

Postulates

- The availability of electricity is a major contributor to prosperity, development and society
- Climate change due to carbon (CO₂) emissions is real and time critical
- Nuclear power is a primary replacement for coal burning, base load electricity generation
- Electricity generation in the U.S. will mostly remain in the private sector
- The U.S. government has responsibility for environment, safety and national security

Discussion: For nuclear power to have a major impact on climate change it must replace coal burning electricity production as rapidly as possible, at an affordable cost. Simultaneously the U.S. government must resolve the spent fuel issue and help lead the international community toward an effective nonproliferation regime. I believe that the tools are in place – or in view – to make this happen. What must be added to the current mix are LEU fueled pressurized water Small Modular Reactors, (SMR) of which there are two credible designs that are preparing to begin the NRC design certification process. Standardized, factory built, transportable SMRs have the potential to substantially increase the rate at which nuclear power can add to U.S. power generation – while in principle increasing safety and security margins and reducing costs. An incremental modular deployment approach might also help reduce the financial risk to the operating utility. The U.S. Navy has demonstrated much of the modular construction technology, utilizing a skilled work force to drive down cost and production cycles, while maintaining high standards of quality. The DOE could provide CO₂ emissions reduction leadership by using SMRs as a primary means of reducing its own facility operations’ emissions profile, pursuant to Presidential Executive Order 13514.

The spent fuel issue is technically solvable with a combination of dry casks for interim storage and long term disposal in a salt repository similar to the Waste Isolation Pilot Plant (WIPP) in Carlsbad New Mexico. Dry cask storage is used throughout the nuclear industry and the WIPP has been operating successfully for over ten years - with strong local community support. WIPP has been licensed by the EPA for 10,000 years and is located deep within a salt formation that has been stable for around 250 million years. (By current law the WIPP can only accept defense waste, but the technology could be applicable to commercial waste as well.) The eventual closing the fuel cycle depends upon the development of affordable fast spectrum reactors and recycling techniques, and should remain an area of active research.

Nuclear weapons proliferation remains a critically important national security problem. While appropriate safeguards on commercial nuclear reactors are useful, the primary method proposed for reducing the risk of diversion of nuclear material from commercial reactors is the development of a “fuel bank” which would provide fuel for nations that abjure their own enrichment facilities and an associated international spent fuel storage site. Such a fuel bank would represent a major national security accomplishment, but is obviously coupled to the U.S. getting its own fuel cycle in order. In this regard, effective use of the DOE sites and nuclear capable infrastructure can be a vital asset.

*Remarks are the presenter's own and DO NOT represent the Department of Energy, or Administration positions.

