NPS Defense Energy Program Presents:

Defense Energy Seminar

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Nuclear Renewable Low-Carbon Energy Futures

5 December 2014 – GL 102 at 1300

With Guest Lecturer Dr. Charles Forsberg

Director and Principle Investigator, Massachusetts Institute of Technology (MIT) High-Temperature Salt-Cooled Reactor Project, and the University Lead for Idaho National Laboratory Institute's Nuclear Energy and Science (INEST) Nuclear Hybrid

Dr. Charles Forsberg

Abstract:

For the last half-million years, man has produced variable heat and light to meet his needs by throwing variable amounts of stored carbon on the fire. Only the technology has changed—from the wood cooking fire to the gas turbine. In this century, we will transition away from burning fossil fuels, either because of concerns about climate change or increasing prices of fossil fuels toward the end of the century. The alternative nuclear and renewable energy options do not economically produce variable energy on demand—and none of them are as convenient as gasoline, diesel, and jet fuel.

We examine the future low-carbon energy options, (1) from hybrid energy systems that may enable base-load use of nuclear and renewables while providing variable electricity to the grid and other products, (2) to the liquid-fuel alternatives to fossil fuels, and (3) to nuclear systems with base-load reactor operations, heat storage, and variable electricity to the gird. The challenge is not finding technical solutions but finding technically viable economic solutions. Energy production is 10% of the economy; thus, major increases in energy costs would imply major reductions in the standard of living—and political unrest.

Abridged Biography:

Dr. Charles Forsberg is the Director and Principle Investigator of the MIT High-Temperature Salt-Cooled Reactor Project, and the University Lead for Idaho National Laboratory Institute's Nuclear Energy and Science (INEST) Nuclear Hybrid Energy Systems program. He was the Executive Director of the Massachusetts Institute of Technology Nuclear Fuel Cycle Study. Before joining MIT, he was a Corporate Fellow at Oak Ridge National Laboratory. He is a Fellow of the American Nuclear Society, a Fellow of the American Association for the Advancement of Science, and recipient of the 2005 Robert E. Wilson Award from the American Institute of Chemical Engineers for outstanding chemical engineering contributions to nuclear energy, including his work in hydrogen production and nuclear-renewable energy futures. He received the American Nuclear Society (ANS) special award for innovative nuclear reactor design on salt-cooled reactors and the ANS 2014 Seaborg Award. Dr. Forsberg earned his bachelor's degree in chemical engineering from the University of Minnesota and his doctorate in Nuclear Engineering from MIT. He has been awarded 11 patents and has published over 200 papers.

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