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Panelists in Washington Explore Issues Related to Fledgling "Innovation Agenda"

In January, House Democratic Leader Nancy Pelosi and other members of the House Democratic Caucus joined select former administration officials and business and academic leaders from around the country in Washington, D.C., for two panel discussions on the Democrats' newly proposed five-year, \$128 billion Innovation Agenda. The two panels focused specifically on issues related to education, research and development (R&D), broadband access, energy, and small businesses.

The discussions came on the heels of a bipartisan congressional bill, known as the National Innovation Act, introduced in December 2005 with the aim of maintaining and improving U.S. innovation in the 21st century (see *MRS Bulletin*, February 2006, p. 85). That bill in turn was in response to growing national concern about the erosion of U.S. leadership in science and technology (S&T), with recent reports from the Council on Competitiveness and the National Academies also sounding the alarm (see *MRS Bulletin*, January 2006, p. 16).

Not surprisingly, many of the panelists echoed in their remarks the sentiments of the National Academies report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. First and foremost among the concerns expressed by the panelists was the need to improve the U.S. educational system to develop the next generation of innovators and to meet future S&T workforce needs. Belle Wei, dean of San Jose State University's College of Engineering, questioned how innovation might be taught—both technological breakthroughs, such as the semiconductor revolution that emerged from the invention of the transistor, and the innovative application of existing technology, such as how Google transformed search engines into a money-making machine. Wei maintained that teaching innovation must extend beyond the classroom.

"Students must learn to connect the dots and make vital connections in order to compete in today's global environment," she said, lamenting the lack of drive and motivation in many U.S. students.

The Innovation Agenda would help address this by making college tuition tax-deductible above a certain threshold in S&T-related fields, said Mike Honda (D-Calif.), who represents parts of Silicon Valley. The plan would also seek to place a highly qualified teacher in every classroom through such incentives as more

competitive salaries and tuition assistance. And a recent bill (H.R. 4435) introduced by Bart Gordon (D-Tenn.) would double federal investment in improving teacher preparation.

Although the U.S. economy has benefited greatly from federal funding of basic research over the last 60 years, the country has become complacent, according to Neal Lane, a professor at Rice University and former director of the White House Office of Science and Technology Policy. "We've forgotten where the good life came from," he said, citing badly deteriorating funding levels, particularly in the physical sciences, materials development, and engineering, as evidence that the nation is "sliding down a slippery slope to an uncertain and likely darker future."

Rush Holt (D-N.J.) echoed the message, criticizing the lack of a government-level commitment to research. "We are living off investments made 30 to 40 years ago, but we are not following up on that." Among other actions, the Innovation Agenda would make permanent an R&D tax credit for industry and would supply funding not just to rebuild obsolete laboratories, but also to hire early-career researchers. One of two physicists with doctorate degrees currently serving in Congress, Holt also called for a stronger commitment to S&T education to combat what he termed "lazy thinking," declaring that "every American should think like a scientist," whether he or she works in a scientific field or not.

Information technology is a key driver of U.S. economic growth, and broadband access is a very large component of that, according to Robert Atkinson, vice president of the Progressive Policy Institute, partly because it results in higher productivity by turning consumers into producers (he calls them "prosumers"). However, the United States has slipped from being second globally in terms of broadband penetration in 2000 to fifteenth in 2005, with France and Germany poised to overtake the United States in the near future. The Innovation Agenda would seek to fulfill President Bush's as-yet-unfulfilled campaign promise of universal broadband access by 2007.

Another key component of the Innovation Agenda is energy. Ernest Moniz, a physicist from the Massachusetts Institute of Technology and former undersecretary of the Department of Energy, warned that the United States is facing a "perfect storm" in terms of energy supply, national security concerns, and the environment. The country needs large amounts of ener-

gy at reasonable cost, but this is increasingly difficult because of stricter security protocols and the country's dependence on fossil fuels. Also of concern is the ongoing threat of global climate change.

"We need innovation in policy, not just science and technology, to achieve a major transformation of the national energy infrastructure within 10 years," Moniz said.

He emphasized the importance of bio-fuels, particularly for decreasing the country's dependency on Middle Eastern sources of oil. For instance, there are still significant technological challenges to be overcome with regard to cellulosic sources of ethanol, but within 10 years it could be feasible to produce a few million barrels of such fuel a day. That is not nearly sufficient to meet current U.S. demand—now 20 million barrels a day—but could provide critical elasticity to the market to help stabilize supply and price fluctuations. Other strong investment areas include the continued development of new lightweight materials for the automotive industry, better hybrid cars, fuel cell technology, and hydrogen-based energy systems.

Small businesses are a critical component in fostering technological innovation and in job creation, according to Michael Bronfein, managing partner and co-founder of Sterling Venture Partners, but increased globalization and outsourcing has taken its toll on this sector. Bronfein believes the key to innovation is twofold: new ideas and access to capital. He said that one disturbing trend is the fact that today 75% of venture-capital investments are directed to company buyouts, as compared with 2000, when 75% went to fund technological innovation.

"We need to foster an environment that encourages and rewards risk-taking," Bronfein said.

Anna Eshoo (D-Calif.), who also represents the Silicon Valley region of California, cited numerous critical ingredients for fostering innovative ideas and economic growth. There must be access to ample venture capital and other startup funding sources, as well as an end to the taxation of patent fees, which can hinder innovation. Stock options for rank-and-file employees are a terrific incentive, since they "win" when the company succeeds. And Congress can help legislatively by reducing onerous government regulations that choke fledgling businesses, streamlining the paperwork process for grants, and increasing the size of grant awards.

The overriding message was that the U.S. government leadership must act immediately, and boldly, to reverse the country's downward trend in technologi-

cal innovation, particularly since it affects every sector of industry and the national economy.

"Without planning now for our nation's future, America cannot remain competitive," said James E. Clyburn (D-S.C.), chair of the House Democratic Caucus. "Congress must make this a national priority; this isn't an agenda we can phone in."

JENNIFER OUELLETTE

EC Proposes Ambitious Biomass and Biofuels Action Plan

In early December 2005, the European Commission (EC) adopted a detailed action plan designed to increase the use of energy from forestry, agriculture, and waste materials. Andris Piebalgs, Commissioner for Energy, said, "This plan will reduce Europe's dependence on imported energy, cut greenhouse gas emissions, protect jobs in rural areas, and extend the EU's [European Union's] technological leadership in these sectors. The plan outlines measures in three sectors: heating, electricity, and transport. The measures in favor of transport biofuels, in particular, are a practical response to the problem of high oil prices."

In the context of security of supply, given Europe's increasing dependence on oil and gas imports combined with rising oil prices and the EU's commitments to reduce greenhouse gas emissions, the development of renewable energy remains high on the agenda of European energy policy. The EC has decided to propose an ambitious action plan to promote the use of biomass energy, a renewable source of energy with a huge potential. The main forms of biomass energy are transport biofuels (made mostly from cereal, sugar, and oil seed crops and waste oils); domestic biomass heating (using wood and wood residues); and the burning of wood wastes and straw in power plants to produce electricity, heat, or both.

The plan announced more than 20 actions, most of them to be implemented from 2006 onward. For transport biofuels,

they include the promotion of "biofuel obligations," through which suppliers include a minimum proportion of biofuels in the conventional fuel they place on the market. The plan includes reviews of how fuel standards could be improved to encourage the use of biomass for transport, heating, and electricity; investment in research, in particular in making liquid fuels out of wood and waste materials; and a campaign to inform farmers and forest owners about energy crops. The EC will also work on future legislation to encourage the use of renewable energy in heating.

The EC estimates that the measures in the plan will increase the use of biomass to about 150 Mtoe (million tons of oil equivalent) by 2010—compared with 69 Mtoe in 2003—without increasing the intensity of agriculture or significantly affecting domestic food production. It forecasts that this move will reduce greenhouse gas emissions by 209 million tons of CO₂ equivalent per year and reduce reliance on imported energy from 48% to 42%.

More information on the biomass action plan can be accessed at Web site http://europa.eu.int/comm/energy/res/biomass_action_plan/index_en.htm.

Finland Invests in Biofuels, Energy Efficiency, Emission Reductions

Tekes, the National Technology Agency of Finland, has announced that the Finnish government has finalized its report concerning the measures that will be carried out in energy and climate policy in the near future. The report describes how Finland intends to meet international requirements for restricting greenhouse gas emissions during the Kyoto commitment period of 2008–2012 and what longer-term goals Finland has for the future trend of greenhouse gas emissions.

The target set in the strategy is that the total consumption of renewable energy will increase by at least 25% by 2015, and by at least 40% by the year 2025. Renewable energy could then account for nearly one-third of primary energy con-

sumption, as compared with 23% in 2003. In particular, the strategy emphasizes the increased utilization of wood chips made from logging waste, as well as field biomass, recycled fuels, and biogas.

Important results have already been achieved in increasing the efficiency of energy use. The goal is to reach an additional reduction of 5% in energy consumption by the year 2015, when compared against the situation where no new measures are taken. The long-term goal in energy conservation is to halt the growth of total primary energy consumption and to bring about a falling trend.

Developing new technology is essential to implementing the energy and climate strategy. Tekes invests €60 million annually to promote the research and development of energy and environmental technologies in companies, research centers, and universities. By finding new environmental solutions, renewable energy technologies, and services, it is possible to respond to the challenges of obtaining energy in an acceptable and affordable way, according to Tekes. Environment and energy is one of Tekes' key application focus areas for the future.

A few years ago, Tekes launched a new technology program called ClimBus—Business Opportunities in Mitigating Climate Change. The five-year technology program is a large investment to develop technology and business concepts related to the reduction of greenhouse gas emissions. The program, with a total budget of €70 million, will run until 2008.

The focus areas of the ClimBus program are clean energy production and fuels, business services, technologies for energy efficiency, and non-CO₂ greenhouse gases. The program aims also at generating an overview of the business opportunities created by climate policy, along with the potential "winning technologies" for the market after 2010.

More information on the ClimBus Technology Program can be accessed at www.tekes.fi/ohjelmat/climbus. □

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