

DOE ARPA-E Selects 37 Transformational Energy Research Projects

www.arpa-e.energy.gov

The U.S. Department of Energy announced in October major funding for 37 ambitious research projects—including some that could allow intermittent energy sources like wind and solar to provide a steady flow of power, or use bacteria to produce automotive fuel from sunlight, water, and carbon dioxide.

The \$151 million in funding is being awarded through the Department's recently formed Advanced Research Projects Agency-Energy ("ARPA-E"). ARPA-E's mission is to develop nimble, creative, and inventive approaches to transform the global energy landscape while advancing U.S. technology leadership. This is the first round of projects funded under ARPA-E, which is receiving a total of \$400 million under the American Recovery and Reinvestment Act.

The grants will go to projects with lead researchers in 17 states. Of the lead recipients, 43% are small businesses, 35% are educational institutions, and 19% are large corporations.

A second set of ARPA-E funding opportunities will be announced in 2009. Visit Web site www.arpa-e.energy.gov for more information about these selections, upcoming technical workshops, and new funding opportunities.

Inspired by the Defense Advanced Research Projects Agency (DARPA), ARPA-E was created to support high-risk, high-reward energy research that can provide transformative new solutions for climate change and energy security.

This first ARPA-E solicitation was highly competitive and oversubscribed, with over 3,600 initial concept papers received. Of those, approximately 300 full applications were requested and ultimately 37 final awardees were selected through a rigorous review process with input from multiple review panels composed of leading U.S. energy science and technology experts and ARPA-E's program managers. Evaluations were based on the potential for high impact on ARPA-E's goals and scientific and technical merit.

The selected projects, which are receiving an average of approximately \$4 million each, span the energy sector, including potentially transformative innovations in energy storage, biofuels, carbon capture, renewable power, building efficiency, vehicles, and other energy technology areas.

Some of the innovative projects selected for awards include:

- *Liquid Metal Grid-Scale Batteries:* Created by Don Sadoway of the Massachusetts Institute of Technology, the all-liquid metal battery is based on low-cost, domestically available liquid metals with potential to break through the cost barrier required for mass adoption of large-scale energy storage as part of the country's energy grid. If successful, this battery technology could revolutionize the way electricity is used and produced on the grid, enabling round-the-clock power from U.S. wind and solar power resources, increasing the stability of the grid, and making blackouts a thing of the past. And if deployed at homes, it could allow individual consumers the ability to be part of a future "smart energy Internet," where they would have much greater control over their energy usage and delivery than is currently possible.
- *Bacteria for Producing Direct Solar Hydrocarbon Biofuels:* Researchers at the University of Minnesota have developed a bioreactor that has the potential to produce a flow of gasoline directly from sunlight and CO₂ using a symbiotic system of two organisms. First, a photosynthetic organism

directly captures solar radiation and uses it to convert carbon dioxide to sugars. In the same area, another organism converts the sugars to gasoline and diesel transportation fuels. This development has the potential to greatly increase domestic production of clean fuel for vehicles and end U.S. reliance on foreign oil.

- *CO₂ Capture using Artificial Enzymes:* Funding will support an effort by the United Technologies Research Center to develop new synthetic enzymes that could make it easier and more affordable to capture carbon dioxide emissions from power plants and factories. If successful, the effort would mean a much lower energy requirement for industrial carbon capture and significantly lower capital costs to get carbon capture systems up and running. Success of this project could substantially lower the cost of carbon capture relative to current, state-of-the-art amine- and ammonia-based processes. This would represent a major breakthrough that could make it affordable to capture the carbon dioxide emissions from coal and natural gas power plants around the world.

NIH Issues Call for Proposals for Transformative Research Projects Program

<http://nihroadmap.nih.gov/T-R01>

A major goal of the National Institutes of Health (NIH) is to foster bold and creative investigator-initiated research. In pursuit of this goal, the Transformative Research Projects Program has been created under the auspices of the NIH Roadmap for Medical Research to enhance submission and support of exceptionally innovative, high risk, original and/or unconventional research that has the potential to have a profound impact in clinical, basic, and/or behavioral/social science arenas.

NIH Roadmap Transformative Research Awards provide up to \$25 million total costs per year for a single project. The NIH encourages applications for the Transformative Research Projects Program from scientists representing all disciplines relevant to the NIH mission, including the biological, behavioral, clinical, social, physical, chemical, computational, engineering, and mathematical sciences. Interdisciplinary teams as well as individual investigators with bold ideas are encouraged to apply.

The deadline for submitting Transformative Research Project applications is **January 22, 2010** with Letters of Intent due by **December 22, 2009**. Additional information, including instructions for the Request for Applications (RFA-RM-09-022) and Frequently Asked Questions about the Transformative Research Projects Program, are available at Web site <http://nihroadmap.nih.gov/T-R01/>. Send questions to T_R01@mail.nih.gov.

The NIH Roadmap for Medical Research, launched in 2004, is a series of initiatives designed to address fundamental knowledge gaps, develop transformative tools and technologies, and/or foster innovative approaches to complex problems. Funded through the NIH Common Fund, these programs cut across the missions of individual NIH Institutes and Centers and are intended to accelerate the translation of research to improvements in public health.

- Low-Cost Crystals for LED Lighting:** Developed by Momentive Performance Materials, this proposal for novel crystal growth technology could dramatically lower the cost of developing light-emitting diodes (LEDs), which are 30 times more efficient than incandescent bulbs and four times more efficient than compact fluorescents. This higher quality, low-cost material would offer significant breakthroughs in lowering costs of finished LED lighting, accelerating mass market use, and dramatically decrease U.S. lighting energy usage. Lighting accounts for 14% percent of U.S. electricity use.

Europe and India Sign Cooperation Agreement on Fusion Energy Research

The European Atomic Energy Community (Euratom) and the Indian Government recently signed a cooperation agreement in the field of fusion energy research. The European Union and India are already partners in the construction of the international fusion tokamak ITER. The agreement was signed at the EU-India Summit in New Delhi by the European Commissioner for External Relations and European Neighborhood Policy Benita Ferrero-Waldner and Anil Kakodkar, chair of the Indian Atomic Energy Commission (AEC).

The agreement will further promote and will give more visibility to the bilateral constructive cooperation. It is a complement to the joint activities already established in the multilateral framework of ITER to which both sides are fully committed.

Euratom and India will establish a fast track for the exchange of both information on research issues and scientists in research projects. India has already ongoing collaborations with several European national research centers on fusion. Indian scientists will now join the major fusion experiments of Euratom.

One of the most important is the possible exploitation of the Joint European Torus (JET) facility in Culham, UK. The partners will exploit their potential in the field of tokamaks and their alternatives, magnetic fusion energy technology, plasma theory, and applied plasma physics. The new collaboration is intended to reinforce the progress on ITER.

The EU and India share strong scientific and technological links. India is the third largest recipient of research and development projects funded under the EU Seventh Framework Program (2007–2013). The EU and India are mobilizing their resources and knowledge to support their strategic mutual interests through co-funded research activities launched through coordinated calls for proposals in areas such as computational materials science, food and nutrition research, solar energy research, and soon water and waste management.

U.S. and Canada Pursue Clean Energy Dialogue

President Barack Obama and Prime Minister Stephen Harper reviewed progress to date in September on the U.S.–Canada Clean Energy Dialogue launched during Obama's visit to Ottawa. They agreed that the report to leaders presented by U.S. Energy Secretary Steven Chu and Canadian Minister of the Environment Jim Prentice represents an important path forward for pursuing shared objectives of environmental protection and secure energy supply in a balanced and effective manner.

Secretary Chu and Minister Prentice also released an Action Plan for the Clean Energy Dialogue, which describes specific initiatives the United States and Canada have agreed to undertake as areas for enhanced cooperation, including carbon capture and storage; clean energy research and development in biofuels, clean engines, and energy efficiency; and the electricity grid and smart grid development.

With respect to climate change, Harper and Obama reaffirmed that given the high degree of integration between the Canadian and U.S. economies and energy markets, they should cooperate closely as they develop their respective approaches. They reiterated the urgency of taking aggressive action to combat climate change and reaffirmed their commitment toward a comprehensive and effective international agreement that puts the world on a clean energy pathway.

The Leaders also agreed to work closely together in the coming months on the critical issue of nuclear security and non-proliferation, particularly in promoting concrete outcomes at the Nuclear Security Summit to be held in Washington in April 2010.

India Prepares for Certified Technology Commercialization Specialists

www.cdc.org.in

India's Consultancy Development Center (CDC) has launched a project for training and certification of Technology Commercialization Specialists in the country. As part of this project, about 200 experts/specialists/consultants will be trained on various aspects of technology commercialization, beginning with technology assessment to technology transfer, leading to mass manufacturing. The CDC is an autonomous institution of the Department of Scientific and Industrial Research (DSIR) within the Ministry of Science and Technology, set up as a nodal organization for promotion, development, and strengthening of consultancy skills and capabilities.

The proposed training process will expose the pool of experts and scientists/engineers from research and development (R&D) institutions to the commercialization process for a few model technologies having potential for commercialization. The training process will also deal with various aspects of technology commercial viability; organizational set up; the transfer process; technology transfer package; legal issues for commercialization; and field support and marketing technology/products/solutions.

The project, expected to be completed in six months, would train and certify Technology Commercialization Specialists across technologies, including biological, chemical, mechanical, and electronics. The Technology Commercial Specialists will subsequently work with R&D engineers in the laboratory to facilitate transfer of technologies from the laboratory to the manufacturers for bulk production, thus providing the benefits of public funded R&D institutions. With the training of laboratory personnel on the technology commercialization process, the success of R&D efforts would be visible in tangible parameters, leading to greater credibility for indigenous R&D efforts.

This pioneering initiative launched by the Consultancy Development Center will fill a long-standing gap of technology commercialization know-how faced by public-funded laboratories in science and technology, defense, telecom, space, agriculture, medicine, and other fields. □





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