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OVERVIEW OF STATE RENEWABLE PORTFOLIO STANDARDS

A renewable portfolio standard is a law regulating electricity generation in a state that requires a certain percentage of the retail electricity power consumed—or generated—to come from renewable energy sources. These renewable energy sources are generally defined as solar, wind, geothermal, hydroelectric and biomass, though other sources, such as energy efficiency, sometimes qualify. Renewable portfolio standards typically also require the renewable electricity generation to come from new or recently installed generating capacity. As of September 2008, 26 states and Washington, D.C., had enacted renewable portfolio standards, with six other states setting renewable energy goals (see table on page 2).

The three main objectives of a typical statewide renewable portfolio standard are:

1. To offset emissions of greenhouse gases in electricity generation;
2. To diversify the state's electricity supply; and
3. To create high-paying jobs in the new energy sector.

A renewable portfolio standard reduces emissions of greenhouse gases—chiefly carbon dioxide—by incorporating a greater diversity of renewable energy into a state's energy portfolio, especially by supplementing coal-fired generation in areas where coal is heavily used. Renewable portfolio standard laws in the United States were passed with the intent to mitigate greenhouse gas emissions, spur the green economy and secure the state's energy future.

By ensuring access to a reliable supply of electricity in times of supply constraints in natural gas and delayed rail shipments of coal to power plants that yield higher prices, renewable portfolio standards serve as a safeguard against unpredictable and often fluctuating prices in traditional energy sources.

In addition to its environmental and price stabilizing benefits, a renewable portfolio standard will also lead to job creation. Many economic forecasts concerning the effects of a renewable portfolio standard predict thousands of new jobs will be added to the local economy as a result of the strategy. Not only will jobs result from new generation construction, maintenance, management and engineering, but support jobs will also be created in the service industry—although indirect job creation numbers are very speculative and difficult to predict.

Concerns exist that a renewable portfolio standard could increase prices to utility customers, but many experts agree this is not a major concern. According to a 2008 Lawrence Berkley National Laboratory study, new standards would increase retail rates by less than 1 percent. On the other hand, renewable portfolio standards may stabilize prices

in areas where natural gas is heavily used since natural gas prices have tended to spike sharply due to supply constraints. According to Energy Information Administration statistics, prices for natural gas increased more than 50 percent between 2002 and 2007. Thus, moderating the use of gas—as a renewable portfolio standard would do by requiring a greater diversity of electricity generation—could actually result in fewer fluctuations in electricity price, more stability and possibly a reduction in rates.

Challenges to Implementation

Though renewable portfolio standard legislation has become increasingly popular in recent years, states face several practical challenges to implementing those laws. One major challenge comes from the electricity grid itself. New renewable power generation capacity will require new transmission lines. For example, a wind farm in Texas may produce enough electricity to power 1 million homes, but until new transmission lines are built to transfer the power to the existing grid, the wind farm cannot do anything with the electricity.

The problem is that many states and local municipalities are snubbing new transmission lines because of environmental and scenic concerns or NIMBYism (not-in-my-back-yard) syndrome. To solve this dilemma, states will need to seek

States with Renewable Portfolio Standards and Target

State	Standard or Goal	Target Date
Arizona	15%	2025
California	20%	2010
Colorado	20%	2020
Connecticut	23%	2020
Delaware	20%	2019
District of Columbia	11%	2022
Hawaii	20%	2020
Illinois	25%	2025
Iowa	105MW	
Maine	10% new RE (30% pre-existing)	2017
Maryland	20%	2022
Massachusetts	15%	2020
Minnesota	30% Xcel (25% other utilities)	2020 (2025)
Missouri	11%	2020
Montana	15%	2015
Nevada	20%	2015
New Hampshire	23.8%	2025
New Jersey	22.5%	2021
New Mexico	20%	2020
New York	24%	2013
North Carolina	12.5%	2021
North Dakota	10%	2015
Ohio	25%	2025
Oregon	25%	2025
Pennsylvania	18%	2020
Rhode Island	16%	2020
South Dakota	10%	2015
Texas	5880 MW	2015
Utah	20%	2025
Vermont	20%	2017
Virginia	12%	2022
Washington	15%	2020
Wisconsin	10%	2015 (goal)

(Source: DSIREUSA.org)

Notes: Italics indicates goal; some states have different requirements for large utilities over small utilities or for investor-owned utilities over municipal utilities and co-ops; the number provided is for the largest provider of electricity. For Wisconsin, the standard has already been met and it set a new goal.

a compromise between connecting renewable resources to the grid and preventing unwanted transmission lines in scenic or environmentally vulnerable areas. To facilitate this process, states—working with public utility commissions and stakeholders such as environmental groups, landowners and utilities—should pre-determine acceptable routes for electric lines and guarantee a fixed time within which a decision will be made concerning a proposed line. In addition, since transmission infrastructure often crosses state boundaries to serve neighboring states, this may afford an opportunity for states to partner together in facilitating regional transmission through agreements, such as interstate compacts.

The near annual uncertainty surrounding the extension of the federal Production Tax Credit poses another problem for state renewable portfolio. The tax credit is the primary federal renewable energy incentive—it provides a monetary incentive to renewable energy generators for every kilowatt-hour produced for the first 10 years of generation. The value of the credit varies from 1 cent to 2 cents per kilowatt-hour depending on the type of renewable energy used to generate the electricity. According to the American Wind Energy Association, the tax credit is vital to the continued development of wind projects, and allowing it to lapse could cost the economy some 75,000 jobs through lost construction and management of new facilities. Uncertainty in the continuation of the Production Tax Credit often stalls projects slated for construction.

Common Renewable Portfolio Standard Design Elements

According to the Environmental Protection Agency, to ensure success of renewable portfolio standards, states often incorporate the following elements in their design:

- Annual increases in targets from new generation;
- Long-term timelines intended to stimulate investment;
- Methods of cost recovery;
- Mandatory compliance supplemented with noncompliance penalties; and
- The promotion of distributed generation and net-metering.

Most states include solar, wind, geothermal and biomass explicitly in their renewable portfolio standard legislation. Additionally, many states do not include large scale hydroelectric power—due to extensive environmental concerns over the area impacted, including the disruption of the river and its natural inhabitants—but do include improvements to existing plants or small scale projects (i.e. those less than 25 megawatts in generating capacity).

States often start out with modest targets—say, 5 percent renewable electricity generation in the first year of implementation—and increase a percentage point or so annually until reaching a maximum renewable energy generation percentage. Several states also set technology targets or provide extra credits for generation from favored renewable energy sources. Illinois, for example, requires that 75 percent of its 25 percent renewable energy target must come from wind power.

In addition, states often specify a target for new generation, especially when a state's renewable portfolio standard is linked to job creation.

New generation requirements ensure utilities will take action to meet the renewable portfolio standard, whether through installing new generation themselves or through purchasing renewable energy credits. Renewable energy credits allow utilities to purchase credits from independent renewable energy producers. In addition, utilities may find purchasing renewable energy credits costs less than directly installing generation themselves. Some states require renewable energy credits to be purchased from specific in-state geographic locations to help stimulate rural communities. In Montana, for example, public utilities are required to purchase renewable energy credits and electricity from community projects.

States typically aim to stimulate private investment in renewable energy sources in three ways: by making compliance to a renewable portfolio standard mandatory, by allowing for a portion of the cost to be recovered and by requiring the renewable portfolio standard to be in effect for an extended period of time. Long timelines signal to investors that policies will not change and that the state is committed to pursuing renewable electricity generation. And long-term price contracts that set a pre-established price for the delivered electricity over a specific period of time, say 20 years, signal developers there will be a buyer for the electricity they produce at a rate that encourages investment in renewable generation. A number of public utility commissions allow some cost recovery for utilities to offset the expense of installing new generation or purchasing renewable energy credits by permitting an additional charge to customers' bills.

Since overall experience with renewable portfolio standards is new, most states set limits on how high electricity rates can rise to prevent an unnecessary burden to rate payers. Rates might increase if utilities are required to purchase more expensive renewable energy credits or build new generation. If electricity costs are rising too rapidly, renewable energy targets can be eased. Rates are often capped at a percentage of the average annual bill for retail customers. The Lawrence Berkley National Laboratory report found that most states have capped price impacts at below 10 percent of the average annual retail bill.

In states where energy-intensive industry is vital to the economy—for example, as the auto industry is vital to the Michigan economy—renewable portfolio standard legislation often lowers or waives the compliance fee for the portion of electricity utilities sell to industry in order to keep electricity rates low. Delaware, for example, exempts sales to industrial customers with peak demands of 1,500 kilowatts or more.

To ensure compliance, noncompliance penalties are generally set higher than the rate at which renewable energy credits can be purchased. These penalties also typically rise each year. The purpose of the noncompliance fee is to make it cheaper to purchase renewable energy credits to further advance the goals of the RPS. New Jersey, according to the DSIRE database, set the penalty at $50 per megawatt-hour that the utility is under the target; a price that is expected to be more expensive than the cost of purchasing renewable energy credits or through installing new generation.

Finally, most renewable portfolio standard policies promote distributed generation and net-metering. Distributed generation refers to small scale power plants located at or near the site of the load and can include mini combined heat and power plants, rooftop solar panels and small scale windmills. During times of surplus generation, distributed generation units that are connected to the grid can send excess power to the grid, thereby reducing the need for added utility capacity.

Net-metering policies encourage the adoption of distributed generation by allowing individuals and businesses to sell back excess generation to the grid at the retail rate. Sales from excess generation are generally credited first to a customer's bill and can then include a payment to the customer by the utility if generation exceeds the total bill. This benefits both the utilities and the customer/owner of distributed generation as it provides power to the grid at peak times when utilities are in need of extra generation and—through revenue creation (or customer bill deductions)—encourages homeowners and businesses to purchase distributed generation systems.

Conclusions

The trend toward implementing and strengthening state renewable portfolio standards is increasing and is likely to continue. A state renewable portfolio standard can have several important benefits for the state that implements it, including stabilized electricity rates, job creation and reduced emissions of greenhouse gases. Regulating carbon dioxide emissions—via a carbon tax or a cap-and-trade program as some states are attempting and as the federal government are likely to do—will raise the rates of electricity from coal-fired power plants relative to electricity generated from renewable energy. If concerns over transmission infrastructure (including addressing industry concerns over interconnection standards to ensure the integrity of the grid is not compromised), price impacts and reasonable reimbursement of utility expenses are adequately addressed, that makes renewable portfolio standards an even more suitable policy.

Useful Links

- Database of State Incentives for Renewables and Efficiency: www.dsireusa.org. Provides a comprehensive overview of state renewable portfolio standard and related policies that promote efficiency and renewable energy.
- EPA Renewable Portfolio Standards Fact Sheet: *http://www.epa.gov/chp/state-policy/renewable_fs.html*. EPA guidelines for designing a state renewable portfolio standard.
- Lawrence Berkeley National Laboratory: Renewable Portfolio Standards in the United States: A Status Report with Data through 2007: *http://eetd.lbl.gov/ea/ems/reports/lbnl-154e.pdf*.
- NREL Renewable Energy Resource Maps: *http://www.nrel.gov/renewable_resources/*. Provides detailed information on state renewable energy resource capabilities.

Renewable Portfolio Standards Cheat Sheet

Common Requirements for Renewable Portfolios

Renewable energy targets and annual compliance reports

- Targets for a state's renewable energy sources start low and then increase to a maximum (usually maximum increase is 1 percent per year).
- Utilities must submit compliance plans and reports for procurement annually.
- Public utilities commissions can recommend altering the schedule if deemed necessary—for example, if the targets create an undue financial burden.
- Reviews are held yearly or once every five years. Targets may be raised or adjusted.
- Alternative compliance payments can be made if utilities don't meet requirements. They sometimes increase each year; for example, non-compliance in the first year could cost $25 per megawatt-hour and could increase to $50 per megawatt-hour in the second year, etc.
- The cost of noncompliance should generally be more than the cost of generation or renewable energy credits to ensure compliance. Failure to comply may result in loss of license

Types of energy providers required to comply

- The types of providers required to comply varies—for example, investor-owned utility, municipal, co-op, etc., but investor-owned utilities more often required to comply.
- Co-ops and municipally owned utilities are sometimes exempt or have lesser standards.
- Out-of-state purchases are often precluded or limited.
- Some states grant more credits for in-state generation (e.g. Colorado at 125 percent)

Eligible resources

- Typically new generation
- Some have higher requirements for specific resources (e.g. in Illinois, 75 percent of target must be met with wind energy); or tier systems (e.g. Pennsylvania).
- Some renewable portfolios include efficiency, though often cap at a percentage of the total renewable portfolio standards requirement.
- Combined heat and power is sometimes allowed in efficiency targets.
- Large hydro is often excluded (though small and incremental typically permitted).

Renewable Energy Credits: Credit Trading System

- One credit would typically equal 1 megawatt-hour (i.e. electricity sold)
- Excess generation from one year can be rolled over to another, usually for two-three years
- Can't be double-counted (say for two different states), but may be able to be double-counted if a federal renewable portfolio standard comes online
- Some states have renewable energy credit multipliers for certain favored sources. For example, wind receives 110 percent credit
- Some require purchase of renewable energy credits and electricity output from community projects to stimulate local (rural) economic development

Costs and Potential Benefits

- Costs apply to retail sales
  - States can cap cost to retail customers at 1 percent rising to 2 percent of annual bill or a flat fee that rises (e.g. $10 in 2008, $12 in 2012 and $34 in 2013 for residential)
  - Sales of electricity to industrial customers are often exempt to keep costs low.
- Costs to pursue renewable portfolio standards can be recovered through a monthly surcharge approved by public utilities commissions, though noncompliance penalties often cannot.
- Money from fees is typically used for renewable funds, which provide loans and grants to develop renewable energy sources.
- Many renewable portfolio standards smooth the transmission line process for utilities.
- Long-term power contracts may be sufficient to attract new investors.