

Energy Policy Act of 2002 Opens R&D Opportunities in Materials

Energy is central to our present and future economic prosperity. Because of its importance, improving and strengthening our energy system can provide significant economic benefits for everyone. Similarly, vulnerabilities in our energy system can present major threats to our economic health. The importance of energy to our national well-being is what drove Senate Majority Leader Tom Daschle and me to introduce S. 1766, the Energy Policy Act of 2002.*

Significant changes in energy markets have occurred since the last time Congress considered comprehensive energy legislation. Our last major energy bill was the Energy Policy Act of 1992. Since that time, our society has moved farther away from command-and-control regulation of energy toward a system relying more on market forces to set the price of energy. In the process, energy markets have become more competitive and dynamic, but not without some significant bumps.

In response to these changes, challenges, and opportunities, we need new ideas and approaches as well as greater investments to move us into the future. That is what S. 1766 proposes to do. This bill has three overarching goals:

- to ensure a diversity of fuels and technologies for adequate and affordable supplies of energy, including renewables, natural gas, oil, coal, hydropower, and nuclear power;
- to improve the efficiency and productivity of our energy use, including the reliability and productivity of our electricity-transmission system, and the efficiency of energy use in industry, vehicles, appliances, and buildings; and
- to keep in mind other important policy goals, such as protection of the environment and global climate, as we sort through energy policy choices.

We can achieve these three goals if we accelerate the development and introduction of new technologies and if we create flexible market conditions that empower energy consumers so that they can make choices that will benefit both them and society.

I believe there is a broad consensus in the Senate that new science and new technology are at the core of any solution to our energy challenges. Yet, despite the importance of energy R&D, our recent commitment to it leaves a lot to be desired. Federal energy-technology R&D today is equivalent, in constant dollars, to what it was in 1966. Yet, our economy is three times larger

now than it was then. It is hard to see how we can build a 21st-century energy system on 1960s-level-of-effort R&D budgets. This bill builds these budgets in a rational way to levels that, by 2006, will give us a robust energy R&D effort to support the goals.

An example of this increased commitment to energy R&D can be seen in the renewable energy R&D programs at the Department of Energy (DOE). Under S. 1766, these programs will grow from an authorized level of \$500 million in fiscal year 2003 to \$733 million in fiscal year 2006. Renewable-energy R&D was cited by a distinguished presidential task force in 1997 as being significantly underfunded relative to its long-term promise. Our bill expands the program consistent with the recommendations of that task force.

While recognizing the promise of renewable-energy technologies, our bill does not neglect the "tried and true" technologies that are the backbone of our current energy system. For example, the bill recognizes that technology holds the promise for dramatically lowering, even to zero, the emissions from coal-based plants. This bill takes a very forward-looking approach to the issue by authorizing a \$200-million-per-year research, development, and demonstration program based on coal gasification, carbon sequestration, and related ultraclean technologies for burning coal. This provision, as well as R&D provisions to improve the performance of natural gas, nuclear, and hydroelectric facilities, illustrate the crucial role that R&D is going to play in shaping the energy future we want.

We cannot have a sound energy policy that is based only on production, or only on conservation. Our energy policy must combine programs that boost supplies with programs that use those supplies more effectively.

A modernized electricity system is one major way we can use our supplies of energy more effectively. The second way is to increase the efficiency of the various uses of energy. Our bill calls for efforts to promote more energy efficiency in vehicles, industry, housing, and appliances, and these efforts are supported by a strong increase in R&D spending related to energy efficiency. The funding increase—from \$810 million in fiscal year 2003 to just over \$1 billion in FY 2006—will support efficiency progress across a broad spectrum.

One particularly exciting R&D opportunity that is being funded in this part of the bill is a program called the Next Generation Lighting Initiative. The Senate provision establishes a government-industry partnership to develop the technology for

semiconductor-based lighting that would be ultra-efficient. The model for this partnership is the SEMATECH consortium, which boosted our national competitiveness in semiconductor manufacture in the 1980s and 1990s.

Current lighting technology wastes much of the energy going into the bulb in the form of heat. But light-emitting diodes create light with very little energy loss. The only problem is that we do not know how to commercially manufacture low-cost and reliable light-emitting diodes that produce white light. Yet, there are a lot of good ideas for doing so out there. The Next Generation Lighting Initiative, then, will try to develop long-lasting, cost-competitive white lights from diodes by 2011.

The third overarching goal of the bill is to balance energy policy with other important societal considerations. Energy production and use comes associated with a host of consequences for our environment. Striking the right balance among energy, environment, and the economy has been a long-standing concern in the Senate and in society.

Probably the most important future problem for us to consider is global climate change caused by increased concentrations of greenhouse gases in the atmosphere. The reason that this topic is so closely related to energy is that the two most prominent greenhouse gases—carbon dioxide and methane—are largely released as a result of energy production and use. In the United States, 98% of CO₂ emissions are energy-related. Every study of how to mitigate the possibility of global change comes up with a list of policy measures that relies heavily on increased energy efficiency and new energy production technologies with lower greenhouse-gas emissions.

Our energy bill recognizes that what we truly need is an industrial revolution to begin to solve the climate change problem. Therefore, this bill contains provisions that build on research and technology efforts already under way at DOE by establishing an aggressive research and development effort in DOE's new Office of Climate Change Technology. That effort will focus on developing a wide range of bold, breakthrough technologies to help reduce greenhouse gases, specifically in areas that are beyond the time horizon now being addressed by DOE's other technology programs.

SEN. JEFF BINGAMAN

Sen. Jeff Bingaman, D-N.M., chair of the Senate Energy and Natural Resources Committee, co-sponsored the Energy Policy Act of 2002 (S. 1766).

*On February 15, 2002, the bill was introduced as an amendment (SA 2917) to S.517, a bill that covered technology transfer.