Computer models in solving the world’s energy problems

The '73-'74 Oil Embargo and the more recent shortages of natural gas have made the general public energy conscious. Moreover, depleted oil and gas resources, energy conservation legislation, and higher energy prices are creating problems in industry. Significant government programs have been initiated; more, possibly much more, is yet to come. However, causes and cures of our energy problems are controversial. Complexity of energy supply and use play as big a role in this confusion as differences in economic and political philosophy. The complexity makes it difficult to accurately assess the impact of corrective action or even if any is needed and is forcing many policy analysts to turn to computer models for help in making major public and private energy policy decisions. More conventional applications of computers to energy are also expanding with the objectives of finding or recovering more oil and gas or making energy systems more efficient.

These sessions on the applications of computers in solving the world’s energy problems can only sample the many possibilities. Two sessions, "Energy Decision Analysis" and "Energy Modeling Panel," are devoted to the very significant application of computer modeling techniques to energy policy analysis. Two other sessions, "Computers in Petroleum Exploration" and "Computers in Energy Technology," provide examples from the technological and engineering side.

"Energy Decision Analysis," chaired by Robert Karsan, has papers by working policy analysts. Tani’s paper reviews an analysis of President Ford’s proposed synthetic fuels commercialization program that seemed to have had a major impact—to kill the program. Brock’s paper addresses the economic theory used to construct several of the large energy models. Schweizer describes a model developed to predict peak electric load demand—a very important quantity in planning electric power system expansion and energy use. Rice and Meeske describe a model for natural gas demand forecasting based on interfuel competition. Although computers are not emphasized in these papers, the work described would not be practical without them.

"Computers in energy technology" chaired by Julius Chang, provides examples of computer use to improve existing technology. Kamel and Wolf show how computers are being applied to build safer and more energy efficient automobiles. Westbrook and Haselman describe work on modeling what goes on in the cylinder.
on an internal combustion engine for computer simulation. Price presents a model which relates to improved oil recovery from existing wells.

"Computers in Petroleum exploration," chaired by Pierre L. Goupillaud, has papers on several aspects of oil and gas exploration. Hoffman and Ternus discuss application of computers to petroleum exploration in general. Savit predicts enormous data processing requirements for geophysical data. Selzler gets into seismic modeling.

"Energy Modeling Panel," chaired by William F. Rousseau, addresses several significant questions raised by the widespread use of energy models in policy analysis. Participants all have wide experience with energy modeling and policy analysis. Questions include why the models were constructed, what questions they answer, historically the significant insights they have provided, how the models are being judged for credibility, and the extent to which these models are meaningful representations of the real world.