

DOE, NRC Issue Licensing Roadmap for Next-Generation Nuclear Plant

On August 15, the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) delivered to Congress the Next Generation Nuclear Plant (NGNP) Licensing Strategy Report, which describes the licensing approach, the analytical tools, the research and development activities, and the estimated resources required to license an advanced reactor design by 2017 and begin operation by 2021. The NGNP represents a new concept for nuclear energy utilization, in which a gas-cooled reactor provides process heat for any number of industrial applications including electricity production, hydrogen production, coal-to-liquid fuel conversion, shale oil recovery, fertilizer production, and others that meet significant industrial needs.

"DOE is committed to the development and commercial deployment of NGNP technology in a timely manner," said DOE Assistant Secretary for Nuclear Energy Dennis Spurgeon. "Nuclear energy is vital to our nation's energy security and the NGNP has the potential to extend the benefits to bring nuclear technology to a whole new sector of the U.S. economy."

The Energy Policy Act of 2005 instructed the agencies to jointly develop a strategy for licensing the NGNP demonstration plant. The report identifies NRC review procedures that require revisions, as well as areas of new or additional research that must be conducted in order for the Commission to reach decisions on any NGNP application.

"The NRC's new reactor licensing process is currently focused on light-water reactors, and the staff is confident this basic framework can also support an NGNP review," said NRC Chair Dale Klein. "We will work with DOE to supplement that framework with NGNP-specific items."

In April of this year, the Department sought public and industry comment to help finalize ongoing conceptual design activities for the NGNP and further define the reactor's performance, safety, and functional requirements, as well as the estimated cost and schedule for its construction and operation. DOE will use the responses to develop a final strategy for partnering with industry to deploy the NGNP project. DOE anticipates noticing its final strategy this fall and seeks to complete the design and construction of a prototype NGNP plant by 2021.

The NGNP project is a part of DOE's Generation IV nuclear program, which

focuses on very high-temperature reactor technologies to produce hydrogen and other energy products, and furthers research and development to ensure the viability of the next-generation of nuclear energy systems. This program supports President Bush's Advanced Energy Initiative, which advocates the increased use of nuclear energy in order to increase energy security.

The joint Licensing Strategy Report can be obtained from the DOE Web site, www.energy.gov.

Brazil and USA Issue Statement on Energy Meeting

Brazilian Mines and Energy Minister Edison Lobão and U.S. Acting Deputy Secretary of Energy Jeffrey Kupfer met in early August for the first time in recognition of the important role each country plays in promoting safe, reliable, clean, affordable, and diverse energy supplies and reaffirming the strong relationship between both countries. Together they agreed that both nations are committed to increasing energy security and will focus on key areas of mutual interest, including oil and gas, biofuels, energy efficiency, coal, nuclear energy, electricity, energy regulatory issues, and climate change. In addition, the authorities discussed the development of cutting-edge technologies to increase energy efficiency.

The energy authorities also agreed to:

- share progress on efforts to develop second-generation biofuels;
- promote energy efficiency initiatives at the international level;
- support efforts to attract greater energy sector investment;
- ensure that leading-edge management, technology, and capital are directed toward the development of new energy projects; and
- increase bilateral cooperation in clean coal technology, with special attention on exchanging information in the following areas: (i) coal-related energy issues and policies, programs and technologies with special emphasis on coal utilization for power generation and clean fuels production including coal gasification; (ii) efficient and environmentally responsible use of coal; (iii) development of combustion technologies for high ash coals; (iv) development of coal and biomass to liquids; (v) studies in coal mine safety, coal mine methane, coal ash utilization, underground coal gasification and coal to liquids, mine ground control, underground coal mining technologies, backfilling, acid mining drainage, and coal beneficia-

tion; (vi) coal greenhouse gas mitigation technologies, including CO₂ capture and storage; and (vii) capacity building for the technologies just mentioned.

This meeting in Brazil comes during a period of renewed intensity in energy relations between Brazil and the United States. Presidents Bush and Lula made complementary visits in March of last year, and energy was a key theme during both visits. Recent joint efforts include the signing in 2007 of a Memorandum of Understanding (MOU) between DOE's National Energy Technology Laboratory (NETL) and the Brazilian Coal Association (BCA), under which clean coal is a potential area for collaboration. Also, in March 2008, NETL sent two scientists to deliver a four-day course on coal gasification and coal gas cleaning to 45 professionals at an event sponsored by the Coal Producer's Association of Santa Catarina. Both Lobão and Kupfer underlined the need for advancement in areas of clean coal energy not yet covered by the existing bilateral agreements.

Furthermore, on March 9, 2007, Secretary of State Condoleezza Rice and Brazilian Foreign Minister Celso Amorim signed an MOU to Advance Cooperation on Biofuels. This agreement established the U.S.-Brazil Steering Group and Advisory Board. Under this Agreement, in 2007, DOE hosted a visit of a delegation of Brazilian scientists at its National Renewable Energy Laboratory (NREL) and Lawrence Berkeley National Laboratory, as well as other scientific centers in the area of biofuels. A reciprocal visit by U.S. scientists to Brazil occurred in 2008, with an emphasis on second-generation biofuels technology research and development and biofuels infrastructure. Brazil and the United States have undertaken biofuel feasibility studies in the Dominican Republic, St. Kitts and Nevis, Haiti, and El Salvador. The Brazilian and U.S. governments are discussing expanding cooperation to a second tranche of target countries.

Along with India, South Africa, China, and the European Commission, both Brazil and the United States have also been engaged in the activities undertaken by the International Biofuels Forum (IBF), launched in March 2008 with the goal to foster the creation of a global biofuels market and in which context the White Paper on Internationally Compatible Biofuels Standards was developed. The U.S. Acting Deputy Secretary of Energy welcomed the upcoming International Biofuels Conference, which will be hosted by the Brazilian Government in São Paulo on November 17–21, 2008. The

Conference presents an opportunity to promote an informed discussion on the opportunities and challenges of biofuels for sustainable development, with a special focus on developing countries.

The United States and Brazil were two of the founding members of the Carbon Sequestration Leadership Forum established in June 2003 to facilitate the development of technologies for carbon dioxide separation, capture, transport, and storage in underground geologic formations as well as partners in support of the International Partnership for the Hydrogen Economy (IPHE), which included the development of a Hydrogen Roadmap for Brazil.

The two countries are committed to cooperation in bilateral and multilateral fora to achieve common goals for global energy stability and social, economic, and environmental sustainability.

Photonics Initiative of South Africa Gathers Momentum

Many have dubbed this the "century of the photon" and in keeping with South Africa's commitment to science and technology, a photonics initiative—supported by the Department of Science and Technology (DST)—has been established. The Council for Scientific and Industrial Research (CSIR) National Laser Centre and the Laser Research Institute at Stellenbosch University are currently driving the project, titled the South African Photonics Initiative (PISA). It ultimately aims to stimulate multidisciplinary research and human capital development (HCD) as well as create economic benefits for South Africa through photonics. Interim CSIR Group Executive of Research and Development, Thulani Dlamini, is leading the CSIR's involvement in the initiative.

To this end, a workshop on a national photonics strategy for South Africa was held in Johannesburg on August 5–6, 2008. Due to the multidisciplinary nature of photonics, it was necessary that the strategy drew input from a diverse range of stakeholders and as such the event was attended by representatives from various industries, tertiary education institutions active in the field, government officials, as well as international speakers.

The significant outcome of the workshop was the spontaneous creation of a South African photonics cluster to be led by the photonics industry. The cluster will facilitate networking between the photonics industry and photonics research institutions. Its activities will be coordinated by a

board with the managing director of Carl Zeiss Optronics, Kobus Viljoen, as the cluster chairperson/convener. One of the first projects will be the development of a photonics technician course, given the serious shortage of photonics technicians and artisans in South Africa. A task team, comprising academia and industry representatives, was created to develop a curriculum for photonics technicians in line with South Africa's industry requirements.

During his welcome speech at the workshop, Dlamini said, "We are here to develop a coherent, comprehensive and multidisciplinary R&D strategy for photonics in South Africa. While the CSIR is currently active in photonics, this mainly involves defense-related research and has had a limited impact on the private sector. Hence, the challenge is to get industries involved and ensure that South Africa is recognized as a world leader in photonics."

Photonics investigates the manipulation of photons, mainly in the ultraviolet, visible, and infrared region of the electromagnetic spectrum. It has applications in many fields, including light detection, illumination and displays, communication, surgery, data storage and processing, materials processing, medical diagnostics and surgery, security, and defense. Globally, numerous initiatives are aimed at developing photonics-based research and development.

The workshop kicked off with presentations from three international experts in the field of photonics—Reinhart Poprawe, managing director of the Fraunhofer Institute for Laser Technology in Germany; Fernando Mendoza Santoyo, director-general of the National Optics Institute in Mexico; and Robert Breault from the Breault Research Organization in the United States.

Poprawe talked about the European Photonics strategy document titled Photonics 21. He said, "There is huge potential for the photonics industry in Europe. From life sciences and health to the automotive and communications industries, photonics has a place. Further, current global challenges and trends have demanded a rethink into alternative ways of addressing these demands." Photonics 21 was developed by industry and academia. It aims to maintain and expand Europe's leading position on photonics worldwide.

Mendoza explained how the photonics industry in Mexico is, in many ways, similar to that of South Africa and that they

are developing a similar strategy. He said, "Ultimately it is about making a social impact. This work must assist in providing a better life for people and this is what we are trying to achieve."

Breault, who made the last presentation, is the father of the cluster concept and is also the chair of the Arizona Photonics Cluster. He has been involved in the establishment of various photonics clusters from Tucson to Korea and Australia, among others.

The presentations were followed by intense discussions on the draft strategy document during which both academia and industry representatives provided valuable and constructive suggestions incorporating all their needs. The proposals generated during the workshop will be collated into a strategy for the DST's approval.

Record Research Investment to Benefit New Zealand

The Foundation for Research, Science and Technology of New Zealand has approved a record NZ\$785 million in contracts with more than two dozen research organizations in its main 2008 investment round, the Foundation announced in mid-July.

Foundation chief executive Murray Bain said there have been significant increases in investments that directly help exporters and investments that focus on manufactured products, with strong support for research in the primary sector.

"This investment round is great for science and it is great for New Zealand," said Bain. He listed some of the exciting contracts, including those made in materials research. Bain said that "in our New Materials, Technologies and Services area, with \$34.7 million committed in year one, there is significant research in high-tech and high-value areas, such as nanotechnology projects being done by VicLink and GNS Science, and the hybrid plastics work at the University of Auckland.

"We're also excited by the potential of LanzaTech's work to develop a high-energy biofuel from industrial waste gases. It has the potential to be used at blends of up to 90% with petrol without causing problems with car engines."

The Foundation for Research, Science and Technology is a funding agency that invests over NZ\$530 million a year on behalf of the New Zealand Government, in public research, science, and technology and in assisting firms with research and development initiatives. □