sales volumes to 16.7%. While development of renewable energy projects has slowed down in the last two years, SNL analysis concludes that the existing pipeline of projects has roughly kept pace with the ramp up in RPS targets. If development continues to lag, the gap between RPS standards and generation brought on-line may become large, but the 1.1% gap appears manageable at this time. In addition to development momentum, policy around REC trading programs is supportive of both state and regional development of renewable generation. Furthermore, infrastructure proposals such as the Texas CREZ, Green Power Express, and Atlantic Wind Connection demonstrate a long-term interest in developing renewable energy resources. While there is little progress in view toward a federal RPS, the groundwork toward continued renewable energy development is already in place.

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