

SCIENCE POLICY

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DOE Announces 20-Year Plan for Science Facilities

During a press conference on November 10, U.S. Secretary of Energy Spencer Abraham unveiled the list of the U.S. Department of Energy's priorities for science facilities over the next 20 years. The 28 facilities cover the range of science supported by DOE's Office of Science, including materials science, fusion energy, biological and environmental science, high-energy physics, and advanced scientific computation. The list is an unprecedented step to prioritize a "wish list" that was narrowed down from 53 items by DOE advisory boards and ultimately by Director of Science Ray Orbach.

Of the 12 facilities listed as "near-term," the first priority is ITER, an international collaboration to build the first fusion science experiment capable of producing a self-sustaining fusion reaction. Priority two is an UltraScale Scientific Computing Capability, to be located at multiple sites, that would increase by a factor of 100 the computing capability available to support open scientific research.

Tied for priority seven is the Transmission electron achromatic microscope (TEAM). The priority document notes that "TEAM will be the first of a new generation of intermediate-voltage electron microscopes capable of developing a much more fundamental understanding of materials by achieving resolution near 0.05 microns. TEAM will provide the U.S. with world-class electron microscopy capability, and very high-resolution imaging. . . . The TEAM microscope will allow scientists to study how atoms combine to form materials, how materials grow, and how they respond to a variety of external factors. These constitute many of the most practical things that we need to know about materials, and will improve designs for everything from better, lighter, more efficient automobiles, to stronger buildings and new ways of harvesting energy."

"Clearly, this document has implications for the budget. But it is not a budget document," Abraham said. He said that potential funds for the projects need to be identified within the president's budget priorities, and any proposed projects would be subject to congressional approval. The priority list was constructed within funding "envelopes" for

each program within the Office of Science. The "envelopes" were constructed from the Biggert bill authorization levels for the Office of Science for FY2004-2008, and then a 4% increase in authorization level each subsequent year until 2023. The document describing all 28 facilities and the prioritization process, *Facilities for the Future of Science: A Twenty-Year Outlook*, is available at www.sc.doe.gov.

Boehlert Pleased with NSF Funding in Omnibus Appropriations Bill

U.S. House Science Committee Chair Sherwood Boehlert (R-N.Y.) released a statement on November 26, 2003, regarding the portion of the omnibus appropriations bill dealing with the National Science Foundation (NSF). He said, "The appropriations bill recognizes the importance of NSF to our scientific enterprise and future economic health, increasing the agency's budget by about 5% to its highest level ever. We will continue to push for an even faster rate of growth, in line with the NSF Authorization Act, which calls for doubling the agency over five years. But in the meantime, NSF will continue to grow and prosper. I am especially pleased to see increases for important education initiatives that I have pushed, including the President's Math and Science Partnerships, the Noyce Scholarship Program [to support the education of K-12 mathematics and science teachers], and the Science, Technology, Engineering, and Mathematics Talent Expansion (STEP, or Tech Talent) program [to increase the number of students receiving associate or baccalaureate degrees in these fields]."

International Materials Technology Promotion Center Established in China

Under the support of China's Ministry of Science and Technology and Ministry of Commerce, the United Nations Industrial Development Organization (UNIDO) established the International Center for Materials Technology Promotion in Beijing, with its headquarters located at the Chinese Academy of Building Material Sciences, as reported in the October 30, 2003, Ministry of Science and Technology newsletter. The mission of the center includes establishment of the global framework and mechanisms for materials technology transfer, assistance

for developing countries to narrow the gap in market and technology, and promotion of sustainable development. According to the Ministry of Science and Technology, establishment of the center marks a new phase for China's development of science and technology intermediary firms in the field of materials.

Australia's Energy Initiative Launched

In one of the largest research projects of its type, leading Australian scientists will concentrate on the country's future energy requirements, with a view toward developing one of the world's first hydrogen economies, according to the Australian Ministry of Science. Taking the first steps toward the use of hydrogen as a clean, safe, and efficient fuel is a goal of Australia's National Research Flagship "Energy Transformed" program, launched in Newcastle last October by Bob Baldwin, Federal Member for Paterson, representing the Minister for Science, Peter McGauran.

The Energy Transformed Research Flagship Program aims to:

- develop and implement technologies leading to near-zero emissions power from fossil fuels and, eventually, large-scale hydrogen generation;
- develop cost-effective electricity and hydrogen from renewable sources;
- increase the fuel and traffic management efficiency of urban transport, leading to an eventual transition to hydrogen-powered vehicles;
- double the efficiency of fuel use (natural gas and, eventually, hydrogen) by the generation of power/heat/cooling at the point of use; and
- carry out energy-scenario analyses to guide the research activities of the program to achieve the goal of clean, cost-effective energy for all Australians.

The launch of the program coincided with the opening of the \$36 million (AUD) Commonwealth Scientific & Industrial Research Organisation (CSIRO) Energy Centre in Newcastle by Baldwin and New South Wales (NSW) Premier Bob Carr. Baldwin acknowledged the support of the NSW government and the NSW Sustainable Energy Development Authority (SEDA) for their financial collaboration on the project.

The new CSIRO Energy Centre will provide an international focus for energy research. The building showcases new and renewable energy technologies and represents the largest base of energy research and development in the Southern Hemisphere, according to the science ministry.

Science and Engineering Salary Comparison in Ireland

The Irish Council for Science, Technology and Innovation published the report "A Comparison of Starting Salaries for Science and Engineering Graduates" last year. It can be accessed on the Web at www.forfas.ie/publications/icsti030813/webpdfs/icsti030813_sci_eng_grad_salaries.pdf.

"The new Centre is a distributed energy system in action," said acting Chief of Energy Technology Jim Smitham. "Photovoltaic cells, gas microturbines, and wind generators will initially provide most of our power, with any surplus being fed back into the main grid."

CSIRO Chief Executive Geoff Garrett said, "Researchers in the energy sector worldwide are keenly aware of the importance of moving quickly toward cleaner energy generation and, ultimately, a hydrogen economy. We believe that demonstrating new and emerging technologies in a working building is an excellent way to show our industry and government partners what can be achieved."

Garrett said the decision to invest in the Energy Centre is closely linked to CSIRO's research and development strategy and to the federal government's national research priorities.

Policy News from Sri Lanka

The Ministry for Economic Reform, Science and Technology in Sri Lanka has issued a call for eminent Sri Lankan expatriate scientists to contribute their knowledge and experience to the economic development of the country. The scientists are invited for short service terms of 1-6 months within any science and technology research institute, university, or other relevant institute where their expertise is needed. The topical areas of interest include materials engineering, polymer and rubber technologies, mineral resources and precious stones, earth sciences, and food science and technology. Interested scientists may contact G. Hewagama, Secretary, Ministry for Economic Reform, Science and Technology, 561/3, Elwitigala Mawata, Colombo 05, Sri Lanka.

The October 2003 issue of *VIDYA*, the quarterly newsletter of the Sri Lankan National Science Foundation, has announced the publication of "Natural Resources of Sri Lanka 2000," containing data on all aspects of resources, their uses, and potential in the future. The report includes sections on energy and mineral resources and on sustainable development. According to the National Science Foundation, the publication is valuable as a standard source of information to scientists, planners, policymakers, students, and the general public. For information, contact the National Science Foundation, 47/5, Maitland Place, Colombo 7, Sri Lanka.

Smitham will continue in his role as acting chief of the CSIRO Division of Energy Technology until David Brockway begins his appointment as division chief on January 19. Brockway is the current chief executive officer of the CRC for Clean Power from Lignite. Brockway joined the State Electricity Commission Victoria (SECV) in 1980, where for over 13 years he held both research and management positions covering many aspects of the Commission's research and development effort, particularly in coal science. He was appointed as SECV's principal materials scientist in 1987 and manager of scientific investigations in 1990, a post he held until 1993.

Garrett said, "With the launch...of CSIRO's new Energy Transformed National Research Flagship, and our new...Energy Centre in Newcastle, David's appointment also coincides nicely with major opportunities for the division to grow substantially in the future."

Australia's other Flagship programs are Preventative Health, Light Metals, Healthy Country, Agrifood Top 5, and Wealth from Oceans.

MoRST Assesses Need for Improvement in New Zealand IT Infrastructure

During the last half of 2003, the Ministry of Research, Science & Technology (MoRST) of New Zealand has been leading an IT [information technology] infrastructure project at the request of Minister Pete Hodgson. The purpose of the project is to identify the problems and opportunities facing researchers and scientists in New Zealand in terms of affordable high-speed bandwidth since it became apparent that scientific progress in the country lags behind most other developed countries and even some developing countries due to the limitations of New Zealand's IT availability.

The project was catalyzed by a visit a year ago by Rita Colwell, director of the U.S. National Science Foundation, who remarked on New Zealand's need for an advanced network in order to keep up with the world of science. The MoRST Research

and Education Advisory Group, chaired by Peter Hunter of Auckland University, placed its report, "Demand Case for a New Zealand Advanced Network: Research, Education, and Innovation" on the Web at www.morst.govt.nz.

In the foreword of the report, Hunter invites comments to be e-mailed to AdvancedNetwork@morst.govt.nz.

Until now, as stated in the executive summary of the report, researchers have been able to access standard IT commercial services that have "not been developed or priced with research needs in mind." The Advisory Board said that the advanced network requires some government support.

In the assessment, the Advisory Board examined five major impact areas in the country's economy, which include input from the physical sciences community. Key requirements expressed by researchers in physical science are faster data transfer, online access to supercomputers, remote use by scientific apparatus, more effective videoconferencing, and avoidance of congestion on commercial networks.

Specific examples were captured in the report. A solid-state physics group works with researchers at Marseille University on annealing of nitride films *in situ* in the university's scanning electron microscope. However, because the physics group views the images over the Internet, the images are actually received "after the fact." In another example, researchers at the MacDiarmid Institute for Advanced Materials and Nanotechnology rely on broad-band videoconferencing linking more than 80 investigators at the institute with their collaborators in at least five New Zealand centers and overseas. The report said, "If the technology could be improved, this type of conferencing would be extended to include regular face-to-face meetings between collaborators both within New Zealand and abroad."

According to the Advisory Board, the current report on-line will contribute toward the government's look at the feasibility of investing in an advanced network. A final report will be published this year. □

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