State Policies Can Cut Energy Dependence

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Abstract: The United States' dependence on energy imports of fossil fuels has resulted in political and economic insecurity, as well as the depletion of natural resources and increased pollution. Although renewable energy production also creates negative externalities, their scope is much smaller than those caused by the generation of non-renewable energy. Renewable Portfolio Standards (RPS) requires the electric power industry to include renewable sources of energy. RPS policies can have a significant impact on renewable energy deployment if they have adequate enforcement mechanisms.

Keywords: Renewable Portfolio Standards; electric power industry; renewable energy policy; policy compliance

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Renewable Portfolio Standards requires the electric power industry to include renewable sources of energy.

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The United States' dependence on energy imports of fossil fuels has resulted in political and economic insecurity, as well as the depletion of natural resources and increased pollution.

In 2009, fossil fuels accounted for 78.4 percent of the U.S. energy supply. Petroleum constituted 35.3 percent of the energy supply, while natural gas was 23.4 percent and coal was 19.7 percent. By contrast, nuclear power and renewable energy amounted to just 8.3 percent and 7.7 percent of the energy supply, respectively.

Relying on fossil energy sources as the primary energy supply creates multiple problems. First, fossil fuel energy creates problems for which the public is not compensated, such as pollution and health issues. These problems are called negative externalities because the social costs needed to eliminate their negative impact are not included in the costs of energy generation and energy prices.

Second, an over-reliance on fossil fuel also leads to the tragedy of the commons, in which shared use of non-renewable resources results in the full depletion of those resources. Thus, the social costs of fossil fuel energy are higher than the private costs.

However, fossil fuel has historically had two major advantages over many alternative renewable energy sources: It is cheaper and easier to transport. Even with rising oil prices, it remains comparatively cheap today.

The Electric Power Research Institute predicts that in 2015, wind energy will cost nearly one-third more than coal and 14 percent more than natural gas. Solar thermal electricity, the institute says, will cost three times the price of coal and more than twice the price of gas.

On the other hand, rapidly improving technologies are advancing the possibility of cheaper renewable energy in the future, while fossil fuels are becoming more scarce and expensive. The global research director for General Electric, Mark M. Little, predicts that solar power may be cheaper than fossil fuel energy and nuclear energy within three to five years. Thus, the price ratio of renewable and traditional energy goes down, opening new opportunities for developers of renewable energy.

Although renewable energy production also creates negative externalities (wind farms cause noise, lower real estate prices in surrounding areas, and harm birds and fish), their scope is much smaller than those caused by the generation of non-renewable energy.

In addition, if landowners are compensated for the use of their land by renewable energy producers (i.e. wind farms), the size of the compensation offers a good estimate of social costs. In this way, negative externalities are corrected because renewable energy prices reflect the true costs related to its generation.

In order to help decrease dependence on fossil fuels and address other energy concerns, the U.S. government is increasingly interested in renewable energy policies. The most frequent target of these policies is the electric power industry, which uses 38.3 percent of the total U.S. energy supply and more than half of the renewable energy supply.

The Renewable Portfolio Standard (RPS) is one of the most popular, and disputed, policies directed at the electric power industry.

The RPS requires companies to produce a certain percentage of their electricity from eligible renewable sources or to use renewable energy credits according to a specified schedule. As of March 2011, 29 states, along with Washington, D.C., have RPS requirements that are mandatory. Seven states have specific renewable goals, which, unlike RPSs, are not legally binding.

Critics of RPS policies dispute their effectiveness, particularly on the national level. Michaels (2008) argues that a national RPS policy would be inefficient for pollution reduction because it “deals with only one of many sources of a pollutant”: the electric power industry. Rossi (2010) argues that the difference in states’ natural resources endowments would create different costs and benefits of RPS implementation, since some states would have more favorable natural conditions for renewable energy production than others.

It’s true that a national RPS policy would arbitrarily set fractional goals for specific kinds of electricity generation. Such a policy would require that certain percentages of total energy production be generated from wind, solar, or biomass, without taking into account the differences in natural conditions between states. For some states, investments in specific renewable energies would be more costly than other measures of pollution reduction (such as energy efficiency), and thus, not effective.

But the data suggests that RPS policies can have a significant impact on renewable energy deployment if they have adequate enforcement mechanisms—specifically, established penalties for underachieving established fractional goals. Penalty features should be included in any RPS design to make it a strong and effective instrument of developing renewable energy.

To comply with the national RPS, these states would have to pay penalties or to buy renewable energy certificates from those states that are better endowed with natural resources—causing wealth redistribution from states with fewer natural resources to states with greater resources.

By contrast, setting RPS policies at the state level allows each state government to consider local natural conditions and to create incentives to develop the least expensive and most effective renewable technologies.

Cory and Swezey (2007) argue that RPS policy could be effective at the state level if it included "noncompliance penalties, either in form of fines or an alternative compliance payment." This would distinguish strong RPS policies from weak ones that allow "ambiguous RPS regulations or definitions" and "frequent or major rule changes," and have "weak enforcement mechanisms."

From 2003 to 2009, only 18 states had active RPS policies that both established certain fractional goals and required compliance to those goals. However, on a yearly basis, just 40 percent of those states fully achieved those goals. Among these 18 states, 46.2 percent achieved 95 percent of the set goals, while 50.2 percent of the states met 90 percent of the goals.

To better enforce compliance, most of the 18 states have established penalties or alternative compliance payments. These have to be paid when a company does not achieve its RPS requirements either through energy production or through purchases of renewable energy certificates from other generators.

On average, the penalty was $27.93 for each megawatt hour of renewable energy that a company fell short of meeting its RPS, but the range is considerable. Some states have penalties as high as $40 to $63 per megawatt hour; others did not have penalties. (A megawatt hour is the amount of energy consumed if one million watts are used for one hour, or if one watt is used for one million hours.)

Empirical results show that penalties have a significant impact on the probability that a given state will comply with its RPS target. A $1 increase in the penalty (say, from $50 to $51 per megawatt hour) raises the probability that a state will comply with its RPS compliance by 48 percent.

With that penalty increase, the percentage of states achieving full compliance with RPS policy goals would increase from 40 percent to 59.2 percent—a very significant result. Similarly, an increase of one more dollar per megawatt hour raises the probability that states will comply to 95 percent of RPS goals to 49.5 percent from 46.2 percent. The probability that states will comply to 90 percent of RPS goals goes to 61 percent up from 50.2 percent. Across the board, higher penalties produce better compliance.

States with higher levels of carbon dioxide pollution are also more likely to comply with RPS policy goals. From 2003 to 2008, the average pollution level in the 18 observed states was 125.74 million metric tons of carbon dioxide. The least polluted states had 10 million metric tons, while the most polluted had 402 million metric tons.

All other factors being equal, one million metric tons more of carbon dioxide pollution increases the probability that a state will fully comply with its RPS policy from 40 percent to 43 percent. These results

indirectly confirm that states that choose to adopt RPS policies are driven by environmental concerns, along with other reasons.

The impact of RPS policies on investments in renewable energy, employment, and pollution level is yet to be estimated. But there is no doubt that RPS policies can be used in conjunction with other policy instruments to decrease U.S. dependence on energy imports and fossil fuel production and to help the country move toward a more sustainable future.