CEP Chemical Engineering Progress

AIChE
American Institute of Chemical Engineers
Three Park Avenue
New York, NY
10016-5991
www.aiche.org

Guest Editorial
Dale L. Keairns,
2008 AIChE President

Energy Challenges and Opportunities

When the chemical engineers of the Class of 2008 retire, essentially all of the current electric power generating capacity will have been replaced with new capacity. What technology will be used? Where will chemicals be produced, and from what feedstocks? Energy system choices will be an integral part of the answers to these and similar questions.

These are indeed exciting times for chemical engineers. We will be part of the interdisciplinary teams tackling the global energy challenges that result from growing demand for and diminishing reserves of conventional fossil energy resources, increasing energy costs, a focus on energy sustainability, and concern for global warming. The market value of the enterprise to develop new energy systems and the supporting infrastructure is generally projected to be well over $2 trillion.

The AIChE Energy Initiative was launched in Fall 2005 by then-president-elect John Chen with the formation of the AIChE Energy Commission. In its April 2006 report, the commission recommends ways for AIChE to implement a more-focused response to the energy challenge. The special supplement on energy in this issue reflects three of the commission's recommendations: enhance energy programming, focus government outreach on energy, and use *CEP* as a forum for exchange on critical energy issues.

In the supplement's first article, Bond Calloway presents results of a survey of the Institute's meeting programming related to energy, which was conducted by the Research and New Technology Committee (RANTC). Responses from 4,500 meeting participants provide perspective on current topic areas. The data are now being used by the programming committee and the chemical engineering technology operating council (CTOC) to identify gaps and improve the quality of our energy programming.

Brad Buecker reports on the recent Bioeconomy Conference held at Iowa State Univ. His article illustrates the current dialogue on the future for biofuels, including the potential for production, alternative feedstocks, limitations such as water use, and potential benefits from combined biomass and coal to liquid plants.

A special event at the Salt Lake City Annual Meeting last November was the session "Challenges and Opportunities for Chemical Engineers in a Changing Global Energy Economy." Two articles in the supplement are based on panelists' presentations. Bill Banholzer and his colleagues address the potential of biofuels as a feedstock for the chemical industry; their comparison of olefin production costs for biomass, traditional and coal feedstocks, considering land use and capital requirements as well as a carbon tax, is quite instructive. Jim Katzer speaks to the future of coal in a carbon-constrained world, specifically balancing the benefits of affordable electric power from coal with environmental concerns and the projected need for carbon capture and sequestration.

Because chemical engineers' technical understanding can provide a sound basis for evaluating energy systems, guiding technology development, and informing public policy, the energy task force identified government outreach as an important activity. Objectives include facilitating communication with congressional staff and agencies, and providing education opportunities for chemical engineering students. The two articles on massive electricity storage relate directly to this initiative.

Bernie Lee and Dave Gushee are leading a Government Relations Committee (GRC) activity that addresses the need for massive electricity storage technology — a requirement to fully utilize solar-based electric power systems for baseload operation. Travis Walker, a 2007 AIChE WISE (Washington Internships for Students of Engineering) intern, focused his project on this topic. Their articles summarize current technology developments and legislative activity. Through the generous gifts of members and the Board of Directors' approval of a new initiatives program, we are pleased to be able to invite three students to participate in the WISE program this summer.

Many volunteers and staff are working to implement the energy initiative recommendations to improve our effectiveness in serving members, our profession and society. Given the interdisciplinary nature of the energy challenge, we are also engaging other professional societies, including the international community. We will report on other activities that are part of the energy initiative in future issues.