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Obama's Science Team Focused on Energy, Environment

President Barack Obama's choices for science team members indicate that his Administration will focus on developing sustainable energy technologies and addressing global climate change during the next four years. Priorities will likely include research areas with short-term potential and long-term payoffs, such as nanotechnology, solar cells, and biofuels.

The new Secretary of Energy is Physics Nobel laureate Steven Chu. Chu comes to the position from Lawrence Berkeley National Laboratory (LBNL), where he has been director since August 2004. During his four years at LBNL, Chu focused primarily on the energy/environmental challenge. He created interdisciplinary research programs to work on some of the most promising alternative energy sources, including solar energy and biofuels.

Chu has also been engaged in national and international science policy efforts, such as co-chairing a 2007 report on sustainable energy commissioned by the governments of Brazil and China. As a member of the committee that produced the National Academies' influential 2006 report, *Rising Above the Gathering Storm*, Chu testified before Congress that the energy problem "is the single most important problem that has to be solved by science and technology in the coming decades."

According to its Agenda Overview, the House Science and Technology Committee of the 111th Congress plans to work with the Obama Administration to implement the Advanced Research Projects Agency for Energy (ARPA-E)—an agency proposed by Chu and others in *Rising Above the Gathering Storm*. ARPA-E would bring together teams of experts to address high-risk energy research areas that have the potential to lead to rapid development of energy technologies.

"Dr. Chu understands the significance of our energy and environmental challenges, and more importantly, understands the technical solutions necessary to address them," said Samuel Bodman, Chu's predecessor as Secretary of Energy, in a statement on December 15, 2008. "I fully expect the Department to continue as the leader of scientific funding and alternative energy technology development in the next Administration."

The Task Force on the Future of American Innovation, of which the Materials Research Society is a member, released a statement on Obama's choice of Chu for Secretary of Energy. "Dr. Chu understands that DOE basic research, as well as basic research at such agencies as



President Barack Obama

Pete Souza



Steven Chu, Secretary of Energy

Photo courtesy of the U.S. Department of Energy



Carol Browner, Assistant to the President for Energy and Climate Change

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Tom Fitzsimmons

John P. Holdren, Assistant to the President for Science and Technology

the National Science Foundation, the Department of Defense, and the National Institute of Standards and Technology, is essential to maintaining our innovation edge," the statement said.

Obama has appointed John P. Holdren, a Harvard physicist and professor of environmental policy to Assistant to the President for Science and Technology. Holdren's work has focused largely on global climate change, energy technologies, and policy. He was a member of President Bill Clinton's science advisory team from 1993 to 2001, and has been engaged in many influential reports on energy, climate change, and sustainability.

"If the oil-dependence problem is a 600-pound gorilla already in the room," said Holdren in a 2006 article for the journal *innovations*, "the climate-change problem is an 800-pound gorilla in the process of beating down the door."

According to Holdren, the energy/environment challenge is closely tied to the health of the economy and security of the nation and the world. He calls for an accelerated pace of energy-related innovation at all levels—from basic research to energy technologies already in the pipeline.

Upon Senate confirmation, Holdren will also be director of the White House Office of Science and Technology Policy (OSTP), which advises the President on science and technology matters and helps federal research and development agencies generate their policies and budgets. In addition, he co-chairs the President's Council of Advisors on Science and Technology (PCAST). PCAST is composed of 35 members from industry, education, research institutions, and other nongovernmental organizations who advise the President on science and technology issues.

The PCAST co-chairs are Harold Varmus and Eric Lander. Varmus is a former director of the National Institutes of Health and was a recipient of the 1989 Nobel Prize in Physiology or Medicine. Lander is Professor of Biology at the Massachusetts Institute of Technology and has been an instrumental force behind mammalian genome sequencing and medical genetics.

Obama's Administration includes a new advisory position, Assistant to the President for Energy and Climate Change, which is filled by Carol Browner. Although the details of the position are unclear, Browner brings experience in energy policy from her position as administrator of the Environmental Protection Agency (EPA) during the Clinton Administration and her work in international environmental protection, climate change, energy conservation, and security at the consulting firm The Albright Group.

In 2007, Chu served as the plenary

speaker at the Materials Research Society (MRS) Fall Meeting, addressing, "The World's Energy Problem and What We Can Do About It." Holdren was to serve as a co-organizer of a symposium on "Materials for Renewable Energy at the Society and Technology Nexus" at the 2009 MRS Spring Meeting but had to step down upon receiving the government appointment.

At a December address announcing his appointments of Holdren, Varmus, Lander, and the new Administrator of the National Oceanic and Atmospheric Administration, Jane Lubchenco, Obama reflected on the current science challenges and his science team. "I am confident that if we recommit ourselves to discovery; if we support science education to create the next generation of scientists and engineers right here in America; if we have the vision to believe and invest in things unseen, then we can lead the world into a new future of peace and prosperity," he said.

KENDRA RAND

NIST Seeks White Papers on Critical National Needs

The National Institute of Standards and Technology (NIST) is interested in detailed pitches for critical national and societal needs that could be the basis for new competitions for research funding under its Technology Innovation Program (TIP).

TIP promotes innovation in the United States through cost-shared funding for high-risk, high-reward research 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. Competitions for TIP funding target large national and societal needs that arguably could be addressed or reduced through a program of high-risk, transformational research. The first TIP competition in 2008 sought new technologies for inspecting, monitoring, and evaluating critical components of the country's roadways, bridges, and drinking and wastewater systems.

In a *Federal Register* notice posted on December 16, 2008, NIST asked interested parties to submit "white papers" describing an area of critical national need and the associated societal challenge and explain how those needs might be addressed through potential technological developments that fit the TIP profile of high-risk, high-reward R&D. The white papers, along with the input from NIST, the TIP Advisory Board, other government agencies, the technical communities, and other stakeholders, will be incorporated into the TIP competition planning process.

NIST announced that, while it is accepting papers in any topic area of concern to the submitter, it is particularly interested in white papers that would help further refine several topic areas now under consideration, including:

- **Civil infrastructure**—for example, construction technologies or advanced materials for transportation or for water distribution and flood control;
- **Complex networks and complex systems**—for example, new theory or mathematical tools to enable better understanding and control of the complex networks that have evolved for energy delivery, telecommunications, transportation, and finance;
- **Energy**—for example, technologies that address emerging alternative energy sources;
- **Water**—for example, technologies that address growing needs for fresh water supplies and ensure the safety of water and food supplies from contamination;
- **Manufacturing**—for example, advanced manufacturing technologies that have shorter innovation cycles, more flexibility, and are rapidly reconfigurable;
- **Nanomaterials and nanotechnology**—for example, technologies that enable the scale-up of nanomaterials and nanodevices from laboratory prototypes to commercial manufacturing;
- **Personalized medicine**—for example, advances in proteomics and genomics that could enable doctors to select optimal drug treatments and dosages based on the patient's unique genetics, physiology, and metabolic processes; and
- **Sustainable chemistry**—for example, novel, advanced process chemistries and technologies that are inherently safer and cleaner, while creating products and processes with attributes superior to conventional methods.

White papers can be submitted to meet several due dates, including **May 11, 2009** and **July 13, 2009**. White papers may be mailed to: National Institute of Standards and Technology, Technology Innovation Program, 100 Bureau Drive, Stop 4750, Gaithersburg, MD 20899-4750, Attention: Critical National Needs Ideas, or may be emailed to tipwhitepaper@nist.gov.

The white papers are expected to contain a description of an area of critical national need and the associated societal challenge, why government support is needed, the consequences of inaction, and a high-level discussion of potential technical solutions and the audience for such a competition. They should not include specific project proposals.

Detailed instructions on preparing TIP white papers may be read at "A Guide

for Preparing and Submitting White Papers on Areas of Critical National Need" at Web site www.nist.gov/tip/guide_for_white_papers.pdf.

Detailed discussion of the seven areas of particular interest is in the *Federal Register* notice, "Technology Innovation Program (TIP) Seeks White Papers," which can be accessed at www.nist.gov/tip/frn_seeking_whitepapers.pdf.

CAS Launches Photovoltaic Research Initiative

The Chinese Academy of Sciences (CAS) has launched an initiative to boost the development of solar energy technology in a bid to turn it into a major energy source in China by 2050. The initiative, which was approved by committee in December 2008, was made public at the annual meeting of CAS officials in late January.

CAS had started to motivate its experts to make an action plan and to set up a platform to support the research in solar energy utilization. It aims to forge a complete value chain including basic research, application research, and market research.

The plan will be carried out in three phases, including "utilization in selective areas" by 2015, "utilization as an alternative energy" by 2025, and "large-scale utilization" by 2035, respectively.

CAS experts said that China has a large potential for solar energy development. The duration of sunshine for two-thirds of its territory is more than 2200 hours a year. It also has vast desert areas, where solar energy could be "harvested." According to an energy industry survey by CAS experts, China has made significant progress in the photovoltaic sector. However, the research centers are scattered and demonstrate a lack of cutting-edge technology.

The United States, Japan, and European countries began to develop solar energy in the 1970s and government investment has greatly promoted solar energy research and development, especially in Japan, Germany, and Australia, according to CAS.

Germany has been promoting a so-called "Solar Energy Family Program," and fixed solar energy facilities on the roofs of homes; and Japan has launched a program to accelerate the use of solar energy, and to cut the price of solar energy by half within three to five years, according to CAS.

CAS experts said that lowering the costs for using solar energy is the key for stepping up the use of this renewable energy in China. □