

Energy Secretary Chu Stresses Global Cooperation on Energy, Economic, and Climate Challenges

In recent discussions with a broad range of world energy ministers, U.S. Energy Secretary Steven Chu has stressed the need for global cooperation on energy, economic, and climate challenges.

One example of the opportunity for global cooperation Secretary Chu has discussed is the development of carbon capture and sequestration technology from coal-fired power plants that can significantly lower greenhouse gas emissions. Many countries, including the United States, China, Australia, Saudi Arabia, and several European Union countries, are funding research into and development of carbon capture and sequestration technologies. Chu said that collaboration and

cooperation in this area holds the potential to pilot different experimental technologies in different countries. Scientists can then learn from the successes and failures of these pilot projects and improve the technology so it can be broadly deployed. He further said that co-development of these technologies could reduce the cost and allow for faster implementation in heavily coal-dependent countries—holding the potential to significantly reduce future greenhouse gas emissions for the benefit of the world.

Chu has been discussing these issues with energy ministers from the European Union; individual European countries including Denmark, France, and the United Kingdom; Algeria; Australia; Brazil; Canada; Chile; Honduras; Japan; Mexico; and Qatar.

During a U.S.-Algerian Energy Forum held in Washington, DC in February, Chakib Khelil, Minister of Energy and Mines of Algeria, invited participants to explore partnerships and investment opportunities with Algeria's energy industry. Khelil said that in the pursuit of the development of renewable energy sources, Algeria is using part of its hydrocarbons revenue to finance research and development programs and projects. Nonfossil energy sources of particular interest in Algeria include photovoltaic and solar thermal power generation.

Countries in other parts of the world have also announced, at various times, their focus on energy efficiency and clean energy.

Within Canada's \$30 billion Economic Action Plan, reflected in the 2009 budget announced by its Finance Ministry, \$1 billion over five years is to be invested for clean energy research development and demonstration projects, including carbon capture and storage. According to Jim Prentice, the Minister of Environment, the budget reiterates Canada's commitment with significant investments that allow for the continued protection and conservation of the Canadian environmental heritage, and also for further research into how the country's natural resources and landscapes can best be conserved.

In March, the Ministry of Economy, Trade and Industry (METI) in Japan announced the preparation of legislation related to energy. Japan remains highly dependent on fossil fuels, with over 80% of its total energy needs being met by oil, coal, and natural gas. This raises the concern that, in the future, Japan may no longer be able to secure sufficient fossil fuels in either quantity or quality, as the global demand for energy has surged recently. In addition, Japan's goal of creating a low-carbon society has made it essential to take measures directed at each stage where energy is supplied and used. According to METI, the government needs to review its alternative-energy policies in order to change the type of energy to be developed and introduced pursuant to this legislation from "alternative energy" to "nonfossil energy" (e.g., renewable energy and nuclear energy).

Australia Minister Launches Climate Change Technology Report

In January, the Australian Minister for Resources and Energy, Martin Ferguson, released the Australian Academy of Technological Sciences and Engineering (ATSE) report, "Energy Technology for Climate Change: Accelerating the Technology Response."

The aim of the report is to identify tech-

NIST Announces 2009 Technology R&D Competition

www.nist.gov/tip

The National Institute of Standards and Technology (NIST) has announced a 2009 competition for multiyear research funding in civil infrastructure and manufacturing, under its Technology Innovation Program (TIP). TIP expects to provide cost-shared funding for approximately 25 new research and development (R&D) projects.

TIP promotes technological innovation by providing funding support to challenging, high-risk research projects that address critical national needs. The merit-based, competitive program can fund R&D projects by single small-sized or medium-sized businesses or by joint ventures that also may include institutions of higher education, nonprofit research organizations, and national laboratories. The 2009 TIP competition is open to projects developing new technologies for the practical application of advanced materials, including nanomaterials, advanced alloys, and composites, in manufacturing; and the monitoring or retrofit of major public infrastructure systems, including water systems; dams and levees; and bridges, roads, and highways.

TIP officials plan to allocate ~\$15 million in first-year funding for R&D projects in manufacturing. New and improved materials underlie many new product innovations. High-strength alloys, aluminum, and magnesium are used to build stronger, lighter, and safer vehicles; superalloys are used to make higher efficiency gas turbines; composites make larger, more efficient wind turbine blades and higher performance aircraft; and nanomaterials are finding their way into better performing batteries, energy storage devices, high-voltage transmission lines, and healthcare applications. This 2009 TIP competition will be limited to technologies for nanomaterials; composites; and superalloys, alloys, and smart materials.

TIP officials plan to allocate ~\$10 million in first-year funding for the civil infrastructure category. The first focus in this area targets innovative, cost-effective sensor and sensor-network technologies for nondestructive testing and monitoring of the structural health of major infrastructure components. The second focus deals with how to do a better job of repairing and upgrading existing structures. Emphasis is placed on practical technologies—including both novel materials and cost-effective methods for installing them—that would provide enhanced performance or longer service life than existing repair and retrofit materials and practices.

TIP awards are limited to no more than \$3 million total over three years for a single company project and no more than \$9 million total over five years for a joint venture.

The due date for submission of proposals to the 2009 competition is 3 p.m. Eastern Time, **Tuesday, June 23, 2009**. Proposals may be submitted electronically through Web site Grants.gov (search for Catalog of Federal Domestic Assistance [CFDA] program 11-616 or Funding Opportunity Number 2009-TIP-01) or on paper to National Institute of Standards and Technology, Technology Innovation Program, 100 Bureau Drive, Stop 4701, Gaithersburg, MD 20899-4701. Review, selection, and award processing is expected to be completed by the end of November 2009.

nologies that can most efficiently and effectively reduce Australia's carbon emissions for stationary power generation in both technical and financial terms. Minister Ferguson said the Australian government is already implementing almost all of the Academy's recommendations such as supporting programs like the Renewable Energy Fund, carbon capture and storage, and the development and deployment of new energy technologies.

Ferguson said, "The Australian Government has made massive investments in the renewable energy field—notably, the [AUD]\$435 million Renewable Energy Demonstration Program intended to establish a portfolio of large-scale projects demonstrating new renewable energy technologies....These investments are intended to create new, clean energy sources. However, as coal-fired electricity is likely to remain in our energy mix for decades to come, the Australian government is also driving the \$500 million Low Emissions Coal Initiative and the Global Carbon Capture and Storage Institute, to which we will contribute \$100 million annually, to help make our most common energy source cleaner. Measures such as the Renewable Energy Demonstration Program will help drive renewable energy supply. Policies such as increasing the renewable energy target to 20% by 2020 will increase demand and ensure Australian renewable energy producers have a market."

According to the report, Australia needs to invest about \$6 billion on research, development, and demonstration (RD&D) on new power generation technologies by 2020 to meet the challenge of achieving projected carbon dioxide reductions. This investment, by government and industry, will require follow-up expenditure on technology deployment and no single new technology for stationary energy production will achieve the projected CO₂ reductions.

ATSE also called for the establishment of a new national Energy Research Council to fund the necessary RD&D proposals and recommends relentless application of cost-effective energy efficiency and conservation strategies so that stationary energy demand growth is less than 1% a year, over a sustained period.

ATSE also recommends continued support of existing Australian programs (including the Renewable Energy Fund, the Energy Innovation Fund, and the creation of an Australian Solar Institute), the National Low Emissions Coal Initiative, and the Global Carbon Capture and Storage Institute.

ATSE's report said that while much

emphasis is currently being given to a carbon pollution reduction scheme (CPRS) trading scheme to reduce greenhouse gases (GHG), a CPRS is a necessary, but not sufficient, condition for timely new technology deployment. New low-emission technologies for electricity generation must be deployed on a massive scale to achieve the proposed reductions in GHG and this has major implications for RD&D, according to the report.

Much technology is already being developed, but it awaits large-scale commercial implementation before the costs come down to allow widespread utilization, even with a price on carbon.

The issue of climate change linked to greenhouse gases is receiving urgent attention in Australia, according to ATSE. This has been facilitated recently by the release of a number of authoritative documents, including the Garnaut Climate Change Review reports, the government's Green Paper on the Carbon Pollution Reduction Scheme, and a recent treasury report on global emissions trading modeling and low-carbon technologies.

While governments are providing considerable support for low-emissions technology research and demonstration funding, it is generally recognized that further and larger investments will be required to bring these technologies to deployment.

Furthermore, major issues exist related to public perception and government policy (for example, nuclear energy), technical and environmental uncertainty regarding carbon dioxide storage sites, high investment cost to replace carbon (for example, carbon capture and storage, solar energy, and geothermal generation) or other environmental issues associated, for example, with extensive application of biomass, wind, and wave generation.

According to the study, Australia's competitive electricity market and the future CPRS will ultimately determine the technology mix that will be deployed.

Ferguson said that one stark difference between the Academy's recommendations and government policy was in the field of nuclear energy. "Nuclear power is one of the power generation options put forward for Australia in the ATSE report; however, it is the government's view that nuclear power is not needed as part of Australia's energy mix given our country's abundance and diversity of low cost and reliable energy sources, both fossil fuel and renewable," Ferguson said.

Ferguson said, "The government has a clear policy of prohibiting the development of an Australian nuclear power industry, but the government also understands that nuclear power is an important part of the

energy mix in some countries where energy demand is growing strongly but which lack the abundant and diverse energy resources available to Australians."

The ATSE report can be accessed at Web site www.atse.org.au.

Japan and Singapore Sign MOU for Research Collaboration

On March 18, with the endorsement of Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the support of Singapore's Ministry of Trade and Industry (MTI), the Japan Science and Technology Agency (JST) and the Agency for Science, Technology and Research (A*STAR) (Singapore) signed a memorandum of understanding (MOU) to implement the "Strategic International Cooperative Program" (SICP).

The SICP initiative aims to promote joint international research collaborations between Japan and Singapore by means of providing funding for research and workshops. Under this MOU, JST and A*STAR have mutually agreed to support research within the field of "Functional Applications in Physical Sciences." This field encompasses strategic research areas such as nanotechnology; materials, including applications for photonics and terahertz; and chemistry, including nanobiotechnology and bioelectronics.

In addition to funding research, SICP provides financial support for invitations of researchers and organizing workshops to facilitate exchange activities among the Japanese and Singaporean researchers.

Lim Chuan Poh, chair of A*STAR, said, "This partnership will bring our ties with Japanese research institutes to a new level as it will pave the way for researchers in A*STAR to interact with the researchers from Japanese universities and public research institutes, and vice versa. I am confident that many new ideas and innovations will be spawned from these interactions."

Since 2003, the Strategic International Cooperative Program has been promoted by JST to foster active research exchange between researchers from Japan and specific countries. Prior to this, JST has collaborated with 16 countries across Asia, Oceania, Africa, and Europe within the framework of the SICP. Through this program, both JST and A*STAR will tap into the international network of collaboration under the SICP to accentuate its focus on fostering world-class scientific research.

Koichi Kitazawa, president of JST, said, "Since Singapore ranks as one of the top countries in the world in science and technology, it is extremely meaningful for Japan to have Singapore as its partner." □