

# How a Clean Energy Standard Works

An Interview with Anthony Paul



In last year's State of the Union address, President Obama called for a clean energy standard (CES), a policy that imposes a national minimum level of electricity generation that comes from clean energy. The idea

has been proposed in various forms since 2010 and is similar to how existing renewable performance standards work in many states. The difference with a CES is that non-renewable but relatively clean technologies—most notably natural gas—can count toward the goal. Nathan Richardson, an RFF resident scholar and managing editor of *Common Resources*, talked with RFF Center for Climate and Electricity Policy Fellow Anthony Paul about the mechanics, costs, benefits, and viability of such a policy, most recently introduced by Senator Jeff Bingaman (D-NM) in March 2012.

**NATHAN RICHARDSON:** Can you describe the clean energy standard as it was proposed by Senator Bingaman?

**ANTHONY PAUL:** The clean energy standard, known as the CES, would set a floor on the fraction of total electricity production that has to come from clean energy. The floor would start at 24 percent in 2015 and rise by 3 percent per year up to 84 percent in 2035. The definition of clean energy is contingent upon the emissions rate of each

generator in the country. The benchmark level is 0.82 metric tons of carbon dioxide per megawatt hour of electricity production. A lower rate is a cleaner generator: renewables have a zero emissions rate, and coal plants tend to have a rate substantially above 0.82. In fact, 0.82 is a level approximately equal to what a brand-new, hyperefficient coal boiler would have. That's more efficient than almost or maybe all the existing coal plants out there now.

**RICHARDSON:** How does it work in practice?

**PAUL:** The program creates tradable credits. The rate at which credits are generated for production of electricity is relative to 0.82. If you have a rate of emissions of, say, 0.41, then you would generate half a credit for each megawatt hour of production. If you have a rate of 0, you generate a full credit. And if you have a rate of 0.82 or above, you would generate no credits.

**RICHARDSON:** Who has to comply, and how do they do it?

**PAUL:** The entities that have to be in compliance with this are the electricity retailers—local utilities that distribute power to customers. In 2015, if you are a local utility and you sell 5 million megawatt hours of power to your customers, then you will have to acquire credits equal to 24 percent of the 5 million hours that you sold. These credits are tradable, and they are separate

from megawatt hours. You could be a utility that buys all of your power from coal generators, and you would then have to buy the credits from another utility somewhere in the country. You are not required to have renewables yourself, you just must have the credits.

**RICHARDSON:** Around 30 states have renewable portfolio standards (RPSs) that require a fraction of electricity to come from renewable sources. Many will be quite stringent as they unfold over the next few decades. How does the CES compare and interact with state RPSs?

**PAUL:** With an RPS, there is no emissions rate threshold; it's much simpler. It's just technology based—for each megawatt hour of production, renewables like wind, solar, biomass, and geothermal earn a renewable energy credit (REC). There's a percentage target like under the CES, but the credits are just generated by renewables.

The two policies might be viewed as substitutes, but they are complementary as well. The key difference between the two is that an RPS doesn't cover natural gas or nuclear power, but a CES does. In this era of such low gas prices, an RPS tends to result in the displacement of new investment in natural gas with renewables. Under a CES, natural gas gets some credit, so instead we would get a switch from coal to gas as well as to renewables.

The state RPS programs are going to cause a significant increase in renewable generation over the next decade. If the CES is on top of that, it won't add to renewables, but there will be more gas and less coal and therefore fewer emissions.

That's the first-decade story. Beyond that, the CES targets get tighter, and credit prices rise. Also, the state RPS programs tend to ramp up quite a bit until 2020 and



not much after 2020. So after 2020, we find many more technologies involved in the swapping, including nuclear. By 2035 we would see substantially less coal, replaced by renewables, gas, nuclear, and reduced consumption. So through the first decade, the whole story is gas. After that, it's all these factors.

**RICHARDSON:** One criticism of these types of policies is that the technology to replace coal is just too expensive. Do you see costs coming down any time soon?

**PAUL:** Technologically speaking, we are going to learn, and it's going to get cheaper. But in the case of renewables like wind and solar, there's a countervailing effect in that the cost to build depends on the geography—there is a lot of variance between the great places and the good places. We will tend to build first in the great places, and then the cost to build will rise as we move to the good places. So you have two effects: the improvements in technology and the



increasing cost curve in terms of geography. In the case of wind, it turns out that the geography dominates, and we get rising prices.

Nuclear is interesting. It's actually quite hard to model new nuclear investments because what constrains them is not just the economics, it's the politics. We modify our models to reflect that political constraints basically make it impossible to build new plants right now.

**RICHARDSON:** How would this policy affect electricity prices?

**PAUL:** There are two different time frames in terms of electricity prices. For about the next decade or so, a CES would have virtually no effect. That's primarily because the target, the REC prices, and gas prices all will be low, and we won't be building much new infrastructure. For instance, the way gas is coming to the market is not through building new generators but in running the ones we have now.

After that, prices would rise by about 16 percent by 2035. Still, this is not a draconian bill. It would have limited effects on GDP—we're talking about fractions of a percent. And the benefit would be a 20 percent reduction in carbon emissions from the electricity sector through 2035. I would say that the costs are not all that great for such a meaningful reduction in emissions.

**RICHARDSON:** How likely do you think it is for the CES or a similar policy to become law?

**PAUL:** In the short term, it doesn't seem likely. Regardless, I think it's important we have this discussion now because it might be an argument that comes back up in this Congress or the next. So it's useful to further the understanding of how a policy like this would work. ●

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