Role of Fusion Energy in the 21st Century

Farrokh Najmabadi

Professor of Electrical and Computer Engineering and
Director, Center for Energy Research
UC San Diego

Abstract:

With the industrialization of the emerging nations, the world energy demand is forecasted to grow by 50% by 2030 and four folds by the end of century. Carbon-based fuels provide the bulk of global energy use now and for some time to come. This presents a significant challenge, both technically and politically, for dealing with major environmental and security issues associated with conventional fuels. As such, there has been a large interest world-wide in developing non-carbon based fuels such as nuclear fission and fusion.

In this presentation, global and national energy trends will be discussed to provide the context for developing and fielding non-carbon based fuels. Progress in developing new generations of fission reactors will be reviewed with special emphasis on proliferation and waste disposal issues (many R&D issues are similar to fusion).

Fusion energy, in principle, can provide world energy with a reasonable cost and attractive environmental and safety features. Most of the presentation focuses on the status of fusion development and technical challenges for fielding fusion power plants.

Bio:

Farrokh Najmabadi received his Ph.D. from UC Berkeley in 1982. He worked at UCLA as a Research Scientist at Institute of Plasma and Fusion Research during 1982-1994. He then joined UC San Diego in 1995 as a Professor of Electrical and Computer Engineering. His research interests include plasma physics, fusion engineering, laser/matter and laser/plasma interaction. He has led the national ARIES conceptual fusion power plants studies for over a decade. Najmabadi has won several awards including UC San Diego outstanding Engineering Professor (2003), ANS Outstanding Achievement Award (2002), and IEEE Fusion Technology award (2007).