Materials vital to NSF and DOE strategic plans

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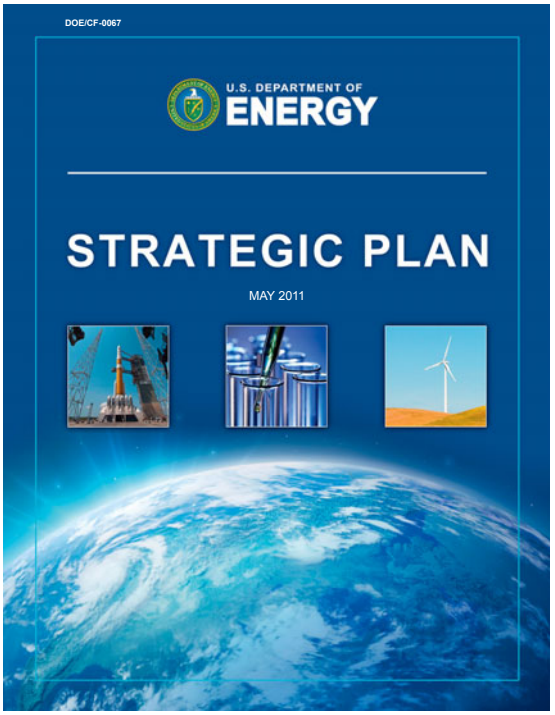
Advances in materials research play an essential role in the strategic plans released by the U.S. Department of Energy (DOE) and the National Science Foundation (NSF) in the spring of 2011. The strategies are agency-specific, but both respond to recent changes in the economic, international, and political landscapes by emphasizing innovation and transformative research.

DOE's Strategic Plan

Energy security, climate change, and national security are the main challenges currently facing the United States, according to the Department of Energy's new strategic plan. The plan lays out an aggressive strategy for meeting these challenges through investing in research, developing new technologies, and deploying innovative approaches.



This strategy will require the continued engagement of the materials research community, according to Harriet Kung, Associate Director of Science for DOE's Basic Energy Sciences program. "For research that is driven by energy needs, many of the challenges have their foundation in materials sciences and engineering. As outlined in the plan, almost every barrier to more effective use, generation, storage, or transmission of energy has an associated materials challenge," she said.

The plan lays out four primary goals for DOE related to clean energy, economic prosperity, nuclear security, and an operational framework, but the overarching science goal is to transform the country's energy system to be modern, clean, reliable, and secure. This will require a better understanding of the fundamental interactions of matter at the atomic and near-atomic levels, how materials interact with their environment, and how to predict and model materials in different environments, said Kung.

An essential aspect of the strategy is discovering the potential and the limits of energy-efficient technologies such as lithium-ion batteries and high-efficiency solar cells, and decreasing the time it takes them to become commercially available. Other DOE efforts will focus on modernizing the electrical grid to offer more efficient and reliable power and enable clean energy technologies to be seamlessly integrated into the system.

The new strategy strongly supports promising technologies through the entire laboratory-to-production process, in conjunction with the private sector. Over the last several years DOE has built a portfolio of projects to this end, which includes a number of collaborative structures that bring together people from the materials community and many other disciplines to address specific energy technology challenges. Two examples are Energy Frontier Research Centers, which focus on specific barriers to breakthroughs in energy research and Energy Innovation Hubs, which pay particular attention to potentially commercial technologies.

"The emphasis on the full range of research—from basic scientific discovery to applied research to full-scale technology demonstrations—will engage the materials sciences and engineering community broadly," said Kung.

This strategic plan was issued by Secretary of Energy Steven Chu in May 2011, and is the most recent one since 2006. The plan is available on the DOE website: science.energy.gov.

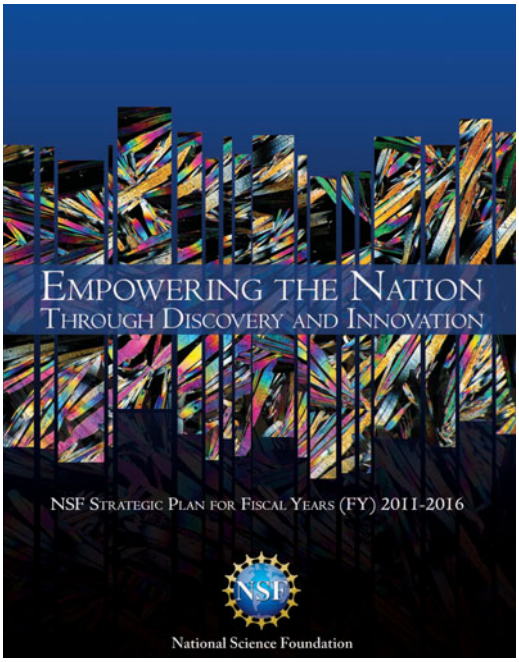
NSF's Strategic Plan

The NSF strategic plan, *Empowering the Nation through Discovery and Innovation*, sets the course for fiscal years 2011–2016. The plan lays out a refined and refocused vision for NSF, along with three high-level strategic goals: Transform the Frontiers, Innovate for Society, and Perform as a Model Organization.

According to Ian Robertson, director of the Division of Materials Research (DMR) at NSF, achieving these goals will require an engaged materials community. "In meeting the first two strategic goals, we look to the materials community. With their assistance and guidance our research portfolio will continue to evolve such that we are supporting innovative cutting-edge research that has short- and long-term impact on our society."

The strategy includes increased investment in challenging, but potentially transformative areas of research that could lead to new fields and game-

https://doi.org/10.1557/mrs.2011.193 Published online by Cambridge University Press



changing discoveries. DMR has a history of supporting innovative projects, through efforts such as the Materials Research Science and Engineering Centers, the Materials Institute, and the Materials World Network. However, assessing progress and looking toward the future is always useful, Robertson said.

"The portfolio of research we support must be examined to ensure we are able to invest in these emerging areas in an appropriate and timely manner," he said. "I believe we do this well now through our discovery of new materials phenomena and new materials, and our advancement of our understanding of fundamental materials processes and properties, but there are always ways to improve and the strategic goals set the challenge."

The plan highlights a number of other efforts to keep U.S. researchers at the frontiers of science, including a commitment to providing researchers with the tools and infrastructure they need, encouraging international collaborations, and addressing societal needs through partnerships with other agencies, academia, and the private sector. In addition, education and workforce preparation are key areas of focus.

The plan does not reflect a change in direction for NSF and DMR, said Robertson. "What it does is ask that we think about where we are today, where we would like to be in future, and start charting our course to ensure we accomplish our goals…. I think this is an exciting time to be involved in materials research."

NSF releases a new strategic plan every five years. *Empowering the Nation through Discovery and Innovation* follows the 2006 plan, *Investing in America's Future*, and is available on the NSF website: www.nsf.gov.

Kendra Redmond

NIST selects first Chief Manufacturing Officer
www.nist.gov

The National Institute of Standards and Technology (NIST) announced last month that manufacturing industry executive Michael F. Molnar has been appointed to be the agency's first-ever Chief Manufacturing Officer.

Molnar will be responsible for planning and coordination of the Institute's broad array of manufacturing research and services programs. He will serve as NIST's central point of contact with the White House, the Department of Commerce, and other agencies on technical and policy issues related to manufacturing.

Molnar has previously served as a federal fellow in the White House Office of Science and Technology Policy. Molnar will begin working at NIST on August 29, 2011.

Japan seeks to expedite commercialization of printed electronics
www.meti.go.jp

Japan's Ministry of Economy, Trade and Industry announced in late spring the launch of the Japan Advanced Printed Electronics Technology Research Association (JAPERA). Located in the National Institute of Advanced Industrial Science and Technology (AIST) in Tsukuba, JAPERA was founded with the goal of accelerating the commercialization of printed electronics—technology for low-power, low-resource manufacturing of large-area devices (e.g., displays, sensors, and batteries) and thin-film, flexible devices with enhanced productivity.

JAPERA aims to achieve early commercialization of manufacturing technologies for flexible devices and printed devices by conducting the project for the "Development of Fundamental Technologies for Next-Generation Printed Electronic Materials and Processes" (fiscal years 2010–2015) under a commission from the New Energy and Industrial Technology Development Organization (NEDO).

Specific research subjects at JAPERA include promoting more environmentally friendly manufacturing of large-area electronic circuits, increasing the energy efficiency of input/output devices for information terminals, and cultivating markets for products with strong industrial competitiveness. JAPERA will also seek to develop technologies to standardize these manufacturing and device technologies. □

https://doi.org/10.1557/mrs.2011.193 Published online by Cambridge University Press