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# Climate Change Legislation: A Full Suite of Technologies Is Essential For Emissions Reductions

As Congress considers climate change legislation to reduce carbon dioxide (CO<sub>2</sub>) and other greenhouse gas (GHG) emissions, the development, deployment, and funding of a full suite of “climate-friendly” technologies are critical to the success of a cap-and-trade bill. These cleaner-energy technologies are needed for electric utilities to meet the nation’s increasing demands for electricity in a carbon-constrained world. In order for electric utilities to make substantial long-term emissions reductions, legislative compliance dates for GHG emissions reductions must be harmonized with the availability of these technologies. Otherwise, achieving aggressive, near-term targets would impose abrupt and significant price increases on electricity consumers.

## A Full Suite Of Technologies Is Essential To Help Meet Growing Demand

The U.S. Energy Information Administration projects electricity demand will increase by at least 23 percent by 2030 as the U.S. population increases, the economy expands, and the use of electric technologies grows.<sup>1</sup> Meeting this growing demand while reducing GHG emissions will require an aggressive and sustained commitment to a full suite of climate-friendly technologies, including:

- energy efficiency technologies and measures, including smart grid;
- renewable energy resources;
- advanced coal technologies;
- carbon capture and storage (CCS);
- increased nuclear capacity and advanced nuclear designs; and
- electric vehicles, including plug-in hybrid electric vehicles (PHEVs).

Some of these technologies are currently available—albeit at a higher cost than conventional generation sources. Others are not yet available. All have different time horizons, but all are critical to our dual goals of reducing GHGs and maintaining a reliable, affordable electricity supply.

## Harmonizing Compliance Dates With The Availability Of Technologies Is Key

For any carbon policy to reduce GHG emissions effectively and to help reduce the cost increases to electricity consumers and the U.S. economy, the targets and timetables must correspond to the widespread commercial availability of technologies needed to reduce emissions. To help meet and mitigate rising electricity demand, electric utilities aggressively are expanding the use of renewable energy and energy-efficiency measures. Electric utilities also must be able to build more baseload generation—for power that is available around the clock—with new, cleaner coal-based power plants and new nuclear facilities. However, significant deployment of new nuclear plants is at least 10 years away, and CCS technologies are not expected to be commercially deployable on a widespread basis until around 2025.

To make significant short-term and mid-term emissions reductions without these technologies, electric utilities would be forced, over a relatively short period of time, to switch from using coal to using large

amounts of natural gas. Utilities would need to build many new natural gas generating facilities to provide baseload power. This massive fuel switching would constrain natural gas supply, driving up natural gas prices and exposing consumers to sharply higher heating and air conditioning bills. Likewise, industries that use natural gas would be less competitive in global markets, making it even more likely that U.S. jobs would be exported overseas.

Analysis recently conducted by the Electric Power Research Institute (EPRI) compared using a full portfolio of technologies to reduce GHG emissions in the electric power sector and using a limited portfolio of technologies. EPRI found that, with the full suite of technologies available, wholesale electricity prices would increase 80 percent from 2020 to 2050, relative to 2007 average costs. However, with only a limited portfolio of technologies available, wholesale electricity prices would increase 210 percent during this timeframe.<sup>2</sup> By harmonizing compliance dates with the availability of the full portfolio of technologies, Congress will help to protect electricity consumers and the economy from such severe price increases.

## The Challenges To Implementing The Full Suite Of Technologies

While these technologies will allow the electric utility industry to reduce emissions in the future, there are a number of challenges that will take time to address. One significant challenge facing many of the technologies is the need for substantial new funding to complete their research, development, demonstration, and deployment. The technologies also face other considerable challenges:

- **Energy-efficiency technologies** offer opportunities for both consumers and utilities to save energy. To make significant gains in this area, electric utilities are working to develop a “smart grid” with advanced meters and infrastructure systems—including new communications networks and database systems. However, high capital costs and regulatory uncertainty remain barriers to implementing these technologies. Properly addressing cyber security concerns also could pose challenges.
- **Renewable energy sources**, such as wind and solar, are variable technologies that can be used only when the resources are available and usually require back-up fossil-fuel generation. The availability of renewable resources also varies among regions; not all areas of the country can benefit from renewable energy resources. At the same time, the electric grid must be expanded, through the transmission and distribution systems, to deliver these energy sources to homes and businesses. Renewables and the transmission facilities needed to deliver their power also often face contentious siting concerns. In addition, long-term extension of the renewable tax credits is essential to the development of renewable resources.
- **CCS technology** offers the ability to capture, compress, transport, and store CO<sub>2</sub> emissions from power plants—which is key for utilities to be able to use coal as a baseload energy resource in a carbon-constrained world. However, CCS technologies are not expected to be commercially deployable on a widespread basis until around 2025. There also are significant cost and performance challenges facing capture technologies. Other challenges facing CCS technology include: permitting, transport, cost, potential liabilities, and public acceptance.
- **Advanced nuclear technologies** will offer electric utilities the ability to increase the nation’s baseload power supply with a carbon-free source of energy. However, unresolved questions about how to dispose of spent fuel from nuclear plants and high capital costs are major challenges to the significant deployment of a new generation of nuclear plants.
- **Electric vehicles**, including PHEVs, will help our country enter an era of clean transportation and greater energy independence. PHEVs are the next-generation hybrid vehicles that will rely on the existing electricity system—instead of gasoline—to recharge car batteries. Battery-powered electric vehicles will

produce just one-third of the GHGs emitted by gasoline-fueled vehicles.<sup>3</sup> While considerable progress has been made to date, PHEVs still face challenges to reaching full-scale commercialization. Specifically, high battery costs increase the cost of PHEVs and remain a significant hurdle to bringing PHEVs to the market.

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As Congress considers climate change legislation, the development, deployment, and funding of a full suite of climate-friendly technologies are critical to the success of a cap-and-trade bill. In addition, the compliance dates must correspond to the availability of technologies needed to reduce emissions. This will allow electric utilities to meet growing electricity demands in a carbon-constrained economy and will help to reduce compliance costs to electricity consumers, U.S. workers, and the economy.

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<sup>1</sup> U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2009* (revised April 2009).

<sup>2</sup> Electric Power Research Institute, *Prism/MERGE Analyses 2009 Update*, August 2009.

<sup>3</sup> Lucy Sanna, "Driving the Solution: The PHEV Hybrid Vehicle," EPRI Journal, Fall 2005, p. 14.

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