Fostering Innovation to Meet our Energy and Economic Needs

The Advanced Research Projects Agency for Energy: a bridge to the new energy economy

The major problems facing our country—a foundering economy, a changing climate, a growing need for clean energy we produce at home—will be solved by science, technology, and innovation. We can take a major step towards fostering the innovation we need by establishing the Advanced Research Projects Agency for Energy or ARPA-E.

ARPA-E will apply the DARPA research model to energy technology development. DARPA at the Department of Defense created a culture of innovation and lead to breakthroughs like GPS, stealth technology, body armor, and the internet.

ARPA-E will be a new agency within the Department of Energy (DOE) tasked with high-risk, high-reward energy technology development, especially research that is too cross-cutting or multi-disciplinary to fit into the current system. It will bring together the best and the brightest from all sectors—national labs, academia, the private sector, individual inventors—in a way that has never been done in energy research. It will give them the resources and the autonomy they need, and it will get bureaucracy of their way.

The question isn't if we can afford to do this research in the current economic climate. The need for the new technologies is greater than ever because of the economic conditions. About half of the growth in GDP over the past fifty years came from development and adoption of new technologies. Innovation—especially new energy technologies—is the path to reinvigorating our economy and ensuring our competitiveness over the next 50 years.

ARPA-E is uniquely positioned to be the bridge to the new energy economy—and, with it, the "green" jobs we need. Although many companies are pursuing new energy technologies—which is positive—the full burden cannot fall exclusively to the business community. Companies have to be accountable to stock holders, so their (legitimate) fear of failure means they are playing it safe, and we are making incremental progress at a time when we need radical breakthroughs. However, because ARPA-E will bring industry to the table from the beginning, the tech transfer will be much more efficient than the current process. This will form the foundation of a vibrant new sector of our economy, the way DARPA formed the underpinnings of the multi-billion dollar defense industry.

Total funding of $415 million was included in the American Recovery And Reinvestment package and the FY10 Omnibus Appropriations to establish ARPA-E.

The first Funding Opportunity Announcement (FOA) was issued in April of 2009 and received an overwhelming response—3,700 white papers—far exceeding anyone's expectations. The enormous response is proof of a pent-up hunger for this type of transformational research. ARPA-E announced the first round of awards on October 26, 2009.

Background on ARPA-E

In August of 2007, the President signed into law the America COMPETES Act (PL 110-69). COMPETES codified many of the recommendations of the 2005 National Academies report, *Rising Above the Gathering Storm*, including to establish an Advanced Research Projects Agency for Energy (ARPA-E) to sponsor "creative, out-of-the-box, transformational" energy research.

ARPA-E is charged with developing technologies that:

- Reduce dependency on foreign oil;
- Improve the energy efficiency of all economic sectors;
- Reduce greenhouse gas emissions; and
- Maintain U.S. leadership in the development and deployment of energy technologies.

ARPA-E utilizes many of the same organizational elements that fostered the successful culture of innovation of DARPA at the Department of Defense. ARPA-E offers a significant shift for the Department of Energy (DOE), both for the research it conducts and how it conducts that research.

- ARPA-E will leverage the intellectual capital of the nation's universities, commercial, industrial, and investor communities, and the national labs to pursue high-risk, highreward research that neither these entities nor DOE would pursue on their own.

- ARPA-E will have the flexibility to sponsor R&D that spans multiple stages, from basic research to commercialization, and in areas that are otherwise too cross-cutting or multidisciplinary to fit into the current DOE system.

- ARPA-E will be an independent entity within DOE with a flat, non-bureaucratic management structure. The ARPA-E Director will report directly to the Secretary of Energy, and no other program within DOE will report to ARPA-E.

- The ARPA-E Director will have flexible hiring authority to recruit the best and brightest program managers from outside of government at competitive salaries and for limited tenures of 3-5 years to ensure that fresh ideas and talent circulate through the program.

- ARPA-E Program Managers are given extraordinary autonomy and resources to pursue high-risk technological pathways, quickly assemble research teams to "crash" on projects, and start and stop projects based on performance and relevance. ARPA-E projects will not be subject to the traditional peer-review system.

If ARPA-E has substantial and consistent funding, and it is implemented as envisioned in COMPETES, the long-term results for the U.S. will be:

- Advanced technologies that transform how we harness, use, and conserve energy.

- A much larger and more diverse community of energy researchers and technology developers, providing the foundation of a vibrant new sector of the U.S. economy.