



**The Secretary of Energy**  
Washington, DC 20585

April 3, 2012

MEMORANDUM FOR WILLIAM J. PERRY  
CHAIRMAN  
SECRETARY OF ENERGY ADVISORY BOARD

FROM: STEVEN CHU 

SUBJECT: Charge to the Secretary of Energy Advisory Board Small Modular Reactors (SMRs) Subcommittee

Purpose of the Subcommittee

Nuclear power is the United States' largest source of emission-free base load electricity, providing 20 percent of the Nation's supply from 104 operating reactors and is an integral element of the Obama Administration's Clean Energy Initiative. These reactors have become reliable and safe, providing affordable electricity to consumers and good financial returns to their owners. This has led to interest in new nuclear construction by the utilities and several types of modern large (>1000 MW (e)) reactors are engaged in the licensing process before the Nuclear Regulatory Commission (NRC). However, several factors, including the economic slowdown, the lack of a price on carbon, the tragic accident at Fukushima, and the potential for new domestic supplies of unconventional natural gas, have slowed the drive toward building new large reactors in the U.S. Leadership in commercial nuclear technology could further shift to foreign suppliers. The Department of Energy's (DOE) Small Modular Reactor (SMR) program could define a new path forward for domestic advanced manufacturing as well as energy security, on a technology platform that is both safer and more financially viable.

The SMRs under consideration are much smaller (<300 MW(e)) than conventional commercial reactors. They would be built in a factory as a complete steam supply module and then transported by rail or truck to a utility generating site where they would be connected to conventional steam turbines and electric generating equipment. Factory fabrication opens the prospect of reducing costs by working in a controlled environment with a dedicated workforce that enables improvement through learning. The number of modules at each reactor site could be sized to meet the anticipated utility demand. Further advances in safety and security would result from simplicity in design, robustness to seismic events, much greater coolant to thermal power ratios, and



below ground emplacement. These methods are also expected to significantly reduce manufacturing and deployment costs. Further, the smaller size and modular construction represent a promising match with the financial structure of privately owned utilities that represent a large fraction of U.S. electricity supply. An additional attribute of the SMRs being developed is that the entire nuclear system could be designed, licensed, built, and operated by U.S. companies and institutions.

DOE has recognized the potential of these SMRs and has initiated a program to accelerate their commercialization. The vision is to have a fleet of SMRs built in the U.S. of sufficient size to make a significant contribution to the Nation's clean energy goals. As a first step in this process, the Office of Nuclear Energy has issued a Funding Opportunity Announcement (FOA) to share the costs of finalizing the designs, and completing the certification and licensing requirements of the NRC. A complete strategy to achieve the goal of an operating fleet will need to address the challenges of first-movers and the prospects of learning in factory-based manufacturing. The DOE SMR program, as envisioned, could provide the impetus to restore the U.S. into a global leadership position for commercial nuclear power and clean energy supply and to maintain global leadership in the non-proliferation and nuclear security arenas.

The broad purpose of the SEAB Subcommittee on SMRs is to advise the Secretary on ways to advance this technology to achieve a global leadership role in civil nuclear technology for the United States, and ways for DOE to accelerate that role.

### Tasks

Looking beyond the current DOE program authorized by Congress and begun by the FOA, this SEAB Subcommittee will:

- (1) Identify areas in which standards for safety, security, and nonproliferation should be developed for SMRs to enhance U.S. leadership in civil nuclear energy.
- (2) Identify challenges, uncertainties and risks to commercialization and provide advice on policies and other approaches that may be appropriate to manage these risks and accelerate deployment in support of national goals.

### Subcommittee Membership

Existing SEAB members: Nicholas Donofrio (Chair), Norm Augustine, Frances Beinecke, and John Deutch.

External members: D. James Baker, Al Carnesale, Admiral (ret) Bruce DeMars, Andrew Kadak, William Madia, Richard Meserve, Burton Richter.

### Schedule

The Subcommittee will begin its work in March 2012 and will complete its work in October 2012 with the submission of a (draft) final report to SEAB. It will make interim reports back to the SEAB as appropriate.

### Other Issues

The Department will provide staff support to the Subcommittee for the purpose of meeting the requirements of the Subcommittee charge, including: Victor Reis, Senior Advisor, Office of the Under Secretary for Science, and Matthew Crozat, Office of Nuclear Energy. Renee Stone will serve as Designated Federal Official for the Subcommittee.

The Subcommittee's work is forward looking and does not involve reviewing the FOA or responses to it.