



Helping America Win the Clean Energy Race

Innovating to Meet the President's Goal of 80 Percent Clean Electricity by 2035

Richard W. Caperton, Kate Gordon, Bracken Hendricks, and Daniel J. Weiss February 7, 2011

Introduction

America can lead again

President Barack Obama laid out a broad agenda for investment, innovation, jobs, and American competitiveness in his 2011 State of the Union. At the heart of the president's plan is an ambitious proposal to transform the nation's energy infrastructure away from the technologies we've been using for over 100 years—inefficient and polluting coal-fired power plants—toward new, clean energy sources.

The president challenged Americans to put our innovative spirit and entrepreneurial prowess to the test, asking us to fuel the engine of our economic recovery with a new generation of clean energy resources with the power to create jobs in U.S.-based industries, launch new businesses, and rewire our cities and rural communities with cutting-edge technology and state-of-the-art infrastructure.

Encapsulating this challenge is President Obama's call for a "clean energy standard" to produce 80 percent of our nation's electricity from cleaner energy sources by 2035. The president harkened back to President John F. Kennedy's response to Soviet space successes by launching a space race that challenged Americans to reach the moon within the decade. Americans rolled up our sleeves and met this challenge in eight years—and in so doing built an entire aerospace industry that has continued to foster American innovation and create jobs and exports to this day.

The race to produce clean energy as a source of economic competitiveness and innovation is at the heart of our generation's new "Sputnik moment." But President Obama's State of the Union address included a cautionary message as well, which citizens, entrepreneurs, and lawmakers must recognize as we prepare to meet the president's clean energy challenge. "The future is ours to win. But to get there, we can't just stand still," he told us. Instead, "clean energy breakthroughs will only translate into clean energy jobs if businesses know there will be a market for what they're selling."

Dramatically increasing the certainty and transparency of market demand for innovative, clean, and efficient technology is the first and most important step in ensuring that the U.S. remains a major player in these rapidly growing global markets. Without clear market signals here at home, domestic investment in clean tech will falter and we will cede potential American jobs and businesses to our global competitors. The sooner we make a commitment to build a domestic clean energy market, the sooner American innovation, entrepreneurship, venture capital, and advanced manufacturing skills can be fully unleashed.

Setting a clear and stable goal is essential to organize the American clean energy market, and focus capital investors firmly on innovation. For this reason, the Center for American Progress applauds the president's call for an 80-percent clean energy standard by 2035. In embracing this agenda, however, we emphasize that it is essential that such a policy builds a strong market for innovative clean energy technologies in order to foster the rapid expansion of the emerging American clean-tech industry. First and foremost, that requires a specific and separate target to ensure the growth of our cleanest electricity resources including energy efficiency, and wind, solar, geothermal, and other truly renewable electricity sources.

For that reason, we recommend that an 80-percent clean energy standard include a requirement that 35 percent of America's energy needs will be met by truly renewable energy and energy efficiency by 2035. This internal goal of "35 by '35" within the clean energy standard, will ensure the growth of strong markets for technologies such as wind, solar, sustainable biomass, incremental hydroelectric power, and geothermal energy, as well as the most effective solutions for reducing energy demand through energy efficiency. CAP believes strongly that such a target is essential for a strong and effective clean energy standard.

In addition, we offer in this paper five "design principles" that are essential for ensuring that a clean energy standard speeds the coming transformation of our nation's electricity grid to a truly sustainable mix of clean, efficient, and renewable energy, while realizing the jobs and economic promise of these emerging industries. As Congress and the Obama administration work to craft effective clean energy legislation they should ensure that any standard meets the following core principles:

- It must generate new, long-lasting jobs and grow the economy
- It must effectively spur development and deployment of renewable energy and energy efficiency technologies
- It must account for regional diversity in resources and electricity markets
- It must be simple and transparent, and minimize costs
- It must provide a floor not a ceiling for clean energy, strengthening and building on existing state leadership

To put these design principles into practice we will later in this paper introduce nine key milestones that should shape the design and development of a specific clean energy standard. If we meet the challenge of passing an effective clean energy policy for the nation, we can create jobs in American industries even as we cut bills for homeowners, safeguard public health and the environment, and improve our national and economic security.

Meeting the investment challenge

Over the past two years, the American Recovery and Reinvestment Act of 2009 provided substantial investments for clean energy innovation and deployment. The law provided funding for technology innovation at every stage from invention to commercialization to deployment. Case in point: It included funds for the Advanced Research Projects Administration-Energy, or ARPA-E, modeled after the Defense Department's DARPA program that invests in commercializing technologies necessary for our national defense. Just as DARPA provided the seed money that eventually led to the Internet, ARPA-E will help discover the clean energy sources that will eventually power our future, by providing money to scientists and fledgling companies doing research on groundbreaking technologies.

The American Recovery and Reinvestment Act also provided substantial tax credits and grants to renewable energy projects that rely on existing technology in wide use already in other countries, but (until the Recovery and Reinvestment Act passed two years ago) not deployed at scale yet in the United States. These programs brought America back into a leadership position on clean energy, and resulted in this country connecting more wind turbines to the grid than any other country during the peak year of 2009.

But these successes cannot continue without a strong signal that the U.S. government is fully committed to building a domestic market for clean energy technologies. Many new business plans were written with the expectation that Congress would pass comprehensive climate and energy legislation that would put a price on carbon pollution that levels the playing field for clean technologies to compete with coal and oil. This effort included a "renewable electricity standard" proposed by Sen. Jeff Bingaman (D-NM), which passed the Senate Energy Committee with bipartisan support. The RES would have required utilities to generate at least 15 percent of their electricity by wind, solar, and other renewable sources.

Unfortunately Senate Republican leaders blocked any energy legislation in 2010, just as the Recovery and Reinvestment Act funds began to run their course. The result: Cleantech companies now find themselves in a tight financial position, facing slackening market demand and a tightening supply of private-sector investment capital.

This is no way to build a modern industry. Already we have seen cutting-edge solar power manufacturing companies begin to close their doors, either permanently or to move to other countries with strong and dedicated clean energy markets. Evergreen Solar Inc., for example, recently announced plans to close its Massachusetts plant to put more funds into solar panel manufacturing in China. The company followed on the heels of SpectraWatt Inc. in New York and Solyndra Inc. in California closing some of their facilities. As General Electric Co.'s chairman and chief executive, Jeff Immelt, said at last year's ARPA-E summit, those countries with strong demand for renewable energy products will naturally pull these companies into their borders because "innovation and supply chain strength gets developed where the demand is the greatest."

Similarly, wind manufacturers in Iowa, once a state leader in this industry, are laying off workers as new orders fail to materialize. Leading global financier Deutsche Bank decided to move billions of investment dollars out of the U.S. clean energy market, and into China and Europe as soon as it was clear there would be no comprehensive climate and energy legislation coming out of the 111th Congress. China and our other economic competitors in Asia, Europe, and emerging markets are not waiting for America to regroup.

The home team can win the clean energy race

These stories share a common theme: investment dollars leaving the United States to be deployed among our global competitors who have fully embraced the economic and environmental imperative to enter a new era of cleaner, more sustainable and domestic energy. China is the most striking example. In 2009, even as the United States was installing more wind turbines, China driven by stable long-term demand for its products, became the world's largest manufacturer of wind power systems. It was already the world's largest solar manufacturer and developer of efficient nuclear and coal technologies.

But China isn't alone. Not by a long shot. Germany is not far behind in linking strong clean energy policies to market growth and manufacturing leadership, as the leading global manufacturer of solar inverters—a key part of solar power systems—and has made huge strides in energy storage solutions that will further accelerate the widespread adoption of renewable power. Denmark, Japan, and the United Kingdom are also global clean energy leaders with thriving domestic markets.

All these countries have comprehensive programs in place to spur robust and stable demand for low-carbon energy, which then creates a market for businesses to manufacture and install the technologies to meet that demand. Last June, China announced its plan to meet a renewable energy standard of 20 percent by 2020, matching the European Union's target. Germany has set a target of 60 percent by 2050. The country already gets 16 percent of all its power from renewables, well on its way to meeting this ambitious

goal, and some think it may reach 100 percent by 2050. Denmark has gone a step further, actually announcing its intention to become 100 percent independent of fossil fuels by 2050, something that at least one of its islands has already achieved. This occurred in a country that in 1970 was almost completely dependent on foreign fossil fuels.

These countries prove that strong clean energy standards build growing economies. But even more than that, strong clean energy standards are now imperative if we are to compete on the same playing field as China and Europe. America over the course of the 20th century took command of the Industrial Revolution and the communications revolution, and then led the world into the Information Age. It is time for us to lead the clean-tech revolution, too.

Today, others are beating us to the punch, not because we lack the technology and innovation to lead this new revolution, but because we are not providing the market signals needed for our private-sector entrepreneurs need to invest over the long haul. This clean energy investment gap is rapidly becoming the greatest threat to America's technology leadership.

Smart policy for strong U.S. electricity markets

Building on the pioneering renewable electricity or portfolio standards already in place in 30 states, a nationwide clean energy standard would provide much-needed certainty to electricity markets, utilities, energy investors, and state power regulators. With meaningful standards in place, these businesses could make smarter long-term planning decisions on engineering, capital budgets, and investment needs. But for a new generation of technology companies to grow up to meet the changing needs of this marketplace, any clean energy standard must be carefully crafted, setting a target that not only phases out older, more inefficient and polluting plants, but also accelerates the growth of diverse domestic renewable energy supplies to meet our changing energy needs.

President Obama proposed an 80-percent clean energy standard by 2035 to achieve these economic goals. We recommend that this program include a separate target for deployment of truly renewable sources, including wind, solar, geothermal, and wave technologies, as well as energy efficiency to reduce demand. A target of meeting 35 percent of our electricity needs by 2035 through energy efficiency and truly renewable energy sources would boost certainty for investors that there will be a market for these sources.

This "35 by '35" provision will provide an overall end goal for the economy and a predictable market for renewable energy and energy efficiency within that emerging demand for clean energy. The remaining 45 percent can be met by a mix of other low-carbon technologies - such as nuclear power, natural gas, and coal with carbon capture and sequestration - as well as renewable energy and energy efficiency.

Near- and mid-term goals for clean technology deployment and regionally determined targets will also be critical for shaping how real projects get planned, financed, and built in addition to a long term 25 year national standard. An 80-percent clean energy standard will send a clear signal that America is moving toward a new generation of power plants, but without more specific policies within that goal we will not create a vibrant American clean-tech industry.

Here's why. In the near term, the cheapest and easiest solution for reducing the emissions of our existing fleet of power plants will be to run existing natural gas plants more of the time while phasing out our most inefficient, dirtiest coal-fired plants. Over time, more coal-burning generators will be directly replaced, but with natural gas technology, not advanced renewable energy technologies. Although natural gas is one-third to one-half cleaner than coal, relying on gas alone is not a recipe for cleaning up our skies or reducing vulnerability to fluctuating fossil-fuel prices. After all, natural gas is very cheap today, but it cost three times as much just two years ago. Price stability will only come from a balanced and more diverse portfolio of investments in new energy technology.

What's more, a new array of natural gas-fired power plants will not power a new, innovation-led renewable energy industry able to rival China or the leading European clean energy producers. What will drive economic innovation and job creating investment, is our "35 by '35" target. This standard should be met by requiring a national target of 25 percent renewable electricity generation alongside a requirement that utilities reduce demand to save energy by 10 percent.

Flexibility should be given to individual states to vary these targets to account for their local energy market characteristics. Regional flexibility within a strong national framework will allow each part of the country to realize its own economic potential while ensuring that the 35 by '35 target is achievable on a national scale.

Design principles and milestones for an American clean energy standard

Moving forward, the president and Congress need to work together to create a clean energy standard that captures all of the economic benefits of clean energy. Practically speaking, the new standards must be structured in such a way that they will gain the support of both Democrats and Republicans from every region of the country. To achieve this broad-based support, and meet the test of effective policy, the Center for American Progress believes that a well-structured clean energy standard must have five essential characteristics:

- It must generate new, long-lasting jobs and grow the economy
- It must effectively spur development and deployment of renewable energy and energy efficiency technologies

- It must account for regional diversity in resources and electricity markets
- It must be simple and transparent, and minimize costs
- It must provide a floor not a ceiling for clean energy, strengthening and building on existing state leadership

These core “design principles” are now evident in existing clean and renewable energy standards now in place in more than 30 states. These examples from the states should be emulated and built upon to learn from the track record of past experience as we design an effective national clean energy standard.

To put these overarching design principles into practice, we offer here nine “milestones” for an effective clean energy standard. These more detailed criteria for effective policy illustrate how the design principles could be put into practice. This list is not exhaustive, but it is offered with the intention of beginning in earnest the national debate on how to implement the president’s call for an immediate transition to a working low carbon economy. Each of these core milestones must ultimately be clearly addressed within any new national clean energy policy.

Create a specific tier for renewable and energy efficiency resources

Renewable energy and energy efficiency have unique economic benefits over other clean energy sources in building emerging domestic industries and expanding investment in construction jobs. The reduced fuel costs stabilize energy prices and protect household budgets from volatile fossil fuel prices, and they improve our national balance of trade by reducing energy imports.

Further, it is important to recognize the value of energy diversity in our fuel mix to avoid over reliance on any single source of energy based on current short term market pricing. Therefore, any clean energy standard should be designed to provide for tiered resources, with an internal target for a first tier of resources including renewable energy and energy efficiency, as well as second tier for non-renewable but clean energy like nuclear and coal with carbon capture.

Set a floor not a ceiling for clean energy deployment

A new national clean energy standard must not do any harm to the existing clean energy economy or interfere with successful state clean energy programs. The new standard should set a floor, not a ceiling, for using clean energy. States with existing stronger standards should be allowed, and even encouraged, to maintain and continue strengthening those standards to build thriving regional markets for clean and efficient energy.

Nine milestones for an effective clean energy standard

- Create a specific tier for renewable and energy efficiency resources
- Set a floor not a ceiling for clean energy deployment
- Preserve existing environmental safeguards
- Encourage early investment through near-term targets
- Remain technology neutral
- Encourage local economic development
- Recognize the different starting positions of the states on clean energy
- Allow regional variation based on differing renewable resources
- Minimize complexity and promote transparency in implementation

Policymakers should be explicit that the new federal standard does not pre-empt any existing state laws, and a national system of credits for clean energy should be designed to reward states that go beyond the national clean energy standard within their own electricity markets.

Preserve existing environmental safeguards

A clean energy standard will create jobs and economic growth, but it also meets the important public purpose of deploying clean energy projects to reduce pollution and protect human health and the environment. A clean energy standard is not a replacement for, but rather builds upon, the critical environmental laws of the past—a clean energy standard that launches clean energy projects complements efforts by the Environmental Protection Agency to set and enforce pollution reduction standards that cut pollution from power plants, oil refineries, and other sources.

This translates directly into health standards to protect against the pollution that causes asthma attacks, pollutes our waterways, and ultimately leads to 20,000 premature deaths each year, because a clean energy standard on its own will not immediately solve all of these challenges. The EPA's authority to police pollution must not be used as a bargaining chip to pass a clean energy standard.

Encourage early investment through near-term targets

There should be incremental near-term targets to make sure our country stays on track to meet an 80-percent goal in 2035. Short-term goals in the next 5 to 10 years will promptly create a market and certainty for investors, generating immediate investments and creating jobs when we need them most.

At the same time, these interim targets should not be so high that they perversely penalize projects that take many years to build. In particular, wind power that requires new transmission lines can take years to come on-line, and utilities may make less effective investments if their interim targets are too stringent. Striking the balance between near term certainty and the ability to plan for stronger targets over time will help consumers, businesses, and governments to make smart planning decisions for the future.

Remain technology neutral

Within the broad two tiered system outlined above, the federal government should promote simplicity and to the extent possible, let investors, states, and other market participants decide which renewable or clean energy sources to utilize. The overarching

federal policy should resist the temptation to create multiple specific carve-outs that mandate the use of certain technologies.

Electric utilities, for example, need the flexibility to choose from a broad mix of technologies that are most appropriate for their unique circumstances. The federal government should not tell utilities exactly which renewable sources of power to use to meet the 35 percent target, or which of the other low-carbon sources to use to meet the bigger 80-percent target.

Encourage local economic development

A national clean energy standard should encourage investments in local energy infrastructure. Alabamans will receive more local economic benefit from renewable energy in Birmingham, for example, than from power generated in North Dakota. And because electricity is regulated at the state level and often plays an important role in regional economic development strategy, these local benefits should be considered and encouraged within any national policy. The upshot: The clean energy standard should promote investment that creates jobs in the communities where the power is used.

Recognize the different starting positions of the states on clean energy

Some states already generate significant amounts of electricity from their plentiful clean energy sources, while others are still dominated by an older fleet of more inefficient and polluting power plants. States that have not seen a significant investment in clean energy, for example the coal dependent Southeast and the energy intensive industrial Midwest states, must not be disadvantaged or penalized by a clean energy standard.

For this reason, a national target should also allow significant state-by-state flexibility in its implementation. State public utility commissions should have significant authority to approve the least costly and most readily available renewable energy resources, and where appropriate allow for regionally differentiated targets, with higher percentages of energy efficiency or non-renewable resources such as nuclear power and carbon capture on fossil fuel plants.

Allow regional variation based on differing renewable resources

A new nationwide clean energy standard that encourages states to use locally-produced clean energy should also allow states to use the resources that are most abundant within their state.

This means that the clean energy standard should include a broad suite of eligible resources. Arizona should be able to use solar power, North Dakota should be able to use wind, Georgia should be able to use new additions of hydropower, and Maine should be able to rely on sustainably harvested biomass.

Minimize complexity and promote transparency in implementation

The trading of renewable energy certificates once clean energy standards are in place will reduce costs, bring much needed new sources of capital investment to finance projects, and lead to greater investments in states that already have thriving clean-tech industries or exceptional renewable energy resources. That's a good thing because it protects rate-payers by driving down costs and improving economic efficiency.

But a trading system also adds complexity to the design and operation of a clean energy standard. Additionally, the trading of these certificates requires strict government oversight to avoid any possibility of market manipulation or speculation. Therefore, a clean energy standard should balance the benefits of tradable permits, with measures that instead reward local efforts. The highly successful market-based acid rain program is an example of a successful system where trading is sufficient to meet the policy's goals at a low cost, but controlled enough to limit market manipulation by speculators.

Market demand, financing and infrastructure

These nine core clean energy standard milestones together represent a critical step forward in the race toward a cleaner economy, but it is not the only step we have to take. The Center for American Progress's research shows that clean energy needs three things to move forward: market demand, financing, and infrastructure. The president is appropriately focused on creating market demand, which is the most important of the three. But policymakers should not ignore the importance of financing and infrastructure.

Congress needs to also pass legislation that encourages research and development, provides needed capital to help breakthrough technologies reach the commercialization stage, and allows for the construction of necessary electric grid improvements to carry renewable energy. To that end, Congress should expand and extend the Advanced Energy Manufacturing Tax Credit; create a Clean Energy Deployment Administration and Energy Independence Trust; clearly define how new transmission will be built; set standards for smart grid technologies; and find a permanent solution to the challenge of using tax credits in project financing.

Conclusion

President Obama's 80-percent clean energy standard and our proposed "35 by '35" renewable energy goal, if developed properly, can usher in a new era of American innovation, entrepreneurship, and competitiveness. This paper outlines key concerns for ensuring that a national clean energy standard builds on innovative policies that have already created more dynamic energy markets in the states and in other countries. Hewing to the design principles outlined here can help American businesses, workers, and consumers navigate the fundamental transitions in energy and technology deployment that our country faces today. Successfully meeting this challenge will improve the competitive footing of the entire U.S. economy.

Today America faces a wide range of energy challenges: to our economic security, our global competitiveness, to homeowners' pocketbooks, and to the health of our communities. President Obama's ambitious but realistic goal of transforming the way we fuel our economy from outdated and inefficient technologies to clean and cutting-edge advanced technologies offers not only a safer and healthier future, but a better economic vision for America moving forward. A new national clean energy standard, if properly designed and executed, will help achieve many of these pressing goals, by boosting investment in profitable American companies and creating hundreds of thousands of jobs for American families, all while improving our environmental security and reducing our dependence on imported energy.

The Energy Independence and Security Act, the most recent clean energy law, had bipartisan support and was signed into law by President George W. Bush in 2007. A politically divided Congress and administration must once again set aside their political differences to meet this national challenge. A national clean energy standard that reflects these principles could go a long way toward building a more vital and growing economy to benefit all Americans.

Richard W. Caperton is a Policy Analyst with the Energy Opportunity team at the Center for American Progress; Kate Gordon is Vice President for Energy Policy at the Center; Bracken Hendricks is a Senior Fellow at the Center; and Daniel J. Weiss is a Senior Fellow and Director of Climate Strategy at the Center.