AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE)
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS (AICHE)
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS) **APRIL 2008**

ENGINEERS FORUM ON SUSTAINABILITY

AAAS SUSTAINABILITY CENTER JOINS FORUM

We are pleased to announce that the American Association for the Advancement of Science (AAAS), through its Center for Science, Innovation, and Sustainability, has joined the Forum as a co-sponsor. The Center supports three strategic goals; 1) international scientific cooperation, 2) capacity-building and workforce enhancements, and 3) sustainable development. This new relationship will facilitate and broaden the exchange of information on sustainability developments and issues between the engineering and scientific communities, and will help to identify opportunities for collaboration. For more information about the Center, please visit www.aaas.org/programs/centers/sd/.

This issue of the Forum Newsletter summarizes the fine presentations made at the January, 2008 Forum meeting. It also contains a variety of sustainability-related articles that you will find of interest. We would be pleased to receive your comments and suggestions on the format and content of the Newsletter, and how we can make it more valuable to our readers.

The next meeting of the Forum is scheduled for Friday, May 9, 2008 in the Lecture Room of the National Academy of Engineering in Washington, D.C. The Forum will meet from 9:00 a.m. to Noon, and the AAES International Activities Committee will meet in the same room from 1:00 p.m. to 4:00 p.m. All Forum attendees are invited to join the afternoon session as well.

You will be e-mailed a copy of the Forum agenda separately. We look forward to seeing you on May 9.

Al Grant, Forum Chair,
Darlene Schuster, Forum Co-Chair

GOVERNMENT

Green Building Provisions of Energy Act Highlighted

At the January 25, 2008 meeting of the Engineers Forum on Sustainability, Deborah Estes, Counsel, Senate Energy and Natural Resources Committee, summarized the green building provisions of the Energy Security and Independence Act. (Public Law 110-140). Under Title IV - Energy Savings in Buildings and Industry, she discussed Subtitle B: High Performance Commercial Buildings, and Subtitle C. Federal High Performance Green Buildings.

Section 422. Zero Net Energy Commercial Buildings Initiative, establishes a research, development, demonstration and deployment initiative that will result in technologies, practices and policies for zero-net energy commercial buildings - with the goals of (1) all new buildings constructed in 2030 achieving "zero-net energy"; (2) by 2040, half of the commercial building stock achieving zero-net energy; and by 2050, all commercial buildings achieving zero-net energy.

Under Subtitle C. Federal High Performance Green Buildings, by 2015, each agency is required to apply conservation measures to the Federal buildings of the agency so that the energy consumption per square foot of the agency is reduced by 30 percent compared to fiscal year 2003 consumption. Also, energy managers are required to perform energy and water efficiency evaluations to identify measures that are life-cycle cost-effective for their covered facilities every four years (25% per year) and may implement the measures subject to available funding. Energy managers are required to use a web-based tracking system to certify compliance with the requirements of the section.

Other features noted were (1) with certain exceptions, Federal agencies may lease space only in buildings that have earned the Energy Star label or will be renovated to meet the Energy Star requirements within a year; (2) GSA is required to review the current use of and design a strategy to increase the use of cost-effective lighting, ground source of heat pumps, and other cost-effective technologies in GSA buildings; and (3) for the purpose of conducting life-cycle cost calculations, the time period is increased from 25 years, in prior law, to 40 years.

EPA Develops Environmental Metrics Tool

Jane Bare, Chemical Engineer, U.S. Environmental Protection Agency, presented a briefing on a Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI) at the last Forum meeting. She stated that the most effective way to achieve long-term environmental results is through the use of a consistent set of metrics and a decision-making framework. TRACI has been developed to assist in impact assessment for sustainability metrics, life cycle assessment, industrial ecology, process design, and pollution prevention.

To develop TRACI, impact categories were selected, available methodologies were reviewed, and categories were prioritized for further research. During the impact assessment methodology research phase, consistency with previous modeling assumptions (especially of the EPA) was important for every category. For categories such as acidification and eutrophication, detailed US empirical models, such as those developed by the US National Acid Precipitation Assessment Program, allowed the inclusion of the more sophisticated location specific approaches and location specific characterization factors. Probabilistic analyses allowed the determination of an appropriate level of sophistication and spatial resolution necessary for impact modeling for several categories, yet the tool was designed to accommodate current inconsistencies in practice (e.g., site specific information is often not available). Assumptions and value choices were minimized by the use of midpoints.

An AICHE 2002 paper provides a brief description of the methodologies underlying TRACI, along with a discussion of the application of TRACI methodologies in various decision-making frameworks. (Bare, J.C., "Developing a Consistent Decision-Making Framework by Using the U.S. EPA's TRACI" (AICHE Annual Meeting, Indianapolis, IN, 2002)

A Journal of Industrial Ecology paper provides additional detail about the impact assessment methodologies within TRACI. (Bare, J.C., G.A. Norris, D.W. Pennington, and T. McKone, "TRACI - The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts," Journal of Industrial Ecology, Vol. 6, No. 3, 2003).

For more information concerning use of TRACI or incorporation of TRACI into other environmental tools, contact Jane Bare at bare.jane@epa.gov .

ACADEMIA

Higher Education Associations Form Sustainability Consortium

Sarah Banas, Program Associate, American Association for the Advancement of Science (AAAS), briefed the Forum on the Higher Education Associations Sustainability Consortium (HEASC) at the January Forum meeting. HEASC is an informal network of higher education associations with a commitment to advancing sustainability within their constituencies and within the system of higher education itself. HEASC was formed in 2005 to support and enhance the capacity of higher education to fulfill its critical role in producing an educated and engaged citizenry and the knowledge needed for a thriving and civil society. Its goal is to help move sustainability to the center stage in higher education and enhance the considerable work that has been and is being done by students, faculty, operational staff and administrators in hundreds of colleges and universities to make a healthy, just and sustainable future a goal of all learning and practice.

The shared principles of the HEASC member associations include:

- Open exchange of information, knowledge and experiences regarding sustainability within higher education.
- Capacity building within each member association to incorporate sustainability activities into ongoing programs and practices
- Sustainability-related training for member association staffs.
- Aligning member association annual conferences with other professional development actives with sustainable practices.
- Encouraging college and university leaders to embrace sustainability as a core campus value.

For more information on HEASC, visit http://www.aashe.org/heasc/index/php.

At AU, The Dream is Green

Home to nearly 11,000 students, American University committed itself to a 10-point action plan for practicing and promoting sustainability when President Neil Kerwin signed the Talloires Declaration last spring. Drafted in Talloires, France, in 1990, the declaration serves as a public pledge for colleges and universities to practice environmentally sound policies, create a future culture of sustainability, and increase environmental literacy. Since the signing, the university has switched its shuttle fleet to biodiesel vehicles and planted a green roof on the Media Production Center, boosting insulation and cutting rain water runoff by 80 percent.

AU created the university's first Campus Sustainability Week by tacking on a few extra days to National Campus Sustainability Day last fall. Amid the week of environmental awareness events, several student groups launched a pilot recycling program aimed at boosting recycling at AU and beyond. Other sustainability events included a solar panel demonstration offering staff and faculty commuting options that could save money and cut pollution.

A student referendum was organized to make AU a greener campus by purchasing at least half its energy from wind or other renewable sources. It passed by a landslide. The National Wildlife Federation has honored AU for this innovative effort. While the referendum is nonbinding, students worked closely with administrators to craft achievable goals, and AU is working to sharply increase its use of wind power. Students turned out in historic numbers for the referendum, which recommended allocating funds from the regular tuition increase or raising student fees if necessary to meet the goal.

Other sustainability-related developments at AU include 30 green buildings, 100 electric vehicles, 10 biodiesel buses, over 2 million kilowatts of wind power, 2,000 trees, over 700 people participating in campus beautification, and 800 bags of produce purchased through a community-supported agricultural program.

PROFESSIONAL ORGANIZATIONS

Sustainability at ASME - A Snapshot

Editor's Note: This article continues a series of brief reports on sustainability developments and activities by the Forum Co-Sponsors and other organizations in which sustainability is a program element. This article was written by Robert Rains, Government Relations Representative, ASME).

This is an exciting and productive time for ASCE in addressing issues of sustainability and energy. ASME is currently in the process of updating its 1998 position statement on the technological issues and solutions associated with global climate change. It will address the current energy challenges of a growing world population, and the issues of sustaining economic growth while incorporating different strategies related to energy consumption. The statement, scheduled for release this summer, is being authored by a small group of ASME members experienced in such energy technology fields as solar, fuel cell, coal and nuclear.

In 2007, ASME undertook an Energy Grand Challenge briefing series, and in partnership with the Congressional Research and Development (R&D) caucus, began showcasing emerging technologies that utilized non-traditional energy sources in other nations. Thus far, briefings have been held on biofuels in Brazil, ocean power in Scotland, and nuclear energy in France. On April 24, 2008, ASME will conduct another briefing on coal-to-liquids (CTL) technology, showcasing the Shenhua Corporation project to develop a CTL plant in China

In late February, 2008, members of the ASME Energy Committee (EnComm) met with high level officials in the Department of Energy (DOE) Offices of Environmental Management, Nuclear Energy (NE), Science (OS), and the National Nuclear Security Administration (NNSA), to discuss the President's FY 2009 budget request to Congress. Officials who met with ASME included the Undersecretary of Science Dr. Ray Orbach, NE Director Dennis Spurgeon, and EM Director Dr. Ines Triay. Recently, the EnComm authored a letter to members of Congress and the Administration urging them to restore funding for the ITER fusion energy program that was not funded in FY2008.

Also, for the past several months, ASME has been working with the American Institute Chemical Engineers (AIChE), IEEE-USA and other founding societies to form a Carbon Mitigation Forum working group. The goal is to collectively offer technical recommendations on sustainable energy practices for reducing carbon emissions, for policymakers and the general public.

Finally, ASME is working on the creation of a new Congressional Caucus focused on High Performance Buildings, along with the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), the Green Building Initiative (GBI), ASTM International, The American Institute of Architects (AIA), and other organizations. The working title for the new caucus is "The High Performance Buildings Congressional Caucus Coalition." The group is currently seeking to secure Chairs from both sides of the aisle, and hopes to formally launch in April, 2008 with a briefing.

For more information, please contact Robert Rains, Government Relations Representative at Rainsr@asme.org.

Greening of Meetings

A growing trend for conference and meetings planners is to “green their meetings.” Led by EPA with green provisions to be included in hotel and meeting contracts, there are a number of initial steps organizations can and are taking. Look for some of these provisions at meetings and conferences you attend:

1. Identification of Green Hotels.
2. Meals and receptions with a greener focus using local and organic based foods, and not using disposable utensils and over packaged boxed meals.
3. Use of local greener transportation including coordinated shuttle services from airports to the hotels, and use of natural gas type shuttle buses.
4. conference materials, advertisements, programs and proceedings using recycle paper and greener inks
5. Use of energy efficient or green designated buildings for meetings and conferences.

EPA is also implementing Environmentally Preferable Purchasing (EPP). It is a federal-wide program that encourages and assists Executive agencies in the purchasing of environmentally preferable products and

services. Executive Order 13101 defines these products as "*...products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose*..." examples include meetings and conferences as well as electronics.

For additional information on green meetings ideas, see the Oct. 15th issue of Science (Vol. 318, No. 5847, pp. 36-38) entitled "Greening the Meeting" and go to www.BlueGreenMeetings.org..

Local Sustainability Award Program Conducted

The National Capital Section of the American Society of Civil Engineers has established an annual sustainability award program that recognizes either private-industry outreach initiatives/projects or public legislation/programs in the Washington, D.C. metropolitan area that advance or promote the responsible and sustainable development of infrastructure, the built-environment, or the conservation of natural resources. Submissions for the program should advance or promote sustainable development as defined by ASCE as follows: "Sustainable development is the challenge of meeting human needs for natural resources, industrial projects, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource essential for future development."

Seven nominations were received and evaluated by the judging panel. At the National Capital Section meeting on March 18, 2008, the award winner was announced and the award presentation was made. The 2008 sustainability award winner was the Metropolitan Washington Council of Governments (MWCOG) for adopting the recommendations of its Green Building Group for Greening the Metropolitan Washington Region's Built Environment. The recommendations included 1) Adopting LEED as the region's standard for green buildings, 2) Encouraging all regional governments to require LEED silver as a baseline for public projects, and 3) Supporting the development of a regional LEED-based green building standard for private development.

The other award program nominations for 2008 included:

Grasses for the Masses (Chesapeake Bay Foundation, Chesapeake Bay Watershed)
Sustainability Training Initiatives (Alexandria Sanitation Authority, Alexandria, VA)
Redevelopment of Downtown Silver Spring (Silver Spring, MD)
Green Building Policy (City of Alexandria, Department of General Services)
Green House; The Energy Efficient Home (Dr. Gajanan Sabnis Residence, Silver Spring, MD)
The Commuter Connection Program (Metropolitan Washington Council of Governments)
Nominations for the 2009 sustainability award program will be solicited at the end of 2008.

INTERNATIONAL

Global Environmental Outlook 4 Published

Since 1997, the United Nations Environment Program (UNEP) has produced Global Environment Outlook (GEO) reports providing assessments of the interactions between environment and society. UNEP has coordinated a series of scientific assessments that resulted in the production of GEO reports in 1997, 1999, and 2002. Ashbindu Singh, Regional Coordinator, UNEP, summarized the fourth GEO report, published in 2007, at the last meeting of the Forum. Highlights of the Key Messages to Decision Makers follow:

There is evidence of unprecedented environmental change at global and regional levels.

- The Earth's surface is warming. This is now evident from observations of increases in global average air and ocean temperatures,
- Widespread melting of snow and ice, and rising global average sea level.
- More than 2 million people globally die prematurely every year due to outdoor and indoor air pollution.
- The "hole" in the stratospheric ozone layer over the Antarctic - the layer that protects people from harmful ultraviolet radiation -
- Is now the largest it has ever been.
- Unsustainable land use and climate change are driving land degradation.
- Per capita availability of freshwater is declining globally, and contaminated water remains the greatest single environmental cause
- of human sickness and death.

- Aquatic ecosystems continue to be heavily exploited, putting at risk sustainability of food supplies and biodiversity.
- The great majority of well-studied species are declining in distribution, abundance or both.

These unprecedented changes are due to human activities in an increasingly globalized and interconnected world. Environmental change affects human development options, with poor people being the most vulnerable. Biophysical and social systems can reach tipping points, beyond which there are abrupt, accelerating, or potentially irreversible changes. The transition toward sustainable development needs to be pursued more intensely by nations and the international community, including through capacity building and technological support to developing countries.

Decision-makers can promote timely action by integrating prevention, mitigation and adaptation efforts into the core of decision-making through sustained efforts which include:

- Reducing people's vulnerability to environmental and socio-economic change.
- Integrating environmental activities into the broader development framework.
- Enhancing treaty compliance.
- Creating enabling environments for innovation and emerging solutions
- Strengthening environmental knowledge, education and awareness.
- Mobilizing financial resources to address environmental problems.

For more information, visit www.unep.org

WFEO 2005-2007 Biennial Report Highlight

The World Federation of Engineering Organizations (WFEO) was founded in 1968 by a group of regional engineering organizations, under the auspices of the United Nations Educational, Scientific and Cultural Organizations (UNESCO) in Paris. WFEO is a non-governmental international organization that brings together national engineering organizations from over 90 nations and represents some 15 million engineers from around the world.

A key mission element of WFEO is "To foster socio-economic security and sustainable development and poverty alleviation among all the countries of the world, through the proper application of technologies". Several WFEO Committees have been involved in sustainability-related activities. A brief summary of the 2005-2007 activities of these Committees follows.

CAPACITY BUILDING COMMITTEE - In March, 2007, the "Engineering Africa" initiative of the WFEO Capacity Building Committee conducted a pilot conference in Abuja, Nigeria. The conference brought together an invited group of educators, industry leaders, government officials and NGO representatives to discuss how a multi-sector approach in enhancing engineering education in this most populous country in sub-Saharan Africa in order to develop an appropriate quality and quantity of engineering graduates to attract foreign investment, address the technical needs of the Nigerian economy, and stimulate small business development through entrepreneurship. The Committee also participated in planning the WFEO International Colloquium in Tunis in June, 2007. The goal of the meeting was to launch WFEO's capacity building efforts to increase the participation and leadership of women engineers within WFEO and the engineering profession. Sessions were held on Women in Engineering and Technology Workforce, Women in Engineering Education, Women as Entrepreneurs of Small and Medium Enterprises, and Women Enabling Technology in Communities.

WFEO ANTI-CORRUPTION TASK GROUP (ACTG) - The ACTG met in Chicago in 2006 and will meet again in New Delhi in this coming November. In two years, the Task Group has published nine ACTG reports; a number of articles have been published on Anti-Corruption procedures; an active distribution of the Engineers Charter; participation in the ASCE Task Committee on Global Principles for Professional Conduct; liaison with the group Partners in Overpowering corruption, and the presentation of the Competence and Integrity Code of Ethics Toward International Guidelines, in Atlanta in 2006. The Task Group is closely cooperating with ASCE, the World Bank, and Transparency International.

COMMITTEE ON INFORMATION AND COMMUNICATION - The first world congress on ICT for the Knowledge Society was held by the Committee in Seoul in July, 2006. In connection with the Civil Society Forum in Addis Ababa in March, 2007, the Committee played a key role in organizing the African Civil

Society Information Society. At the meeting, the African Global Alliance for ICT & Development network was launched to better represent Africa in this UN structure.

STANDING ENERGY COMMITTEE - The Committee has met in conjunction with the WFEO annual meetings during the reporting period. Several task groups have been engaged in the preparation of reports on the feasibility conditions of different energy technologies currently being considered for implementation around the world, including wind energy, nuclear power, solar energy, and bio-energy. A survey on nuclear power prospects was performed to assess the range of country views on this option. The survey covered issues related to power generation, waste disposal, nuclear energy education programs, local nuclear power design and engineering, and national policy on nuclear power generation.

For more information on WFEO and its activities, visit www.wfeo.org .

OTHER ORGANIZATIONS

Network for Emerging Leaders in Sustainability Formed

The Network for Emerging Leaders in Sustainability (NELS) is a community of early-career professionals (and professionals who are new to the topic of sustainability) who are interested in building bridges with peers in DC-area agencies and organizations. The Network includes leaders with diverse backgrounds and expertise, from natural resource management to energy policy to public health. NELS members share a common interest in taking a multidisciplinary approach to sustainability challenges - considering the economic, environmental, social and cultural dimensions of these problems. Through NELS, these emerging leaders will foster relationships enabling them to more effectively bring about a sustainable future.

NELS first meeting, held on March 5th at the Keck Center of the National Academies, was attended by over 75 people, mostly from federal agencies, environmental NGOs, and the private sector. Matt Arnold, Director of Sustainable Finance Ltd and former Chief Operating Officer at the World Resources Institute opened the discussion with a talk on "Making Sustainability Tangible", providing a number of examples of collaborations that have created notable impacts in a journey towards sustainability. In addition, several "emerging leaders" on the NELS steering group shared brief introductions on what sustainability means within their agency or organization. Following the speakers, participants had the opportunity to mingle and share their ideas for future NELS gatherings, which are expected to occur on a monthly basis.

The next NELS event is being held in conjunction with the 2008 Arthur M. Sacker Lecture on Thursday, April 3, 2008, in the National Academy of Sciences Building on C Street. Michael Crow, President of Arizona State University and visionary for ASU's School of Sustainability, will speak on "Opportunities and Limits in the Creation of Useful Knowledge for Sustainable Development." A reception and poster session in the Great Hall from 5:00-6:00 will precede the lecture, which will begin at 6:00 pm in the Auditorium. NELS will have a table in the Great Hall, where people can meet after the lecture to continue the discussion. Registration for this event is at http://sustainability.nationalacademies.org/NELS.shtml.

NELS is supported by the National Academies George and Cynthia Endowment for Sustainability Science. For further information, please contact Marty Perreault at mperreault@nas.edu or 202-334-2143.

Building Resilience: A Major Climate Change Initiative

(Editors Note: The following article was drawn from "Climate Change Adaptation: The Next Great Challenge for the Developing World", Remarks delivered by Judith Rodin, President of the Rockefeller Foundation, at the 2008 Annual Meeting of the American Association for the Advancement of Science, February 15, 2008, Boston, MA)

The Rockefeller Foundation recently announced a major climate change initiative that concentrates on building resilience to a changing, challenging natural environment. As envisioned, resilience incorporates five dimensions.

Information - Effective adaptation will always be locally driven. As the communities affected by climate change shape their preparations for and responses to it, they will need access to sound data, solid research, and definitive conclusions. They need sophisticated measurement and assessment tools, integrated information about the risks those tools reveal, and the best substantiated approaches to minimize them.

Infrastructure - Communities need institutional infrastructure that's more agile and more flexible so they can adapt and prepare more effectively for climate change. New research must help illuminate which specific improvements make the most sense in which specific geographies.

Insurance - Neither meteorologists nor climatologists can predict or prepare vulnerable communities for everything. Underserved populations need access to the social and economic security that comes from sharing risk. And the more people who share the risk, the lower the cost of coverage. Insurance also encourages individuals to lessen their risks in advance of extreme weather.

Institutional Capacity - Resilience requires that individuals and communities be prepared for and respond to crises from the ground-up. There's also a crucial role for governments and institutions to play in supporting resilience from the top-down. In both instances, sound decision-making is reliant upon sound data.

Integrated Systems - Successful adaptation systems are holistic. They integrate urban planning, land-use regulation, water management, infrastructure investment, especially in energy and transportation, early-warning systems, and emergency and disaster preparedness, among many other elements.

Basic and applied research is imperative for all five dimensions of resilience. More research is also needed in the category of essential diagnostic tools; including improved measuring and monitoring, more thorough integration of data, more technically sophisticated vulnerability assessments, and new analytics to understand and anticipate environmental change.

Basic and applied research must keep moving forward. We must stabilize the earth's climate. We must repair its ecosystems. We must support resilience. We must enable and empower millions to lift themselves from dire poverty, deprivation and disease. None of these objectives is possible without continuing investment, inquiry, and innovation.

Summit Held on America's Energy Future

The National Academies initiated its study on "America's Energy Future: Technology Opportunities, Risks and Tradeoffs" in 2007 to inform the national debate about the nation's energy future. The study has been designed to provide authorative estimates of the current contributions and future potential of existing and new energy supply and demand technologies, their associated impacts, and projected costs.

The study is being carried out by a committee of 25 experts. The Academy expects to publish a final committee report at the conclusion of the study by the end of 2008. Three independently operated panels have been organized to examine three classes of technologies for which there are considerable uncertainties and disagreements about prospective cost and performance; namely (1) energy efficiency, (2) alternative transportation fuels (such as biofuels), and (3) renewable electric power technologies.

A key event associated with this study, the National Academies Summit on America's Energy Future, was held on March 13-14, 2008, to stimulate discussion among experts with diverse points of view on energy issues as the 2008 U.S. elections approach. Feature presentations were made by leaders in energy policy representing the government, research institutions, and the private sector. Overviews were presented of recent major assessments, such as the National Petroleum Council report (Facing the Hard Truths about Energy), the Council on Foreign Relations report (National Security Consequences of U.S. Oil Dependency), the National Commission on Energy Policy's report (Ending the Energy Stalemate), and the InterAcademy Council's report (Lighting the Way).

The opening session included presentations on " Current U.S. Policy Content" by Senator Jeff Bingaman, Chair, Committee on Energy and Natural Resources, U.S. Senate; "Meeting Emerging Challenges to Global Energy Security" by Reuben Jeffery III, Undersecretary for Economic, Energy and Agricultural Affairs, U.S. Department of State; and "The Geopolitical Context of America's Energy Future" by James R. Schlesinger, Chairman, the MITRE Corporation. Other topics addressed during the course of the Summit included, Global Energy and Environmental Projections: Next Steps, The Rise of China, Facing the Hard Truths About Energy, The Future of Coal and Nuclear Power, Biofuels: How Much, How Fast, and How Difficult?, Automotive Fuel Economy: How Far Should We Go?, Prospects of a Hydrogen Economy, Basic Research and America's Energy Future, Ending the Energy Stalemate, Electricity Innovation Pathways, Lighting the Way: Toward a Sustainable Energy Future, Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?, Winning the Oil End Game, and Climate Change Technologies.

For more information about the study and the summit, including access to the texts and videos of the above presentations, visit www.nationalacademies.org/energy/ .

Grand Challenges for Engineering Include Sustainability

At the request of the National Science Foundation, the National Academy of Engineering brought together a committee of experts to sift through suggestions solicited from engineers, scientists, policymakers and the general public. The committee was chaired by former Defense Secretary William Perry. The list of challenges follows an earlier Academy list of the past centuries greatest challenges.

The challenges fall into four general themes: promoting sustainable technologies, advancing human health, reducing vulnerability to threats, and increasing the joy of living. The experts identified 14 objectives that would benefit humanity and the planet. The 14 Grand Challenges for Engineering, announced in Boston at the annual meeting of the American Association for the Advancement of Science, are:

MAKING SOLAR ENERGY AFFORDABLE: How do you convert and store the power of sunshine at a cost competitive with fossil fuels?

PROVIDING ENERGY FROM FUSION: How do you sustain a controlled fusion reaction for commercial power generation?

DEVELOPING CARBON SEQUESTRATION METHODS: How do you capture the carbon dioxide produced from fossil-fuel burning, and confine that excess carbon underground?

MANAGING THE NITROGEN CYCLE: How do you develop countermeasures for fertilizer use, internal combustion and other activities that contribute to pollution?

PROVIDING ACCESS TO CLEAN WATER: How do you address the short supply of water for personal use and irrigation in many parts of the world?

RESTORING AND IMPROVING URBAN INFRASTRUCTURE: How do you renew aging infrastructure while bringing cities into better ecological balance?

ADVANCING HEALTH INFORMATICS: How do you identify the specific factors behind wellness and illness, and follow through on the promise of personalized medicine?

ENGINEERING BETTER MEDICINES: How do you find new treatments for age-old scourges as well as newly emerging diseases?

REVERSE-ENGINEERING THE BRAIN: How do you unlock the secrets of brain function, to heal human diseases and advance the field of artificial intelligence?

PREVENTING NUCLEAR TERROR: How do you head off threats from agents who are bent upon bringing ruin to industrial society?

SECURING CYBERSPACE: How do you protect the global information infrastructure from identity theft, viruses and other threats without bogging down the flow of data?

ENHANCING VIRTUAL REALITY: How do you use computer technology to create imaginative environments for education and entertainment?

ADVANCING PERSONALIZED LEARNING: How do you move from a "one-size-fits-all" style of education to more engaging, computer-enhanced teaching techniques?

ENGINEERING THE TOOLS FOR SCIENTIFIC DISCOVERY: How do you improve our methods for exploring the frontiers of life, the atom and the cosmos?

For more information about the Grand Challenges for Engineering, visit www.nae.edu .

UPCOMING SUSTAINABILITY EVENTS

12th Annual Green Chemistry & Engineering Conference—Using Green Chemistry and Engineering to Advance Sustainability. Tuesday, June 24 – Thursday, June 26, 2008, Capital Hilton, Washington, DC.

AIChE 2008 Annual Meeting, November 16-21, 2008, Philadelphia Marriott & Pennsylvania Convention Center, Philadelphia. Call for papers is now open. Topicals include: Sustainability in the Pharmaceutical industry, Life Cycle Assessment, Sustainable Biorefineries, and Global Perspectives on Sustainability. http://www.aiche.org/Conferences/AnnualMeeting/index.aspx

Center for Sustainable Technology Practices, an industry consortium, holds monthly virtual mini meetings on the 2nd Tuesday of each month. For additional information and a list of upcoming virtual sessions on sustainability, contact ifs@aiche.org.

For more information on this newsletter
Please contact:
Darlene Schuster
AIChE Institute for Sustainability
3 Park Avenue
New York, NY 10016
Phone: 410-458-5870; Fax 717-225-0305
E-mail: darls@aiche.org

For more information on the sponsors of this newsletter please visit their web sites:
ASCE: www.asce.org
American Society of Civil Engineers
ASEE: www.asee.org
American Society for Engineering Education
AIChE: www.aiche.org
American Institute for Chemical Engineers
IEEE: www.ieee.org
ASME: www.ASME.org
AAAS: www.aaas.org
American Association for the Advancement of Science