

## ABSTRACT

2008 Hawkins Memorial Lecture in Heat Transfer

Dr. Paul Hommert  
Sandia National Laboratories

“Role of Science and Engineering in Shaping our Energy Future”

As the need for affordable, reliable and lower carbon energy sources becomes a national and global imperative it is valuable to look both to the past and to the future, and explore the role that science and engineering has played. Events of 35 years ago brought energy, especially oil, to the forefront of national priorities. How do the conditions of 35 years ago compare and contrast with today? What can be learned from the impact of science and engineering on energy production, utilization and efficiency that can guide the research community as it confronts renewed national initiatives around energy? It is an economic and security imperative for the nation that the next 20 years see dramatic progress in the development of energy technologies. This progress will be led in large part by the engineers and scientists who are just beginning their careers.

The Department of Energy's national laboratories have held a key role in developing new energy sources and new approaches to energy conversion. Sandia National Laboratories has been a leader in energy technologies since the early 1970s. Early programs focused on coal gasification, solar thermal and geothermal energy technologies. Over the last decade wind energy and the transition to distributed sources of electricity have prompted new research and innovation. The importance of combustion as a fundamental process in energy conversion was recognized and continues to be pursued. Progress in these areas continues to be shaped by a balance between cost, performance and public acceptance.

In the future the globalization of energy supply and demand, and the need for constraining the growth of carbon in the atmosphere, will place even greater stress on world energy systems. The complexities of the social and political environment will require that researchers take a systems approach and provide a range of options as well as key innovations. While progress in energy over the last generation may have been incremental, when compared to advances in information technologies, cumulatively great advances have been made in both energy and in the environment. The challenges the U.S. and the world face are how to accelerate energy innovation and how to diversify our energy options. I will suggest some new ways that the research and development communities can work to achieve these goals.