

Appendix B

The Renewables Portfolio Standard

Using Markets to Promote Clean Power

With the move toward free markets for electricity, proponents of a sustainable energy future face the risk that unsustainable sources of electricity (primarily fossil fuels and nuclear power) will dominate the market. Today, only 2 percent of US electricity comes from clean, sustainable renewable sources (biomass, geothermal, solar, and wind power), with another 8 percent from hydroelectric power.¹ Although the cost of producing renewable energy has been falling, it has not yet reached the cost of fossil fuel electricity. The combination of market reforms and fossil fuel electricity, could result in a collapse of the existing renewable energy industry, as well as a cutback in investment in research and development on renewable technologies. The short-run economic gains from market reform could block long-run efforts to achieve a sustainable energy future.

To integrate commercially-ready renewables into a competitive market, a number of jurisdictions have, as described in Appendix C, adopted or proposed a renewables portfolio standard (RPS). This simple mechanism would assure that a minimum percentage of all electricity consumed comes from renewable sources.

Who Participates in the RPS and What Do They Do?

The renewables portfolio standard (RPS) is a requirement that a minimum percentage of each electricity generator's or supplier's resource portfolio come from renewable energy. The RPS uses renewable energy credits (RECs)—tradable credits awarded for each unit of renewable energy produced—as a way for companies to meet the minimum standard for renewables easily and efficiently. Without RECs, this standard would be more difficult to meet, since renewable resource generators and retail providers could have to enter into thousands of small power purchase contracts. This process could be relatively

time-consuming and expensive. RECs would make compliance simple and transactions more efficient.

Three types of players will be involved in trading renewable energy credits.

- **Energy generation companies**—These are the “power factories,” making electricity and selling it at wholesale rates to retailers. When they use renewable sources, they will receive renewable energy credits, which they can sell.
- **Retailers**—These companies sell power to consumers. They will be required to have a certain number of RECs each year. Depending on market rules adopted in different places, one company could be both a retailer and a generation owner.
- **Program administrator**—The administrator, probably a state or federal government agency, will dispense credits to renewable generation companies; ensure that everyone complies with the law and files truthful reports; keep records, and set the price cap, if any.

Other entities could participate as well. Brokers are likely to emerge who buy and sell RECs, offering one-stop shopping for retailers and renewable generation companies. Also, environmental groups or foundations that want to promote renewables could buy RECs and remove them from the market to increase demand, just as they have done with sulfur dioxide credits.

Note that RECs and energy can be traded separately. Buying power from a generator that uses renewable sources is only one way of obtaining RECs. Instead, a retailer may buy power from a generation company that uses only coal and nuclear power or from a spot market (whatever is available at the time), then buy the necessary RECs from a broker. In this way, all retailers can meet their requirements and support renewable energy without having to deal



directly with multiple companies. Conversely, a renewable generation company can sell power to a local retailer at the going rate for generic electricity, but sell its credits to a broker to make up for higher production costs. In this way, the renewables company gains income from two sources: the sale of its electricity and the sale of RECs, as shown in Figure B-1.

Renewable energy credits are proof of generation and sale, so to comply with the RPS, all a retail provider has to do is purchase RECs. Figure B-2 is an example of the one-page compliance form a retail provider would have to submit to the program administrator once a year. It simply lists how much power was provided the previous year, how many RECs are needed to comply with the standard, and how many RECs are attached. There are also a couple of lines related to the price cap (discussed below).

In this case, a power retailer who sells 10 million kWh already has half the required RECs at the time of the reporting and buys the other half from the program administrator at the level of the price cap, here set at 2.5¢ per kilowatt-hour (¢/kWh).

Price Caps. One criticism that has been made of the renewables portfolio standard is that the cost of the requirement is not known in advance. If a direct subsidy to producers or a cash incentive to customers is used to promote renewables, it can be budgeted in advance, down to the penny. However, in such cases, a bureaucrat rather than market forces would make the decision about who to support and how much to

pay them. Though the decisions may be wise, they may not be economically “optimal” and may be unwieldy to implement.

One way to retain the simplicity of using renewable energy credits, while limiting the cost of the RPS program is to set a price cap. If REC prices get too high, as a result of low supply or high demand, the program administrator can offer “proxy credits” for sale at a fixed price. The price would be set slightly above the expected price of RECs. Look again at Part 3 of the Sample Compliance Sheet in Figure B-1. The power retailer can comply with the RPS simply by writing a check to the program administrator for the required number of RECs multiplied by the posted price cap. With a single transaction and a single payment, the retail provider has complied with the RPS. Of course, if RECs are cheaper on the open market, a retailer will save money by buying RECs.

The money collected by the program administrator would not simply disappear into the bureaucracy. Rather, the program administrator would spend the money on RECs in the market, seeking the lowest price and buying RECs until the fund is exhausted. In the example shown in Figure B-1, the administrator would use the \$6,250 received from Green Power Inc. to buy RECs. If RECs were selling for 3¢ apiece, the administrator would buy 208,333 RECs, representing 208,333 kilowatt-hours of renewable energy production, instead of the 250,000 kilowatt-hours for which Green Power was responsible. This would save Green Power \$1,250 in compliance costs, while supporting renewables to the greatest possible extent.

With a price cap, power retailers are protected against unanticipated shortages in the REC market, while generators (and their financial backers) are assured of a thriving market for RECs. To date, however, no state that has adopted the RPS has felt the need to adopt a price cap. Regulators have not judged the added costs for purchasing renewable energy to be burdensome enough to require one.

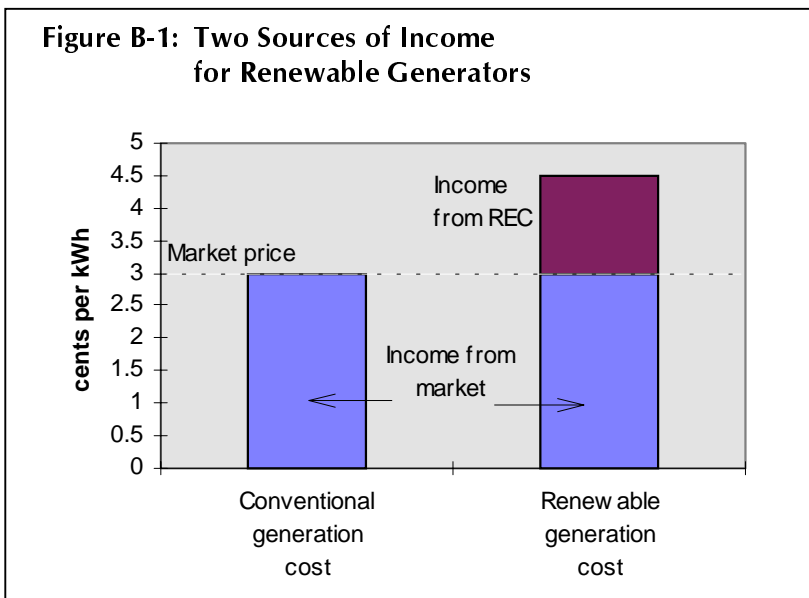


Figure B-2: Sample Compliance Sheet

Renewables Portfolio Standard Compliance Form

Company Name and Address: Green Power Inc., Sheboygan, Wisconsin

Part One: Total REC Requirement

Total kWh sold in 1999:	<u>10,000,000</u> kWh
x RPS requirement percentag	<u>5%</u>
equals Total Requirement for RECs	<u>500,000</u> kWh

Part Two: RECs Purchased

Total Requirement for RECs (from above)	<u>500,000</u> kWh
less RECs attached to this form	<u>250,000</u> kWh
equals Remaining Requirement	= <u>250,000</u> kWh

(If Remaining Requirement is equal to or less than zero, stop here.)

Part Three: Price Cap Purchases

Remaining Requirement (from above):	<u>250,000</u> kWh
x price cap (\$0.025/kWh)	x <u>\$0.025/kWh</u>
equals Total remittance to the REC Purchase Fund	= \$ <u>6250</u>

(Please attach check payable to REC Purchase Fund to this form.)

From Good Idea to Good Policy: Filling in the Details of the RPS

The renewable portfolio standard has the potential to move the United States along a path to sustainable energy, but only if the state and national governments make a commitment to it. This section examines some of the practical issues that could move the RPS from a good idea to good policy.

Choosing the Right Percentage for the RPS. The portfolio standard should be set at a level that can create a viable, predictable and safe market for a still young renewable energy industry. What is that level? At a minimum, it would maintain the

current level of renewable generation we have now and lead to slow but steady growth over time. Retaining the level of existing generation does not necessarily mean retaining the same generators, since low-cost new generation should be able to compete against and displace high-cost existing generation. The RPS should also grow slowly over time, to allow the market for renewables to develop. Finally, the level should reflect societal values and goals for environmental protection, economic independence, and sustainability.

A study by the Union of Concerned Scientists and others, *Energy Innovations*, found that by following



an “innovation path” of energy efficiency and low-polluting technologies, the United States could reduce greenhouse-gas emissions to 10 percent below 1990 levels by 2010, while reducing air pollution, saving money, and promoting economic development.² Under that scenario, renewable electricity would make up 14 percent of the US power supply by 2010. But even a 10 percent standard by 2010 would assure sufficient development of renewables to contribute substantially to that goal, while allowing market forces to increase renewables penetration further if they are the low-cost compliance option. (For details about state and federal standards enacted or proposed as of September 1998, see Appendix C.)

Costs of an RPS Program. Costs associated with renewable portfolio standards fall into four categories: the cost to consumers, the public costs of administering the program, the cost of the renewable energy credits, and the costs to private firms of carrying out the program.

Costs for public administration of the program would stem from handling claims for RECs from generators and retailers; overseeing, reviewing, and enforcing the program; and administering the price cap fund. These costs could be covered by fees collected for processing REC claim forms or by the general funds of the agency charged with administering the program. The process could be largely computerized, as the Environmental Protection Agency’s sulfur dioxide allowance trading program is, thereby reducing management costs considerably. The combination of participant fees, computerization, straightforward forms and accounting, and stiff penalties to deter false claims means this program should not be costly to administer.

Prices for RECs will be a function of supply and demand. The portfolio standard will set the demand for RECs, a demand that will increase slightly each year. Power producers will determine the supply of RECs. Producers and retailers, through negotiation, will set the price.

Finally, the administrative cost to companies for trading RECs and complying with the standard should be small. Retailers will have numerous options for trading or may simply rely on brokers. The primary cost of an RPS program is the cost of the RECs, which directly supports renewables generation; low

administrative cost is one of the distinguishing benefits of market-based regulation.

Regional Issues. If RECs are traded nationwide, some critics have argued that regions with a substantial base of renewables already in place, such as California, would be the sole or primary beneficiary of the RPS. This needn’t be the case. A federal RPS can be designed to promote regional or state development of renewables. Current federal bills allow states to tailor the RPS to fit their needs.

For example, a sunny state like Nevada could require that 1 percent out of a 5 percent national REC requirement come from Nevada-based solar generators. Or it could require retailers to obtain 1 percent of their power from in-state solar plants, on top of the federal standard. And, to keep costs down, a state or region could set its own price cap.

Due to interstate commerce rules, state-level RPS laws probably cannot now require in-state siting of renewable generators. Such a law would arguably restrict interstate commerce. However, a federal law that allows for state-specific siting could overrule interstate commerce considerations.³

With or without a local standard, states could promote renewables development by providing tax incentives or development grants to energy developers. Public universities could provide research to identify renewable resources within a state. These complementary inducements would attract renewables developers to any state inclined to pursue them.

States also have the option of allowing the standard to be met entirely through nationally tradable RECs. This option permits states with less attractive renewable resources to contribute to meeting the national standard at the lowest possible cost.

Automatic Sunset and Ongoing Adjustments. In the transition to a fully competitive retail electricity market, some policymakers are worried about how long they should support renewables, energy efficiency, and low-income issues. They worry that these issues won’t just go away in a competitive market, but that political support for ongoing funding may. Thus, many policy measures include sunset provisions or at least sunset reviews. California’s \$540 million “transition fund” for renewables ends after only four years, implying that renewables must be fully competitive by then.



Because of the way in which the RPS is designed, policymakers needn't worry about picking an end date for it. A goal of an RPS is to drive down the cost of the renewable energy through competition. If an RPS is successful and renewables become competitive with conventional generators, the value of the RECs will be driven down to almost nothing. In other words, a renewable power producer that can be profitable selling its power at market rates will be able to sell its RECs for less than any other generator on the market. Eventually, the RECs will be worthless, and the RPS will be obsolete.

If the renewables standard remains at the same level, the RPS requirement is likely to become increasingly irrelevant as prices for renewable energy decline. But the RPS approach also allows regulators to continue raising the standard so as to develop more renewables. Just as the Clean Air Act tightened emission standards over time, so too can an RPS require more clean energy production over time. If a 5 percent standard is met ahead of schedule and under cost, regulators can increase it to 6 or 7 percent, creating continual improvements. Renewables will always provide public goods that future legislators may want to continue to credit.

The RPS and Resource Diversity. By developing a market for nonfossil fuel and nonnuclear electricity, the RPS would take an important step toward diversifying the nation's energy supplies. Further increasing the variety among renewable energy sources would also provide diversity benefits. The RPS is designed to promote the technologies that are closest to being market-ready, such as wind, landfill gas, and in some areas, geothermal. But if other types of renewables—such as biomass and solar—are also developed, the stability of the entire US energy program will increase.

The RPS could be designed to explicitly promote different technology types. Arizona's standard, for example, focuses exclusively on solar energy, while Nevada's requires that half of new production to be from solar technologies. In California, RPS proponents recommended that part of the overall RPS percentage be set aside for biomass power, to support the large and troubled biomass industry in that state.

An alternative mechanism would be to set a limit on the use of any one or two technologies to meet the

standard. Thus, a supplier could be limited to meeting the standard with no more than 60 percent of credits from any one technology, or 90 percent from any two technologies. This mechanism would preserve diversity without requiring government officials to pick technology winners.

A related issue is the conflict between existing and new renewable power plants. Some existing power plants may have already recovered their capital costs and need less support, while others may need to pass their costs along to the consumer. In most cases, new renewable plants will have difficulty competing with older plants. One proposed federal bill (Bumpers-Gorton) would use adjust the RECs to favor new renewables: it proposes giving energy from new renewables two credits, that from existing renewables one credit, and energy from large hydro dams a half credit.

Another solution (adopted in Connecticut and Massachusetts and proposed in Vermont) is to create separate portfolio standards for different tiers or classes of renewables. New renewables are assigned a separate minimum, growing standard. This mechanism allows new renewables to receive a price premium different from that needed to preserve existing renewables. New renewables are also allowed to compete to displace the class of existing renewables, ensuring that existing renewables continue to be supported only as long as their operating costs are less than the cost of building and operating new renewables.

Linking the RPS with the Public Benefits Trust Fund. The RPS is designed to bring a minimum percentage of renewables into the market at the lowest cost to society. The least-cost renewables will be the winners. But emerging technologies like photovoltaics and fuel cells—which cost more now but may have important future benefits—would not be viable in the near-term based solely on the value of renewable energy credits. A public benefits trust fund, created by a small charge on each kilowatt-hour of electricity, could support the research, development, and commercialization of innovative renewable technologies. It could also help to overcome specific market barriers, provide financing for renewables projects, and build renewable industry infrastructure.



Connecticut and Massachusetts have adopted both portfolio standards and renewable energy trust funds.

The Relationship Between the RPS and “Green Marketing” of Electricity. A federal or state RPS is not incompatible with green marketing. It is a supply-side requirement—it doesn’t specify how the power is sold, only that retailers must include it in their product mix. In a competitive market, retailers will sell renewable energy for whatever the market will allow, and many are likely to try to charge a premium for it as an “environmentally friendly” product. Since the RPS is a minimum standard, strong consumer demand could result in more power being produced than the RPS requires.⁴ If demand is weak due to high prices, the RPS would ensure that the public desire for a clean environment is being addressed, at least at a minimum level.

The RPS is likely to affect the content of products offered as “green.” If every power product has a minimum 10 percent renewable content, then green marketers will have to go beyond the minimum to attract a premium from environmentally-concerned consumers.

To Whom Should the Standard Apply: Retailers or Generators? Some of the legislative proposals require that retailers comply with the RPS, while others put the standard on electricity generators. It seems to make more sense to have retailers meet the RPS requirement, using RECs created by generation companies.

Power retailers will operate as intermediates between generation companies on one side and retail customers on the other, essentially assembling a “portfolio” for their customers. It would be a natural function of their business to incorporate renewable resources and RECs into their portfolios. They will be in the best position to decide whether they should buy RECs, buy power and RECs, or invest in their own renewable resource facilities and create RECs.

Generation companies will have a very different role. Their job will be to provide power to the wholesale market. In some cases, this could involve collecting a number of different power plants into a single product, but in many cases it wouldn’t. Generators may or may not have regular contact with other generation companies, so may have limited

ability to incorporate REC trading into their everyday operations.

Financial Effects on Renewable Resource Generators. The RPS does not pick winners and losers, and it does not guarantee an income for a power producer. It does guarantee that a share of the power market will come from renewable energy, but requires individual companies to fight for a piece of that share. Renewable energy companies will survive and thrive according to their ability to compete.

This competition, like competition in the broader market for electricity, will drive down costs and increase innovation. It will cause some generation companies, if they don’t innovate to lower their costs, to go out of business. Likewise, low-cost generators that are already competitive could earn additional revenues from an RPS program. This is not necessarily a bad outcome for a number of reasons. First, it would reward the most cost-effective generators and provide them with incentives to expand low-cost output or build new plants. Second, it would provide an incentive to high-cost generators to work hard to lower their costs. And third, it would compensate these renewable generators for the environmental benefits their power provides. As with other industries, those that find ways to lower costs profit more and offer a cost target for others to pursue.

The RPS in Regulated Markets. The portfolio standard will work well in competitive markets, but it can be used to lower the cost of renewables in regulated utility markets as well. Without retail competition, an RPS is similar to a “set-aside,” which a number of state legislatures and utility commissions have implemented. But instead of each company, or specific companies, complying with the standard, the suppliers can collaborate by means of tradable renewable energy credits. For example, one company may have superb wind or geothermal resources that others lack. By developing that resource and selling credits to other companies so that they can meet their share of the standard, the industry as a whole can meet the goal at the lowest cost to state consumers.

By having an RPS up and running under the current regulated system, utilities and regulators will be ready to implement renewable credit trading if competitive markets take over.



The RPS and Current Laws and Regulations. Because the RPS is not a subsidy program, it would not necessarily come into conflict with government tax credits or production credits for renewable generation. For example, a company producing renewable energy credits could still receive Renewable Energy Production Incentives authorized by the Energy Policy Act of 1992. The RPS also would not directly affect existing contracts formed under the Public Utilities Regulatory Policy Act (PURPA). It is possible that the RPS could cause generators or utilities to mutually end or change existing contracts, if the opportunity for added revenue from selling renewable energy credits (perhaps under a new long-term contract for credits) is more attractive than maintaining the existing power contract.

Unless specified otherwise, the Internal Revenue Service is likely to declare RECs to be taxable income for the renewable generators. Taxing RECs will reduce their value to the generators and produce additional tax revenues for the government. It would be preferable to declare RECs nontaxable. Alternatively, an offsetting tax cut could be implemented.

Choosing a Program Administrator. Candidates for administering a federal RPS include the Department of Energy, the Federal Energy Regulatory Commission, and the Environmental Protection Agency. Their state-level counterparts would be the state energy office, utility commission, and department of natural resources. One argument in favor of the DOE is that it does not have an adversarial relationship with potential RPS participants. FERC has extensive knowledge of the wholesale electricity industry. The EPA might also be an appropriate place to manage the program. First, the EPA has experience managing the acclaimed sulfur dioxide trading program. The RPS would be a similar but simpler undertaking, since there would be no emissions monitoring. Second, RECs represent the “clean” in clean power (among other attributes), so a case can be made for an environment-oriented agency to administer the program.

States have made differing choices. Massachusetts chose the state Division of Energy Resources (the governor’s policy office) to administer the program. Connecticut chose the Department of Public

Utility Control. See Appendix C for more details about state RPS programs.

Whoever is chosen, the approach should be nonadversarial, problem-solving, promarket, and goal oriented. That is, the program administrator should set performance goals and seek to live up to them. Some of the administrative functions—such as REC purchases from the price cap fund or site audits—could, under appropriate circumstances, be contracted out to private firms.

Alternatives to the Price Cap Mechanism. By offering “proxy” credits at a price slightly above where RECs are expected to sell, as described above, the program administrator would limit the total cost of an RPS. As competitive forces drive down the price of RECs, the likelihood that retailers would ever pay this maximum decreases. The price cap option retains the cost-reducing power of market incentives while protecting buyers from unexpected upswings in REC prices.

The price cap is unlikely to become the “going price” for all RECs. First, retail providers have numerous options for acquiring RECs, so they will actively seek out lower-cost credits. Second, there are too many generators to coordinate a “REC cartel” and game the market. With dozens (perhaps growing to hundreds) of renewable resource generators spread all over the country, individual generators could easily lower their prices slightly and obtain the most secure contracts for RECs and power. Third, if renewable generation exceeds demand for RECs, some generators will not be able to sell the RECs they created, thus driving down prices. Finally, as a result of market-based innovation, the price for sulfur dioxide credits in the EPA’s acid rain reduction program has never risen to the “penalty” price cap; the RPS aims to stir the same market forces.

An alternative to the price cap would be to allow retail providers to petition the program administrator to reduce their REC targets or extend compliance dates. This approach has three weaknesses. First, it would require a bureaucratic investigation and decision, a process likely to be costly and time consuming. Second, the process would introduce uncertainty into REC markets. Renewable energy sellers (and investors) would not know how much of a market exists. Should they or should they not invest in a new



plant? If they do, and then enough retail providers manage to postpone compliance, the generator could go bankrupt for lack of a REC market. Third, such an option would give retailers an incentive to resist compliance and violate the spirit of the law. It is far simpler to set a reasonable price cap and let the market decide which is the least-cost provider.

Penalties for Noncompliance. If a generator attempts to falsely certify RECs, a penalty could range from simply denying the request to imposing a fine to excluding the generator from certifying any RECs for a given period of time (thus missing out on credit payments). Penalties should be severe enough to deter submission of false claims. If a retail provider fails to comply—unlikely, given the price cap mechanism—the program administrator could impose a significantly higher penalty per required REC.

Self-Generators and Hybrid Fossil Fuel/Renewable Generators. Some companies have their own electricity generators that do not provide power to the larger electricity grid. Most self-generators use polluting, nonsustainable fuels, just like conventional generators. They should be required to participate in the RPS program just like any retailer of power. To ease administration and compliance, companies with small generators, perhaps 1 MW or less, might be exempted from participation.

Some power generation companies use both renewable power and conventional power in hybrid power plants. For example, solar thermal power plants in California use gas-fired turbines to provide power when needed. Renewable energy credits would only result from the renewable energy portion of a hybrid technology. Maine has chosen this approach for fossil fuel hybrids in draft RPS regulations.

Issues Relating to Energy Use across National Boundaries. The RPS is analogous to any other product safety or performance standard. For example, no matter where an airplane is manufactured, if it is used in the United States, it must meet US safety and performance standards. The RPS covers all power whose end use occurs in the United States, regardless of where the power or the power sales originate. Since all countries are treated equally under the RPS, it is unlikely to conflict with NAFTA or GATT trade rules.

Both Mexico and Canada have renewable energy generators that could qualify for RECs. Mexico has a 100 MW geothermal facility that has historically sold power into the US market, while Canada has some wind facilities and some small-scale hydropower. If these companies are supplying power to the United States, they should be allowed to apply for and receive RECs from the program administrator. Similarly, retailers located in Canada or Mexico who sell power in the United States would need to acquire credits for the US portion of their sales.

REFERENCES

- ¹ Energy Information Administration, *Renewable Energy Annual 1997*, February 1998.
- ² Alliance to Save Energy, American Council for an Energy-Efficient Economy, Natural Resources Defense Council, Tellus Institute, Union of Concerned Scientists, *Energy Innovations: A Prosperous Path to a Clean Environment*, Alliance to Save Energy, June 1997.
- ³ See Kristen Engle, Tulane Law School, “The Federal Constitution and State Implementation of Renewables Portfolio Standards: An Analysis of Commerce Clause Issues,” Memorandum for the American Wind Energy Association, March 13, 1996; Steven Ferrey, “Renewable Subsidies in the Age of Deregulation,” *Public Utilities Fortnightly*, December 1997; and Scott Hempling and Nancy Rader, “State Implementation of Renewables Portfolio Standards: A Review of Federal Law Issues,” American Wind Energy Association, January 1996.
- ⁴ It would also swamp the market for RECs. If demand is 10 percent and the RPS only requires 8 percent, say, there will be an oversupply of RECs, driving down their value, and making the RPS somewhat obsolete.

