

Deploying Our Clean Energy Future

As for the future, your task is not to foresee, but to enable it.

— Antoine de Saint-Exupery

The United States and the rest of the world face a momentous choice. It is a choice that will determine the nature of our economies and our climate for generations to come. One option is to continue down our current energy path—relying to a substantial degree on fuels and technologies that will result in ever-increasing levels of atmospheric greenhouse gases (GHGs). The other option is to chart a new path—a path by which we protect the climate and rebuild our economies by developing and deploying clean energy technologies.

The choice is obvious: we must pursue a clean energy future.

The consensus among scientists who study the issue is that if we hope to avoid the worst effects of climate change, emissions of carbon dioxide and other GHGs must be reduced worldwide by 50 percent to 85 percent from 2000 levels by 2050. In order to do this, we must start now, and we must be aggressive.

Transitioning to a low-carbon economy in the time frame required will not be easy. If we remain on our current path without significant changes to the way we generate and use energy, global energy-related carbon dioxide emissions are projected to increase 39 percent by 2030. Over the next two decades, U.S. emissions, which currently account for about 20 percent of the world's total, will continue to grow. Meanwhile, emissions from developing countries are projected to increase by 40 percent. So, how do we create the impetus for broad, across-the-board emissions cuts while still meeting our goals for development and economic growth?

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Here is what we know. First, and most immediate, we know that a collection of market-ready technologies already exists that, accompanied by innovative policies, can start us down a more climate-friendly path and play a substantial role in reducing emissions. Second, we know that we need a low-carbon economy by mid-century. Third, we know that we cannot and will not achieve a low-carbon economy if we continue on a “business-as-usual” trajectory.

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Our challenge over the next decade is to chart a new path that leads to action on this issue across all sectors of the economy, from electricity and transportation to agriculture, manufacturing, and buildings. We need policies that trigger investment and propel new technologies into the marketplace. This means putting a price on carbon, such as through a

cap-and-trade system, and implementing complementary policies that create incentives to develop and use new technologies. The need for technological innovation is non-negotiable. To succeed, we need to take strong action that moves us away from the dirty fuels of the past and toward clean, safe energy sources to power our future.

THE NEED FOR POLICY CERTAINTY

Since the energy crisis of the late 1970s, the federal government has promoted clean energy alternatives in fits and starts. This inconsistency has kept many innovative companies from placing big bets on an uncertain clean energy future. Today, amid tough economic times, concerns about foreign energy supplies, and growing risks of climate change, businesses are looking to Washington to deliver long-term regulatory certainty in climate change and energy policy.

In testimony during the first House Energy and Commerce Committee hearing on climate change this year, CEOs of a dozen large industrial companies were unanimous in making the case that regulatory certainty is critical to unleashing substantial investment dollars. The CEOs said they will invest billions of dollars in the research, development, and deployment of new clean energy technologies—creating jobs and helping to rebuild the economy in the process—once they have clarity on the regulatory rules of the road.

“I believe that this may be the single greatest opportunity to reinvent American industry, putting us on a more sustainable path forward,” said DuPont Chairman Charles Holliday, Jr., regarding legislation on climate change and clean energy that passed the U.S. House in June. “A federal climate program has the potential to create real economic growth through innovation.”

Jim Rogers, president and CEO of Duke Energy, the nation’s third-largest coal-burning utility, said, “Long-lasting climate change legislation must be based on three equal tenets—protecting the environment, the economy, and consumers. The sooner Congress acts on climate change to provide the regulatory clarity business and industry needs to move ahead with major capital projects, the more rapid our economic recovery will be.”

Examples of past policy efforts offer good guidelines for providing this regulatory clarity. A 2003 Pew Center report looked at historical U.S. technology and innovation policies to see what lessons could be learned for addressing climate change. One of the key insights was that past government policies that go beyond R&D—to promote downstream adoption of technologies and learning by doing—have greatly influenced technological change.

For decades, the market for clean energy alternatives has lacked sufficient demand to promote the wide-scale supply and use of technologies required to reduce GHG emissions to the level that scientific findings demand. An economy-wide price signal on GHG emissions and consistent and substantial public investment in clean energy are key ingredients to ramping up these technologies. Policymakers face the challenge of employing a suite of innovative policy tools to craft an environmentally strong, cost-effective regulatory environment to induce significant private sector commitments in a low-carbon future.

INNOVATIVE POLICY SOLUTIONS

Just as there is no single technological solution to reduce GHGs, there is no one policy “silver bullet” for transitioning to a clean energy economy. Both strong inducements for technology development and deployment and strong emission reduction requirements are needed. In January 2009, the Pew Center joined with the other members of the U.S. Climate Action Partnership (USCAP) in endorsing a detailed framework for legislation to address climate change. As noteworthy as the contents of the framework were the constituencies that put it forward: a coalition of leading businesses and non-governmental organizations.

A decade ago, it would have been unimaginable for companies ranging from Alcoa and John Deere to Dow Chemical to agree on an agenda advocating federal action to achieve dramatic reductions in U.S. emissions. But the USCAP *Blueprint for Legislative Action* is part and parcel of a campaign that has engaged CEOs and other leaders of Fortune 500 businesses to become active and very visible supporters of climate solutions. Their plea for strong action and regulatory certainty on this issue has found a receptive audience in Washington and has provided a vital push for Congress.

The USCAP *Blueprint* calls for a federal cap-and-trade program that sets targets for GHG emissions and allows companies the flexibility to trade emission credits to achieve their targets. In addition, USCAP advocates complementary policies for many other efforts: technology research, development, and deployment; carbon capture and storage technology deployment; lower-carbon transportation technologies and systems; and improved energy efficiency in buildings,

industry, and appliances. These policies, including subsidies like tax credits or performance standards to speed deployment, can reduce the cost of low-carbon technologies and thereby accelerate the spread of emission reductions. The two approaches—the policy pull of cap-and-trade combined with the policy push for clean energy technologies—are more powerful in tandem than either one can be alone.

Federal policies limited to financial support for new energy advances have largely failed to produce meaningful results.

For example, the Synthetic

Fuels Corporation created under President Carter was quashed within six years by the Reagan Administration, which viewed it as unnecessary interference in the free market. The Synfuels Corp. was established to help create a market for domestically produced synthetic oil or gas made from coal, and from less conventional sources such as tar sands and oil shale, as an alternative to imported fuels. Designed to provide substantial subsidies to the private sector for commercial-scale projects, the initiative fell far short of its production goals.

More recently, the FutureGen project for carbon capture and storage was a major technology initiative under the George W. Bush Administration. FutureGen was set up as a public-private partnership to construct a near-zero emissions coal-fueled power plant. Later suspended under President Bush, FutureGen has been revived by the Obama Administration; a decision on whether to build the plant is expected to come in 2010. Whatever FutureGen's outcome, the years of delay in constructing a full-scale CCS demonstration plant underscore the shortcomings of a technology-only policy approach. Without support for technology R&D and a clear price signal on carbon, development and deployment of major new energy technologies is largely inconsistent and ineffective.

The businesses that are part of USCAP believe very strongly in the potential for

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strong policy to spur new investment in the climate-friendly technologies we need. Consider this comment from Tim Fitzpatrick, vice president for marketing and communications with FPL Group, the parent company of Florida Power and Light, which has become a leading generator of carbon-free electricity worldwide:

America's energy economy has already suffered from a lack of business certainty—simply witness the annual ritual over whether tax credits in support of wind energy will be renewed. Over the years, numerous wind projects have been put on hold while Washington dithers over whether to renew this vital support mechanism. . . . The lesson for U.S. policymakers is clear: Put a predictable price on carbon so that U.S. companies can invest with confidence.

Another perspective comes from George Nolen, president and CEO of Siemens Corporation, the U.S. subsidiary of Siemens AG:

Businesses need to plan. The absence of a price signal for carbon in the U.S. stifles planning and creates a competitive barrier to investment in technology.

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NO SILVER BULLET: THE TECHNOLOGIES WE NEED

Transforming the world's fossil fuel based energy system to one centered on low-carbon alternatives is an unprecedented undertaking. The fact is that no single technological silver bullet will be sufficient. The ultimate success of a climate change strategy—at both national and international levels—will hinge on the innovation and commercialization over time of a broad spectrum of technologies that can compete in a carbon-constrained world. That includes changes in how we produce electricity, how we get from one place to another, how we farm and manage our forests, how we manufacture products, and even how we build and operate our buildings.

A quick sector-by-sector overview illustrates the collection of market-ready technologies that, accompanied by innovative policies, can start the United States down a cost-effective, low-carbon path.

- In electricity, we need to improve efficiency while shifting the supply mix to lower-carbon energy sources, such as renewable and nuclear power and advancing carbon capture and storage to reduce emissions from coal combustion.
- In the transportation sector, we must focus first on using oil more efficiently, while making the transition away from petroleum-based fuels to running cars and trucks on electricity, next-generation biofuels, and hydrogen.

- In the building sector, which accounts for nearly 40 percent of U.S. energy consumption, more efficient building designs and equipment can deliver enormous energy savings without sacrificing comfort or quality of life.
- And, in manufacturing, we need to take a hard look at changing inputs, redesigning production processes, reworking the product mix, and, wherever possible, reusing and recycling products so they don't have to be produced again.

The low-carbon technologies available now, if deployed at a more rapid rate, would significantly reduce GHG emissions. But these technologies will not be enough. New breakthrough technologies will be essential for the world to meet its immense appetite for energy without endangering the global climate.

We have seen a certain amount of progress in all of these areas, but it's been largely hit-or-miss. Consider carbon capture and storage. Despite extensive planning, the United States has spent nearly a decade talking about but not building a commercial-scale demonstration plant with CCS. We need to provide producers with the incentives to build cleaner-burning plants as soon as possible—to bring down the costs of capturing carbon from conventional plants and to prove to policymakers, investors, and the public that large-scale CCS is an effective, safe technology.

Simply waiting around for these technologies to make their way from the laboratory into mainstream use is not an option. We don't have the luxury to sit and watch this process evolve ever so slowly, as if we're watching *American Idol* week after week to see who wins in the end. We need to speed the process along. Without picking winners, we need to enact policies that provide incentives to help commercialize new, viable technologies.

THE BENEFITS OF CLEAN ENERGY TECHNOLOGY

Developing and deploying these new technologies will have benefits beyond reducing GHG emissions. President Obama has stated very strongly that tackling energy and climate change will not only get the United States firmly on a path to economic recovery, but also will provide a new foundation for strong, sustainable economic growth. The economic stimulus package the president signed in February 2009 included more than \$80 billion in new spending and incentives for everything from smart-grid technologies to renewable energy development to energy efficiency improvements and mass transit.

Of course the White House is not alone in highlighting the multiple benefits associated with the development and deployment of clean energy technologies. Mayor John Fetterman of Braddock, Pennsylvania set out to debunk the notion that reducing U.S. emissions through a national cap-and-trade program would cause industrial communities like his to lose jobs. "People here desperately want to work, and a cap on carbon pollution will generate jobs in industries like steel," he wrote this year in *The Dallas Morning News*, noting that it takes 250 tons of steel to make a wind turbine.

The U.S. manufacturing sector would greatly welcome a shot in the arm. Its struggles began well before the recession hit, and the new products and processes needed to build the clean energy economy and address climate change will be a boon to many American workers. Representing 850,000 manufacturing workers, United Steelworkers President Leo Gerard believes that “addressing climate change and ensuring the strength of our nation’s manufacturing sector can be compatible goals.”

Many governors—both Democrats and Republicans—also recognize the great potential that energy technologies can play in turning around their states’ economies. In May, a bipartisan coalition of 27 governors signed an agreement supporting federal energy and climate change legislation that will help create clean energy jobs and industries and accelerate technology deployment. And nearly two-thirds of U.S. mayors believe that addressing climate change with technological innovation represents an “enormous” economic opportunity, according to a 2009 U.S. Conference of Mayors survey of 140 mayors from 40 states.

These calls for action to spur the deployment of new, low-carbon energy technologies are backed by a wide-ranging cast of clean energy economy boosters from *New York Times* columnist Thomas Friedman to businessman T. Boone Pickens. Supporting these views are growing signs of the economic opportunities that await leaders of a new energy future.

For instance, in a recent 10-year period, U.S. clean energy jobs grew nearly 2.5 times as fast as jobs overall. This growth rate, documented in a state-by-state analysis of clean energy jobs between 1998 and 2007 published this year by The Pew Charitable Trusts, demonstrates that good opportunities exist to spur new jobs, businesses, and investments in clean energy if supported by the right policies. Over the 10 years studied, clean energy jobs grew at a national rate of 9.1 percent compared to the 3.7 percent growth rate in traditional jobs.

Several other recent studies cite substantial job growth opportunities in clean energy. For instance, the *2008 Green Jobs Report* for the U.S. Conference of Mayors found that increasing renewable energy use and implementing efficiency measures could generate 4.2 million U.S. jobs by 2038 and account for 10 percent of total new job growth over that period. Private investors are well aware of this growth potential. In 2008, \$5.9 billion in private investment—15 percent of global venture capital investments—went to U.S. businesses in the clean energy economy. But this amount pales in comparison to the cost of transforming to a low-carbon energy system. The International Energy Agency estimates this transition will cost \$45 trillion globally between now and 2050. Major investments to drive the development and commercialization of new energy technologies largely hinge on implementing appropriate policies.

The opening letter to the Deutsche Bank Group report *Investing in Climate Change 2009* captured this critical need. Kevin Parker, global head of asset management for the group, wrote:

The aim must be to create a clear long-term regulatory regime that determines a market-driven cost of carbon while at the same time encouraging the development of alternatives. If governments recognize the necessity of creating the right regulatory environment, investors will recognize the opportunity and step in.

A growing number of parties—from senators and CEOs, to governors and venture capitalists—understand what’s at stake. They believe in the power of current and emerging technologies to reduce GHG emissions in the United States and around the world. At the same time, however, they understand that these technologies will not be deployed in the marketplace at the scale and in the time frame needed to address climate change without an explicit and unprecedented set of policies from government.

A new path is needed to reduce emissions and advance clean technologies across the economy. It requires a carbon price signal to help level the playing field for clean energy technologies combined with substantial, consistent public investments to propel critical solutions from the laboratory to the marketplace. The pull of an emissions price tag in tandem with the push from technology policies provide a solid framework for engineering a low-carbon transformation—without dampening the competitive ingenuity that is a key driver of the world’s most innovative economy.