Role of Fission and Fusion Energy in a Carbon-Constrained World

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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. Fusion energy, in principle, can provide world energy with a reasonable cost and attractive environmental and safety features. Technical challenges in fusion energy development will be presented.

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) and IEEE Fusion Technology award (2007). He is also a member of APS, ANS, Tau Beta Pi, and Eta Kappa Nu.