

LBNL director Chu to head DOE

Physicists reacted with elation to President-elect Barack Obama's selection of Steven Chu to be secretary of the Department of Energy. If confirmed by the Senate, Chu, a Nobel laureate physicist and director of the Lawrence Berkeley National Laboratory since 2004, will become the first working research scientist to head DOE since the agency's inception in 1977.

Chu, a staunch supporter of renewable energy and a forceful advocate of urgent actions to curb global warming, shared the 1997 Nobel Prize in Physics for developing methods that use lasers to cool and trap atoms. At LBNL, he has built up the lab's portfolio of R&D in carbon-neutral alternative-energy and energy-saving technologies. With other national laboratories and universities in the San Francisco Bay area, Chu, 60, organized the Joint BioEnergy Institute, one of three DOE-funded centers that are conducting basic research to lower the cost of producing ethanol and other renewable fuels from a variety of biomass. He also was instrumental in bringing together the University of California, Berkeley; LBNL; and the University of Illinois into a BP-funded collaboration known as the Energy Biosciences Institute.



Chu

Speaking at a 15 December press conference at which Obama announced his nomination, Chu said he believes "the US and the world can and will prevail over our economic, energy security, and climate change challenges." Obama said Chu has been "working at the cutting edge of our nation's effort to develop new forms of energy," noting that "the scientists at our national labs will have a distinguished peer at the helm." Obama added that his selection of Chu "should send a signal that my administration will value science, we will make decisions based on the facts, and we understand that the facts demand bold action."

"My reaction is hooray," said Nobelist Burton Richter, retired director of SLAC. "He's a great scientist and a very good administrator," he said, adding that from Chu's interactions with Silicon Valley businesses, he also has a good understanding of how industry works.

"It's the finest appointment to that position that has ever been made," said Richard Muller, a physics professor at UCB and author of *Physics for Future Presidents: The Science Behind the Headlines* (Norton, 2008). "He has the management experience, the political finesse, and solid scientific credentials." Under Chu, said Muller, LBNL has developed "the most diverse set of energy and environmental research projects in the US."

"He's a wonderful scientist and is passionate about energy," said Mildred Dresselhaus, institute professor at MIT and a former director of DOE's Office of Science. "We will need some national and world leadership on energy. A few individuals can make a big difference there."

All three applauded Obama's selection of a scientist for a post that has typically gone to individuals with little or no background in physical sciences. Previous secretaries have included an economist, lawyers, former members of Congress, a retired admiral, and a dentist. An exception is the outgoing secretary, Samuel Bodman, who holds a doctorate in chemical engineering.

Chu will vault from managing a lab with a budget of around \$600 million and 4000 staff to an agency with annual expenditures of more than \$23 billion and more than 100 000 federal and contractor employees. About two-thirds of the department's budget goes for nuclear weapons maintenance, environmental cleanup of cold war-era weapons production, and disposing of spent nuclear fuel from the nation's commercial nuclear industry.

"I hope he will have some time left over for science," cautioned Richter, who said DOE lab managers are hopeful that Chu may "rein in the bureaucracy overload" at the department and restore a partnering relationship that Richter said once existed between the agency and the labs. Today's relationship is more arms-length; DOE treats the labs as it might if it was making a purchase from a supplier. "That's not healthy," he said.

The selection of Chu is in line with Obama's campaign promises to spend \$150 billion over 10 years on clean energy R&D and to increase the amount of energy from renewable sources to 10% of total US energy supplies by 2012 and 25% by 2025. As a member of the National Research Council committee that wrote the 2006 *Gathering Storm* report, Chu has emphasized the report's call for the creation of an "advanced research projects agency-energy" office within DOE. ARPA-E would fund high-risk projects that could lead to new clean energy technologies and big gains in energy efficiency (see *PHYSICS TODAY*, June 2006, page 27).

Obama also named former Environmental Protection Agency administrator Carol Browner to a new White House post that will coordinate energy and climate change policy throughout the federal government.

David Kramer

of the three venture capital firms that are already in place. "No one's doing this for the money," the DOE official explains, admitting that the award size won't come close to meeting a firm's cost to participate. The smaller grant size also means that DOE will get five entrepreneurs for less than the amount it paid for the first three.

Requirements are relaxed

To be eligible, venture capital firms must have a minimum of \$5 million in funds available for energy efficiency and renewable energy technology investment, and an overall fund size of at least \$50 million. Those levels are half the minimums that first-round participants had to meet. After signing a nondisclosure agreement, the entrepreneurs hired by the selected firms get full access to all the lab's inventions—except those that require a security clearance. Once a promising technology is identified, the entrepreneur prepares a business plan, assembles a management team, and raises capital for the startup company. DOE and established venture capital firms have negotiated in advance a 17-page agreement spelling out the share of equity, royalties, or both that the lab will receive. The only variable in the agreement is the lab's share of the equity.

Michael Bauer, the entrepreneur-in-residence at Oak Ridge, says he has waded through some 1500 invention disclosures since April and found five or six that are ready to be spun off in a new venture. "There are a large number of interesting technologies at Oak Ridge, from materials processing to nanotechnology and computational biology to hybrid motors, but there are not that many that fit a startup company," he said. And few are sufficiently mature to build a company around in a 12-month time frame, he adds. Most lab technologies having commercial potential will require an additional 6 to 12 months of development work before they can attract venture capital, he said. DOE's Office of Energy Efficiency and Renewable Energy, which runs the EIR program, has provided some funding to mature a number of technologies, generally in the \$200 000 to \$250 000 range.

Of the half-dozen viable technologies Bauer has brought to the attention of his colleagues at venture investment firm Foundation Capital, one or two may be spun off with the help of venture funding. To qualify for funding, a technology must fit a host of criteria—a multibillion target market, five times or better price-to-performance advan-