

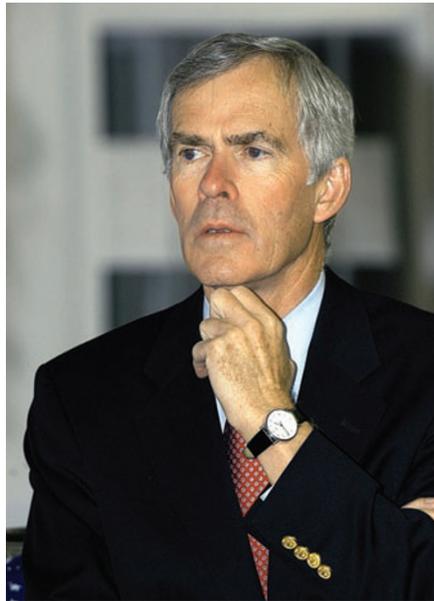
Agency for energy innovation may be funded under Obama

Proponents of a new US energy agency are hopeful it will finally take off. Kurt Kleiner reports.

A new research programme, designed to bypass bureaucratic red tape and bring 'transformative' energy technology to the market, could finally win approval in the United States under a new Obama administration and a Democratic Congress. Supporters have been pushing for the new agency — to be modelled on the Department of Defense Advanced Research Projects Agency (DARPA) — since the National Academy of Sciences proposed it in a 2005 report¹. Called the Advanced Research Projects Agency-Energy (ARPA-E), it would spend as much as a billion dollars a year on energy research to create clean alternatives to fossil fuels.

Congress voted to create ARPA-E in 2007, despite the objections of the Bush administration, but has since failed to provide funding to actually implement the programme, leaving it authorized on paper only. The recent election of Barack Obama as US President, however, has brought hope that it will now finally materialize. Obama promised during his campaign to spend \$150 billion over 10 years on renewable energy research, but has not committed specifically to ARPA-E. Jeff Bingaman, a Democratic senator from New Mexico and chairman of the Senate Energy and Natural Resources Committee, recently called for Congress to fund the agency², as did Bart Gordon, a Democratic congressman from Tennessee who chairs the Committee on Science and Technology.

"The need for the new technologies is greater than ever because of the economic conditions," says Gordon. "Innovation — especially new energy technologies — is the path to reinvigorating our economy and ensuring our competitiveness over the next 50 years." Last week's announcement that rocket scientist and Nobel laureate Steven Chu, who runs the Lawrence Berkeley National Laboratory at the University of California, will be secretary of energy as of next year has further thrilled energy transformation advocates and bodes well for ARPA-E.



US Senator Jeff Bingaman.

The US already spends about \$4 billion a year on energy research through the Department of Energy (DOE), but the hope is for ARPA-E to develop the next generation of breakthrough technologies; thereby replicating the success of the legendary DARPA. Established in 1958 in response to the Soviet launch of Sputnik, DARPA has since given birth to technologies as diverse as the Saturn rocket engine, which made the Moon landings possible, global positioning satellites, unmanned Predator airplanes and perhaps most notably, the Internet. "I think because of the nature of the energy challenge it demands some new thinking and new ways of doing things," says Stephen Forrest, Vice President for Research at the University of Michigan, a supporter of ARPA-E. "This is really to focus fast moving and agile research particularly in the area of renewable energy." ARPA-E would probably finance research into familiar areas such as advanced batteries, fuel cells, solar, wind, hydrogen and geothermal power,

and biofuels. But its mandate would be to look for research where increased financial support would bring major breakthroughs that could help shift the US from fossil fuels to cleaner, renewable energy sources.

IMPORTANT DISTINCTIONS

Unlike DOE funding, which goes largely to researchers at its own national laboratories and research centres, DARPA does not manage facilities or conduct research itself. Instead, it relies on a staff of project managers who finance outside researchers for projects that last three to five years. Project managers are largely autonomous, and face few bureaucratic impediments, according to a Congressional Research Service report prepared for Congress in August. In its 2005 report the National Academy of Sciences concluded that "Introducing a small, agile, DARPA-like organization could improve DOE's pursuit of R&D much as DARPA did for the Department of Defense." A main goal of ARPA-E will be to forge partnerships among government, businesses and academic researchers, Forrest says. It would probably concentrate on long- and medium-term research.

"People who promote ARPA-E are operating under many misapprehensions. They think the Department of Energy doesn't know how to do R&D."

Joseph Romm

"The main genesis for it is the desire to really coordinate research activities," says Daniel Kammen, Director of the Renewable and Appropriate Energy Laboratory at Berkeley. ARPA-E would pursue research with an eye to bringing important new technologies to market. "The real issue is the integration. It's not so much that the science itself would be

inherently different," he says. How well it fulfills that mission will depend largely on the people in place and their vision. Ideally, project managers will be made up of active research scientists with good ideas about what areas of research to fund, Forrest says.

“Because of the nature of the energy challenge, it demands some new thinking and new ways of doing things.”

Stephen Forrest

But critics of the proposal say it risks either replicating existing DOE research, or siphoning funds from existing programmes. “The question is, what role is it fulfilling that isn’t happening now?” asks Joseph Romm, a senior fellow at Washington think-tank, the Center for American Progress, and former acting assistant secretary at the DOE’s Office of Energy Efficiency and Renewable Energy. “The Department of Energy has a major research and development programme that has been phenomenally successful. People who promote ARPA-E are operating under many misapprehensions. They think the



An unmanned Predator airplane, one of the many breakthrough inventions of DARPA.

Department of Energy doesn’t know how to do R&D,” he says.

Although Romm admires DARPA, he says that an energy research programme will probably not be able to duplicate it. “There is no analogy between energy research and Department of Defense research. If you have begun a project that the military says it wants, you will be successful. There’s one customer, and the price is no object.” On the other hand, Congress tends to meddle in energy research, earmarking funding for favourite programmes, increasing overall funding some years and decreasing it in

others. “Somehow I doubt Congress is going to authorize a programme that it’s not going to finagle with,” Romm says. Where the money will come from is another question. A number of different bills pending in Congress contain different suggestions. The money could come from general revenues, from funds raised through carbon taxes or from oil and gas lease revenues.

It’s not clear when ARPA-E’s future will be decided. It could receive funding from Congress as soon as February, as part of the final appropriations for fiscal year 2009. Otherwise, supporters may have to wait for an answer until President Obama makes his first budget proposal for 2010, in May.

Published online: 18 December 2008

doi:10.1038/climate.2008.139

References

1. National Academy of Sciences, National Academy of Engineering & Institute of Medicine, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (National Academies, Washington DC, 2005).
2. Plumer, B. *The New Republic* 17 November 2008; <http://blogs.tnr.com/tnr/blogs/environmentandenergy/archive/2008/11/17/bingaman-lays-out-the-senate-s-energy-priorities.aspx>

Kurt Kleiner is a freelance science writer.

nature
geoscience

Submit online now!



Chief Editor: Heike Langenberg PhD

Associate Editors: Ninad Bondre, PhD; Alicia Newton, PhD and Anna Armstrong, PhD

Nature Geoscience is a new international forum for the timely publication of significant new research in the geosciences. This monthly journal is aimed at a broad interdisciplinary audience of scientists from all areas of the Earth and planetary sciences. *Nature Geoscience* is committed to publishing top-quality original research in the geosciences through a fair and rapid review process.

In addition to publishing primary research, the journal provides an overview of the most important developments in the Earth sciences through the publication of Review Articles, News and Views, Research Highlights, Commentaries and reviews of relevant books and arts events.

Nature Geoscience also provides Advance Online Publication (AOP) of research articles, which benefits authors with an earlier publication date and allows readers access to accepted papers before they appear in print.

Complete submission information is available at:

<http://www.nature.com/ngeo/authors/index.html>

General editorial inquiries and correspondence should be addressed to the Editor at: geoscience@nature.com

www.nature.com/naturegeoscience

nature publishing group 