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Putting a floor on energy savings: Comparing state energy efficiency resource standards☆

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ABSTRACT

Energy efficiency resource standards (EERS) refer to policies that require utilities and other covered entities to achieve quantitative goals for reducing energy use by a certain year. EERS policies generally apply to electricity and natural gas sales and electricity peak demand, though they also cover other energy sources in Europe. Our study aggregates information about the requirements of existing EERS policies for electricity sales in the United States. We convert quantitative goals into comparable terms to compare the nominal stringency of EERS programs across states. EERS programs also differ in their nonquantitative requirements, including flexibility measures; measurement and verification programs; and penalties and positive incentives. We compare the U.S. policies to similar policies in Europe and discuss important policy issues, including exogenous changes in fuel prices and issues with utility management of energy efficiency programs.

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1. Introduction

Out of concern for environmental harm, climate change, and the expense of generation and transmission capacity to meet peak demands, governments have been looking at a wide range of policies to change the amount of energy we use and the portfolio of fuels used to generate it. Among the policies that have been considered are carbon taxes, marketable emissions permit (cap-and-trade) programs, renewable portfolio standards (RPS) and clean energy standards (CES), real-time retail electricity pricing, demand response programs (such as critical peak period rebates or utility air conditioner controls), and programs to promote energy efficiency (i.e., the use of equipment and appliances that use less electricity or gas to provide a given level of service). One type of policy receiving increased attention, particularly at the state level in the United States but also in Europe, is the energy efficiency resource standard (EERS). We describe the individual standards in more detail below, but in general, EERS programs consist of mandates to reduce the use of electricity and natural gas by some prescribed percentage or amount, by some prescribed time (Nadel, 2006). Twenty states have adopted EERS programs. Maryland's EmPower program, for example, envisions reducing electricity use per capita by 15 percent of 2007 levels by 2015 (Maryland Energy Administration, 2008).

State statutes and public utility commission orders that establish or implement EERS policies cite a largely homogenous list of reasons for enacting the standards. Common rationales include: environmental and public health benefits, green jobs creation, deferment of electricity infrastructure improvements, greenhouse gas reductions, energy savings, reduced reliance on fossil fuels, and energy security. For example, the 2006 California Assembly Bill No. 2021[1] states that, "Expanding California's energy efficiency programs will promote lower energy bills, protect public health,

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[1] Assembly Bill 2021, California Statutes of 2006, chapter 734.

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improve environmental quality, stimulate sustainable economic development, create new employment opportunities, and reduce reliance on imported fuels."[2]

We take a close look at different features of the EERS policies for electricity that have been adopted in the states. We assess the relative stringency of different state policies; the role of different flexibility mechanisms; approaches to evaluation, measurement, and verification; and penalties for noncompliance. We also describe the differences in regulatory incentives for utility efficiency programs. To facilitate comparison of policy stringency across the states, we translate each state's nominal EERS policy goal into comparable annual energy savings and compare this goal to the state's covered and total energy sales. We also briefly survey similar policies in Europe, highlighting the ways in which they differ from U.S. policies. Further, we discuss a number of important implementation challenges, including interactions with other policies, effects of exogenous fuel and electricity price changes, and advantages and disadvantages of implementing the policy through utilities.[3]

States vary substantially in the stringency and flexibility of their EERS policies, but in general we found the EERS policies to be quite stringent. The policies require reductions on average equal to 12.7 percent of covered load and 11.5 percent of total state load. These values are well in excess of past energy efficiency requirements, though within the range of energy savings from energy efficiency programs expected over the next decade by experts in the field.[4]

States also vary in the flexibility of their policies. Currently, 13 states explicitly allow one or more of a broader set of efficiency investments beyond those that target reductions in customer use of electricity to be eligible for compliance, but only two states allow efficiency credit banking. Seven states have explicit penalties for noncompliance, and an additional ten states have financial rewards for compliance that create implicit penalties at the margin. In virtually all cases, EERS standards require the energy efficiency programs used to produce energy savings to pass a cost benefit test where the benefits of savings depend on the costs of producing electricity. As a result the effects of EERS policies are potentially sensitive—in unexpected ways—to changes in the underlying economics of electricity supply. Last, the role that regulated utilities should play in the provision of energy efficiency services is debatable. The current practice in many states of relying primarily on regulated utilities to deliver energy efficiency services may be more the result of political considerations than of economic efficiency.

Although we focus our empirical analysis on electricity use EERS policies, we expect that our methods will apply in the electricity peak demand and natural gas use settings. We hope that this exercise provides a basis for further research, particularly in testing the effectiveness of EERS policies and comparing them to other energy and environmental policies. These two challenges are particularly formidable as many of these programs are new. In addition, because states do not choose to adopt EERS policies at random, empirical testing of their effects becomes significantly more difficult. This review should be of interest, not just to other states that are considering the adoption of EERS programs, but also to the federal government, which might look to an EERS as an alternative to politically infeasible emissions tax or cap-and-trade programs.[5]

2. Overview of state EERS policies

A number of states have adopted a variety of policies that seek to incentivize or mandate energy efficiency by setting broad-based goals or targets. For the purposes of this report, we define an EERS as a legally binding numeric target for energy use reduction stated in either percentage or quantity terms. Not every energy efficiency policy counts. For example, a state that has energy efficiency goals but no entity or group of entities that is legally obligated to meet those goals does not have an EERS. Similarly, any state that has defined an EERS but not provided funding nor required obligated entities to fund the projects, does not have a legally binding policy and thus is not included.[6] Also, we do not include states, such as Nevada, North Carolina, and Connecticut, that allow energy savings from efficiency investments to earn credit under the state RPS, but do not have a separate, multi-year energy efficiency policy. Sciortino et al. (2011) and other policy databases classify Maine, Oregon and Texas as having an EERS; however, because the states do not have a legally binding energy savings goal, we exclude all three from our list.[7]

Based on this definition, 20 states have EERS policies for electricity. EERS policies are typically specified for energy (electricity and/or natural gas) use, and sometimes for reductions in peak electricity consumption; we focus on EERS policies targeting electricity use. A list of states with EERS policies for electricity use overall, with their adoption years, is shown in Table 1.[8]

Among electricity use EERS policies, perhaps the most salient feature is the required reduction in electricity use. To understand and compare required reductions across EERS programs, we need to define some terms. The *reference case* is our estimate of the amount of electricity that would be used in a given year but for the EERS. The *basis* is the quantity from which a percentage reduction is calculated. Different terms are necessary because the percentage reduction is not calculated against the reference case. For example, in Maryland the goal is to reduce per-capita electricity use in 2015 by 15 percent of the amount of electricity used in 2007. In our terminology, the amount of electricity that would have been used

[2] Many other states offer similar policy rationales. For example, New Mexico's Efficient Use of Energy Act states that, "cost-effective energy efficiency and load management programs undertaken by public utilities can provide significant reductions in greenhouse gas emissions, regulated air emissions, water consumption and natural resource depletion, and can avoid or delay the need for more expensive generation, transmission and distribution infrastructure."

[3] A companion paper (Brennan and Palmer, 2012) compares EERS policies to policies that directly address the problems motivating them and analyzes conditions for when an EERS will achieve optimal outcomes in the face of changing demand—an issue arising because the typical EERS is a floor on energy efficiency, not a cap on energy use.

[4] Sciortino et al. (2011) also categorize and compare EERS policies across U.S. states. We have consulted extensively on our results with Sciortino et al. in the preparation of this report and compare our results directly to theirs and discuss the reasons for differences in Appendix B.

[5] In June 2009, the U.S. House of Representatives passed the American Clean Energy and Security Act (generally known as the Waxman–Markey bill), which included cap-and-trade provisions for carbon dioxide. This legislation did not pass the Senate, and prospects for passage of similar legislation in the current Congress appear minimal. Concern over deficit reduction and the desire to hold down or lower tax rates in other parts of the economy may spur consideration of carbon taxes. The Environmental Protection Agency has issued proposed regulations on emissions of CO_2 from new power generators and is expected to promulgate regulations of existing sources as well (*Bloomberg BNA Daily Environmental Report*, 11/8/12, 11/14/12, 11/16/12).

[6] Wisconsin is the best example of this situation. The state passed a funding increase for EERS programs in December 2010. However, that increase was revoked in the 2011 Wisconsin Act 32 of the 2011–2013 Biennial Budget Act, effectively forcing utilities to only maintain existing programs.

[7] Texas has an EERS for peak electricity demand which requires utilities to report resulting reductions in electricity sales, but does not have a stand-alone binding standard for reductions in electricity sales.

[8] Washington State has an EERS, but we were not able to gather sufficient information to calculate its stringency. As a result, Washington State is not included in any of the remaining stringency calculations.

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