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# A National Clean Energy Standard: Insights from the States' Experiences

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## Summary

President Obama has proposed a national "clean energy standard" of 80 percent clean electricity by 2035. The experience over the past 15 years of those states that have adopted renewable portfolio standards illustrates the inherent complexity of moving the country toward a national energy standard. Issues include inconsistent or non-existent policies among the states, the appropriateness and efficiency of specific policy approaches, and the effectiveness of energy standards in increasing alternative energy sources or decreasing reliance on fossil fuels.

## A National Clean Energy Standard

In his January 25, 2011 State of the Union address, President Barack Obama encouraged Congress to establish a clean energy standard. This national standard of 80 percent clean electricity by 2035 – note that "clean" is arbitrary and likely controversial since it is not based on lifecycle environmental assessments, but intends in this context to include all renewable energy resources, as well as nuclear, coal with carbon capture and storage, and efficient natural gas – has the potential to secure a globally competitive position for the U.S. in the field of advanced energy resource innovation.

Many will note that the President's proposed energy standard, although not a new policy option discussed among policymakers, is of a different tune than the climate policy strategy that the White House sang back in 2009, when a carbon cap-and-trade program was, albeit arguably, a conceivable bipartisan policy option. Indeed, with the failure of all six introduced comprehensive energy or climate bills* to pass the House or Senate during the 111th Congress (2009-2010), and the resignation in 2011 of Carol Browner, the senior climate and energy policy adviser to President Obama, a national clean energy standard (CES) may be the only politically palatable policy option to target greenhouse gas (GHG) emissions, market innovation, and other U.S. economic and geo-political energy concerns.

The U.S. has had the opportunity to gather insights on the performance, strengths, and limitations of energy standards. More than half the states have adopted a similar policy, referred to most commonly as a renewable portfolio standard (RPS; hereafter, "RPS" refers to state portfolios and "CES" refers to the proposed national standard), over the past 15 years. While the exact design of the policy varies from state to state, the general structure of the policy is a mandate that a specific percentage of total electricity must be sourced

*Includes the American Clean Energy and Security Act of 2009, the Clean Energy Leadership Act of 2009, the Clean Energy Jobs and American Power Act of 2009, the American Power Act (2010), the Carbon Limits and Energy for America's Renewal Act (2009), and the Practical Energy and Climate Plan (2010).

by renewable energy by a specific terminal year. For example, North Carolina's RPS, adopted in 2007, requires 12.5 percent of all investor-owned retail electricity sales to come from renewable energy. To put this percentage mandate in perspective, as of 2009 the U.S. sourced roughly four percent of total electricity from non-hydroelectric renewable energy, compared to two percent in 1995, at roughly the beginning of the RPS adoption trend. This paper reviews some of the states' RPS experiences, and discusses implications of these findings as they relate to a possible national CES.

## Is an Energy Standard the Best Tool for the Job?

The choice of policy instrument for a specific issue depends on the market failure policymakers seek to correct, and the policymakers' objective(s). When the market failure is GHG emissions due to the market's failure to accurately price the true societal costs of these emissions, and the objective is to price carbon in the most efficient manner possible, the best tool for the job is a carbon policy, either a carbon price or a cap-and-trade program. Alternatively, when the market failure is the limited ability of alternative energy technologies, such as solar photovoltaics, to compete with more conventional sources of energy, such as pulverized coal, and the objective is to increase the market diffusion and reduce costs of these alternatives so as to pave the way for an eventual technological market transition, the best tool for the job is a policy that targets energy technology innovation and early market adoption. Policy options include, but are not limited to, financial support for research and development and subsidies of various kinds, such as feed-in tariffs or volume-limited tax credits. Some would also include portfolio standards as viable technology policies. Once the targeted technologies mature and reach adequate market penetration levels, these policies need to be phased out and allow the market to perform competitively.

These different policy instruments may also be used together to target multiple policy issues at once. Such is the case in the UK, which has a mandatory renewable energy target and also participates in the European Union Emissions Trading Scheme. As is often the case, however, carbon policies, particularly carbon taxes, are more difficult to pass, even when the market failure is GHG emissions; and renewable energy policies, such as a portfolio standard, are more politically feasible due to their less explicit price tag in the short-run, and the incentive nature of the instrument, as opposed to the "stick" nature of a tax.

Even when an energy standard is less efficient and potentially more costly than a carbon policy, but the standard is adopted because it is more political acceptable, it is possible to increase or improve the efficiency of the policy with the inclusion of flexibility mechanisms. Possible energy standard flexibility mechanisms include the allowance of renewable energy credits (RECs**) to help producers comply with standards in the most cost-effective manner, as well as REC trading, banking, and borrowing of credits over time. Whether a national CES is adopted to target GHG emissions or energy technology innovation, or both, it will still be desirable to ensure that the policy is as efficient as possible. The use of flexibility mechanisms can improve such efficiency.

## The Renewable Portfolio Standard Landscape

No two states' RPS policies are the same. Not only do different states' RPS designs demonstrate wide variation in renewable energy percentage mandate, but RPS policies also vary according to which entities must comply; whether RECs are allowed; whether the energy must come from in-state development or, if out-of-state REC purchases are allowed, which resources are RPS eligible; whether specific energy resources are required; whether the policy is binding; and how or if a non-compliance penalty is applied. Some states, including West Virginia, Ohio, Pennsylvania, and Michigan, allow for "clean" energy, not just renewables and, therefore, these states' RPS policies more closely resemble the proposed national CES in the category of resource eligibility. There are also many states with no standards at all, such as the majority of Southeastern states. This variation in design means that some states have far more stringent and rigid policies than others, and presumably will experience greater rates of renewable energy development on average than states with weaker, voluntary, or no standards.

In light of the inconsistency of the RPS policy landscape across states, and the uneven resulting renewable energy development, by the time that the national CES is passed – with the assumption that it is passed at all – the ability of different states to comply with the national policy will also be quite inconsistent. Some states that have either already experienced significant wind energy development as a result of its state's RPS, or developed new renewable energy to sell into neighboring states' REC markets, will find it easier to comply with a national mandate than a state with no RPS and little REC market activity. As an aside, it is also important to note that states with significant coal generation will find it more difficult to comply with a CES than states with heavier mixes of nuclear, natural gas, and renewable generation.

There are other implications of this variation in design for a national CES. In particular, it is important to consider that different

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**One REC is the equivalent of one MWh of renewable generation, which utilities can purchase from other power producers.

policy design features can make a standard more or less stringent. If it is desirable to fully comply with the 80 percent CES, then it will be important to ensure that all policy design features support this mandate through the use of binding and non-bypassable targets, trading, limited exemptions, and penalties for non-compliance that are enforced and above the market clearing price for RECs.

## Beggar Thy Neighbor?

The energy policy literature is just beginning to detect trends associated with the energy trade interactions among states as a result of inconsistencies in policies across state borders. One such trend is the development of renewable energy generation in states without RPS policies for the sale of RECs to states with RPS policies. The state of Indiana, for example, has one of the fastest-growing wind energy markets in the U.S., with 1,339 MW of capacity by 2010. Indiana has no RPS policy but is able to sell the RECs associated with this generation to surrounding states with RPS mandates, including Illinois, Ohio, Michigan, and Wisconsin. These conditions leave little incentive for Indiana to adopt a binding RPS policy of its own, and great incentive to free ride off of its neighbors' policies. States in this situation may either avoid RPS legislation entirely or adopt voluntary standards as a symbol of support for renewable energy market development. When RPS-avoidant states are heavily dependent on carbon-intensive electric generation, such is the case for Indiana, free ridership allows these states to profit off of surrounding states' regulations without addressing its own generation mix or GHG footprint.

A second and somewhat related trend is the incidence of carbon leakage. Leakage is the export of carbon-intensive electric generation from a state with an RPS to a state without an RPS. An RPS policy can create excess carbon-intensive generation if renewable energy replaces a portion of an existing load; the price of that excess generation then drops and surrounding states, especially those without RPS mandates of their own, will purchase and import the carbon-intensive generation so long as it is cheaper than their own generation. The degree of carbon leakage present in the U.S. as a result of inconsistency of RPS policies across state borders is not yet measured. Assuming that a state adopts an RPS policy only to increase renewable energy and diversify its generation mix, carbon leakage is a tangential issue; if, however, a state adopts an RPS with an objective to reduce GHG emissions, than leakage may be a valid and important policy concern.

This article does not attempt to take sides on whether a national CES is a good approach or not, but if politicians want to pursue a CES policy, both of these trends indicate that a national approach allows for policy coordination that a fragmented state approach does not. So long as electric utilities continue to operate within a patchwork of different state RPS regulations, free ridership and carbon leakage will continue to attenuate the renewable energy and GHG abatement potential of RPS policies. These trends also underscore the importance of a national CES that applies consistent standards across states,*** so as to minimize free riding and leakage, but with sufficient policy flexibility that states can reach their mandates in the most cost-effective manner possible.

## Winners and Losers

RPS policies are designed to encourage renewable energy development, and lead to market penetration rates that render these technologies cost-competitive, as well as institutionally embraced and well integrated into the supporting infrastructure. One might expect, therefore, that states' RPS policies are precipitating the development of solar, wind, biomass, and geothermal energy. But, in reality, roughly 94 percent of all RPS-related capacity additions between 1998 and 2009 was sourced from wind. Solar only made up 1.5 percent of new additions, biomass 3 percent, and geothermal 1.4 percent.

In recognition of the uneven cost characteristics between wind and other renewable resources, several states have built "set-asides" into their RPS legislation. A set-aside requires that a specific amount of the total RPS mandate come from a certain resource. For example, North Carolina's RPS legislation requires that 0.2 percent of all retail sales must come from solar energy, 0.2 percent from swine waste, and 900,000 MWh from poultry waste. The impetus for set-asides is to create an extra market boost for energy resources that are at a cost disadvantage, but still demonstrate potential as a viable energy option due to a state's resource endowment or manufacturing base. The use of set-asides, however, may decrease the efficiency of the policy, since instead of creating flexibility in the achievement of RPS mandates, it makes mandates more rigid and will likely increase the costs of compliance. Also, if the ultimate intent of a set-aside is to help a resource become cost-competitive with wind and other conventional energy resources, set-asides that only mandate modest amounts of a specific resource may not encourage any real or substantive market development, and will only increase the costs of energy standard compliance. If a state or the national government, therefore, decides to use set-asides for resources such as solar energy, it should consider mandating set-

***It is possible that the CES will allow states with binding mandates to keep their own RPS benchmarks, so long as these benchmarks are higher than the national mandates. In this case, there will still be inconsistency in standards across states but with a consistent mandate floor.

asides that are ambitious enough that it actually encourages new market activity and affects the long-term cost-competitiveness of solar, so as to offset the loss of efficiency and extra short-run cost.

State RPS policies are leading power producers to pursue the most cost-effective, technologically viable wind development first. Once the bulk of this low-hanging fruit is tapped, however, market participants will need to transition to more expensive sources to meet state and, perhaps eventually, national standards. An important question is who will foot the bill? Those states that already have significant wind development from their own RPS policy or surrounding states' REC markets will find it easier to comply with national standards; those states that have little to no renewable energy development, such as several states in the Southeast, will likely have to invest in more expensive forms of renewable energy, and at a rate that exceeds that of states with RPS and REC market experience.

## More Renewable Energy or Less Fossil Fuels?

While there is no doubt that state RPS policies effectively increase renewable energy generation on average, several researchers have found that an RPS is either ineffective or inefficient in achieving other outcomes, including reduction in electricity demand, fossil fuel generation, or GHG emissions. Some states' RPS policies include specific mandates for energy efficiency; in the absence of such a mandate, however, there is little incentive for a utility to encourage its customers to use less electricity, especially if the utility needs an increase in demand to match the increase in supply from the RPS-induced renewable energy. No state has an RPS policy that specifically mandates a reduction in fossil fuel generation or GHG emissions in conjunction with its renewable energy mandates. Assuming that RPS- or CES-induced renewable energy replaces fossil fuel generation, then it is reasonable to assume that GHG emissions will decrease as a result of energy standards. Yet it is not always the case that states simply replace one for the other: Some states use new renewable energy to satisfy increasing demand and still dispatch existing sources; other states build new renewable energy and export excess generation over state lines, as discussed above; and some use roughly the same amount of existing energy but buy RECs to satisfy compliance benchmarks.

Returning to the first topic above, if the policy objective is to increase renewable energy – and possibly also to experience economic development benefits from the manufacturing, installation, or operations of the new facilities – an energy standard is a viable option. But if the objective is to reduce GHG emissions, retire carbon-intensive fossil fuel plants, or even reduce energy demand, then an energy standard may not be the best tool for the job. A national CES with coordinated and consistent mandates will improve the ability of an energy standard to accomplish these secondary objectives, since it will reduce the incidence of free ridership and carbon leakage, and hold all states responsible for satisfying a portion of their electric load with alternative energy. Other mechanisms that the government may consider to help additionally achieve these secondary objectives include: (1) building into the CES legislation specific mandates for GHG emissions and fossil fuel generation, or demanding reduction in both or (2) passing the CES in conjunction with other energy policies that specifically target these other objectives.

## Conclusion

States' experiences with RPS policies can shed light on possible strengths and limitations of a national CES. As President Obama and the 112th Congress consider an energy standard more extensively, the need to revisit these RPS lessons will become increasingly more important, so as to ensure the greatest efficiency, flexibility, and achievability of the proposed energy policy.

### Further Reading


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