U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY

HEARING CHARTER

The Future of Nuclear Energy

Thursday, December 11, 2014
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Purpose

The Energy Subcommittee of the House Committee on Science, Space, and Technology will hold a hearing titled *The Future of Nuclear Energy*, at 10:00 a.m. on Thursday, December 11th in room 2318 of the Rayburn House Office Building. This hearing will discuss the next generation of reactor designs, the DOE's support through its Office of Nuclear Energy (NE), and challenges for private investment in new nuclear energy technology.

Witnesses

Panel I

- **The Honorable Peter Lyons**, Assistant Secretary for Nuclear Energy, U. S. Department of Energy

Panel II

- **Dr. Ashley Finan**, Senior Project Manager, Energy Innovation Project, Clean Air Task Force
- **Mr. Mike McGough**, Chief Commercial Officer, NuScale Power
- **Dr. Leslie Dewan**, Co-founder and Chief Executive Officer, Transatomic Power
- **Mr. Daniel Lipman**, Executive Director, Policy Development, Nuclear Energy Institute

Background

NE's mission is to advance nuclear power as a resource capable of meeting the United States' energy supply, environmental, and national security needs. NE's total funding for civilian nuclear energy R&D totaled approximately $489 million in fiscal year 2014. NE supports this effort through its R&D programs, including Small Modular Reactor (SMR) Technical Support, Reactor Concepts, Fuel Cycle R&D, and Nuclear Energy Enabling Technologies (NEETs).

The purpose of NE's Reactor Concepts program is to develop new reactor designs, including high-temperature gas-cooled reactors (HTGRs), liquid metal-cooled reactors, and liquid salt-cooled reactors. These advanced designs present numerous advantages over the current fleet, such as yielding higher temperatures for industrial applications, burning nuclear waste as fuel, minimizing the volume of waste products, and overall increased efficiency and safety. This program also supports, among other things, research to support life extensions of existing reactors (large light water reactors). DOE requested approximately $100 million for this program in fiscal year 2015.

The SMR Technical Support program supports first-of-a-kind costs for design certification and licensing activities through the Nuclear Regulatory Commission (NRC) on a minimum 50% cost-shared basis with industry partners.[1] DOE requested approximately $97 million for this program in fiscal year 2015.

The Fuel Cycle R&D program supports, among other things, research to reduce waste, enhance safety, and limit proliferation risk from the nuclear fuel cycle. Pursuant to the DOE's *Strategy for the Management and Disposal of Used Nuclear Fuel and High Level Radioactive Waste*,[2] the Fuel Cycle R&D program funds R&D related to storage, transportation, and disposal of used nuclear fuel, $24 million of which is sourced from the Nuclear Waste Fund.[3] For fiscal year 2015, DOE requested approximately $189 million for the Fuel Cycle R&D program.

The Nuclear Energy Enabling Technologies (NEETs) program funds R&D in crosscutting technology areas, including materials, sensors and instrumentation, and advanced manufacturing, as well as modeling and simulation of reactor systems. DOE requested approximately $78 million for this program in fiscal year 2015.

Currently, the United States generates approximately 20 percent of its electricity from nuclear reactors that use water, also known as "light water"[4] in the nuclear context, to both cool the reactor and slow down neutrons to fission atoms of uranium fuel. Dating back to the 1950s, the United States began development and construction of numerous advanced reactor designs for research purposes. These non-light water reactor designs can reach higher levels of thermal efficiency, some of which can use nuclear waste as fuel, including fast reactors, high temperature gas-cooled reactors, and liquid salt-cooled reactors. Transatomic, a company located in Cambridge, Massachusetts, intends to develop a molten-salt reactor design that will "turn nuclear waste into a safe, clean, and scalable source of electricity."[5]

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[1] See generally, DOE website: http://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors; See also DOE cost sharing for R&D contracting here: http://energy.gov/sites/prod/files/35.2_Cost_Sharing_in_Research_and_Development_Contracts_0.pdf

[2] http://energy.gov/sites/prod/files/Strategy%20for%20the%20Management%20and%20Disposal%20of%20Used%20Nuclear%20Fuel%20and%20High%20Level%20Radioactive%20Waste.pdf

[3] In accordance with the Nuclear Waste Policy Act of 1982, as amended, the Nuclear Waste Fund is derived from fees imposed on nuclear power utilities, which carries a current balance of approximately $30 billion.

[4] Light Water refers to water composed of the more common isotope of hydrogen with one proton and zero neutrons per atom. Heavy water refers to water composed of heavy hydrogen which has one proton and one neutron per atom.

[5] http://transatomicpower.com/

In the late 1950s, the U.S. Navy began its nuclear program to fuel submarines and eventually aircraft carriers by way of small reactors. In general, small modular reactors would allow for lower initial investment compared to larger reactors, scalability, and siting flexibility. NuScale Power, a company based in Corvallis, Oregon, is developing an SMR with passive safety features that will cool itself down in an accident scenario without the need for any electricity or mechanized systems.[6]

Additional Reading:

- U.S. Government Accountability Office, "*Advanced Reactor Research: DOE Supports Multiple Technologies, but Actions Needed to Ensure a Prototype Is Built*" (June, 2014), available here: http://www.gao.gov/products/GAO-14-545

[6] http://www.nuscalepower.com/