

ECA ROUNDTABLE DISCUSSION ON SMALL MODULAR REACTORS U.S. DEPARTMENT OF ENERGY MEETING SUMMARY

On June 20, 2012, the Energy Communities Alliance (ECA) hosted a Roundtable Discussion on Small Modular Reactors (SMRs) in coordination with the U.S. Department of Energy's (DOE) Office of Nuclear Energy and Office of Science. Representatives from nine local communities participated:

- Oak Ridge, TN
- Hanford Site, WA
- Savannah River Site, SC
- Carlsbad/Waste Isolation Pilot Plant (WIPP), NM
- Idaho National Laboratory (INL), ID
- Nevada National Security Site, NV
- Portsmouth, OH
- Paducah, KY
- Newport News, VA

Representatives from the following national laboratories also attended:

- Oak Ridge National Laboratory (ORNL)
- Savannah River National Laboratory (SRNL)
- Los Alamos National Laboratory (LANL)

In addition, officials from DOE's Office of Environmental Management (EM) and the National Nuclear Security Administration (NNSA) participated in the meeting.

Meeting Purpose and Goals

Vic Reis from DOE's Office of Science – the Department's lead for providing information on SMRs for the Secretary of Energy's Advisory Board (SEAB) – asked ECA to host the roundtable. The purpose of the meeting was to understand the local perspectives on the potential use of SMRs as a power source for DOE and other federal facilities. The information provided during the meeting will be used to inform the SEAB's report for the Secretary of Energy with guidance on how to enhance U.S. leadership in civil nuclear energy and how to accelerate the development and deployment of national energy policy.

The Roundtable Discussion will have/had no bearing on DOE's SMR Funding Opportunity Announcement.

Three goals were outlined at the outset of the Roundtable discussion:

- 1. Determine the role local communities (including regional and national organizations), utilities and states should undertake in supporting the development of SMRs.**
- 2. Identify the drivers and impediments that are affecting the development of SMRs in the marketplace.**
- 3. Define the role of the federal government as a customer, partner, or supporter of SMR owners/operators.**

Key Messages for the SEAB and DOE from the Participants

While each community identified unique aspects of its community/area and the potential for SMR development and use, there were many shared messages from the participants for the SEAB and DOE:

- Create the legal authority to permit DOE to enter into power purchase agreements of up to 30 years to enable financing of both SMRs and other long-term energy projects (similar to DOD's authority for renewable energy projects).
- DOE policy should clarify that DOE currently has at least 50 year leasing authority through the Atomic Energy Act, Section 161g, and other legal authorities.
- DOE should continue to help fund SMR design and "buy down" risk for early adopters.
- A program needs to be developed to facilitate education related to SMRs.
- The federal government should develop loan programs and subsidies for SMR development.
- DOE should not voluntarily amend and narrow the applicability of its land transfer and leasing authority 10 CFR 770 (and limit the provision to closure and downsizing sites as it is currently proposing). DOE should retain the authority to lease and convey land at all DOE sites for SMRs if it wants to support SMR development. Rather DOE should consider current regulations that have been in effect for 10 years.
- DOE should consider the DOD utility rate-paying model that allows payment above the current utility rates at renewable energy projects for SMRs to facilitate financing SMRs.
- DOE should facilitate discussions with utilities and include electric cooperatives.
- DOE can consider whether to have energy service companies (ESCOs) for SMR development.

- DOE should consider pre-permitting sites for SMRs where DOE owns the land (and prepare the land and NEPA documentation).
- Outlook for operating costs and funding for SMRs needs to be further developed.
- There needs to be flexibility in how SMRs are licensed.
- DOE should look at establishing agreements for fuel and technical support.
- DOE can advocate allowing energy savings through the ESCO program to be applied to building SMRs.
- DOE should decide whether it wants to be a customer or part of the supply chain.
- DOE should look at tying SMR development to the Asset Revitalization Initiative (ARI).
- DOE must look at how to integrate the waste discussion.
- DOE should look at opportunities to “partner” with DOD and other federal agencies as potential customers of SMRs.
- DOE should consider experience with naval nuclear reactors (they now have 30 year lifetime cores).

Key Messages for Communities

- Communities need to work together to support SMR development at multiple sites.
- Communities need to consider manufacturing and workforce development issues.
- Geographic dispersion of SMR projects can help build political support.
- Communities should consider how to integrate the waste discussion.

Community Roundtable

Each community/interested consortia was asked to present its vision for SMR deployment, a proposed business model, and to address how the federal government can provide support that advances U.S. SMR commercial interests domestically and abroad.

Individual presentations considered the following:

- Creating a market for the utility to purchase power generated by SMRs.
- Public/private financing models for SMRs.
- Potential SMR manufacturing issues and opportunities (identify current manufacturing of nuclear components at DOE facilities).
- Potential Market Demand for SMRs.
- Incentives for financing SMRs.
- Location of facilities/knowledgeable workforce.
- Nuclear waste disposal issues.
- What developers and the capital market may need to participate.

Oak Ridge, TN

- The City of Oak Ridge has a resolution to support SMR development.
- The Tennessee Valley Authority (TVA), in partnership with Babcock & Wilcox (B&W), is looking at SMR development at TVA's former Clinch River Breeder Reactor site.
- B&W applied for DOE cost share for 2021 operation.
- An SMR on the site could potentially take Oak Ridge National Laboratory and Y-12 off the electric grid.
- There is interest in doing a gap analysis and capabilities assessment regarding the technologies and expertise in the area to help move SMR development more rapidly.
- See an opportunity for fuel leasing where the producer takes spent nuclear fuel back for interim storage until a site is available/ready for permanent disposal.

Hanford, WA/TRIDEC

- An SMR demonstration project is needed to go beyond licensing and into construction and operation to understand the costs.
- SMR advantage is manufacturing and construction over time.
- DOE has broader objectives (i.e., non-proliferation, affordability, availability and waste management) than a utility that wants to get power on the grid quickly.
- Energy Northwest on the Hanford site has NRC approved siting for three 1 gigawatt nuclear plants.
- Washington's senators and the Governor have sent letters to Secretary Chu supporting SMR development at the Hanford site to provide electricity for the Waste Treatment Plant (WTP).

- Believe existing facilities could work with an SMR and save up to \$50 million (reducing typically high first-of-a-kind costs).
- An additional \$400 million+ could be available for SMR development at Hanford from the proposed \$800 million savings for converting the WTP process steam plant to natural gas under the Federal Energy Management Program.

Savannah River Site

- SRS assets include land, SRNL capabilities, nuclear workforce, and nuclear supportive community
- There are two proposals by SMR and NuScale Power in to DOE to site SMRs at the SRS.
- On June 19, 2012, Governor Nikki Haley expressed support for SMR development.
- SMRs are a way to revitalize SRS assets.
- Community and national benefits include job creation, export of goods and services, enhanced national security, and reduction in greenhouse gas emissions
- Potential community involvement includes establishing a SMR Test and Training Center to conduct research/testing to support NRC licensing
- SEAB should consider adding SMR aspect to existing energy park legislation.
- SEAB interest in SMRs should also extend to R&D and future deployment efforts to support other innovative advanced reactor technologies.

Carlsbad/WIPP, NM

- SMRs are needed to address the growth of industry and population within Eddy County; by 2021, Southeastern New Mexico will need an additional power generation site.
- The role of rural electric cooperatives should be considered in the development of policy surrounding SMRs. Over 80% of the land mass of NM and 75% of the land mass of the United States is serviced by rural electric cooperatives.
- Power needs for rural electric cooperatives can be met within the range of MW that a SMR can provide.
- A power purchase agreement from the co-ops would eliminate the financial risk associated with unknown demand to capitalize the SMRs.
- In Clovis, NM, the Tres Amigas project will link ERCOT, the Western and Eastern grid interconnections.
- The region is host to the Waste Isolation Power Plant and Waste Control Specialists, two facilities designed to dispose of nuclear waste; a uranium enrichment plant and a proposed site location for a Consolidated Interim Storage Facility.

Los Alamos National Laboratory, NM

- Los Alamos National Laboratory started a study, but is not itself a good site for an SMR due to nuclear opposition nearby.
- Has power purchase agreement issues.

Idaho Falls/Idaho National Laboratory, ID

- The community has not engaged in partnership discussions with any SMR vendors to participate in the DOE demonstration program.
- The community is interested in pursuing discussions with SMR vendors to site an SMR project in eastern Idaho.
- INL was the site where the first SMR was developed for the Navy.
- Designated as the lead laboratory for nuclear R&D in 2002.
- Idaho Falls owns its own utility – has 4 hydropower plants with transmission and distribution assets.
- There are 25 nuclear-industry related businesses in eastern Idaho with experienced labor and trade unions.
- The city is looking to replace heavy coal generation with nuclear.
- Governor recently formed a Leadership in Nuclear Energy (LINE) Commission to look at nuclear energy-related opportunities for the state.
- DOE needs to play a leadership role in advising interested communities about the pros and cons of each viable technology.
- DOE should expand the current loan guarantee program for SMR projects.
- DOE needs to consider power purchase authority of up to 30 years for financing SMRs.

Nevada National Security Site, NV

- Nye County would like to be part of SMR development.
- Nye County hosts the Nevada Nuclear Security Site (NNSS, formerly the NTS), and at least two DOD facilities that could probably find good use for SMRs.
- NNSS itself has facilities that could support research and development.
- SMR implementation could add infrastructure that can complement and enhance the County's renewable energy development.
- SMRs could be very beneficial in providing power for remote, rural mining operations in Nevada.
- Nye County is interested in SMRs and dry cooling in arid regions as an opportunity to provide energy but reduce water usage.
- Renewable energy development will take precedence as long as the nation's nuclear waste disposal issues are unresolved.

Paducah, KY

- The Paducah-Area Community Reuse Organization (PACRO) promotes future uses of the Paducah Gaseous Diffusion Plant (PGDP) site that will maintain or enhance its economic contribution to local and regional communities. There is support for new short and long-term missions that will fully utilize the workforce and the site assets.
- The PACRO is working with DOE's site Manager on the development of a Land Use Plan.

- The Land Use Plan concentrates heavy industrial land use operations toward the center of the site for continuing missions, surrounded by concentric site industrial support, and general support land use/greenfield areas.
- Potential for siting a nuclear related industry at the PGDP site with support of the community and the Governor.
- Support of storage/reprocessing/small modular reactor/fast/terra power reactor to power heavy industrial client, or to be coupled with a nuclear fuel manufacturing/recycling, or a coal-to-liquid demo plant for a national lab.

Newport News, VA

- There is a move to establish an energy corridor in Hampton Roads based on unique regional assets providing a variety of long-term sustainable power options for the region's facilities, and act as a centerpiece for business development, R&D, education and training for the region, state and U.S.
- Hampton Roads assets include, among others, distributed energy consuming federal facilities, many with land and financial resources.
- There are major DOE, DOD and NASA facilities in the area needing energy to meet mission requirements for sustainability, security and surety.
- There is strong support for the energy corridor from leaders and boards including the Hampton Roads Partnership and the Hampton Roads Military and Federal Facilities Alliance.
- Hampton Roads already has the largest collection of SMRs in the world. There is commercial and federal experience with SMRs on ships, though careful community relations would be needed to get them on land.
- Power company interested in SMRs with broad experience including large reactors, energy distribution.
- There are challenges: While DOD has access to 30 year financing for Power Purchase Agreements (PPAs), DOE currently only has access to 10 year financing; at 10 years costs are too high for new power generation. Also, Virginia is a regulated state with essentially a single rate structure.

Portsmouth, OH

Presentation by Dr. Ron Filadelfo, Center for Naval Analysis: Department of Defense (DOD) Role in Deploying SMRs

- Section 2845 of the National Defense Act of 2010 directs DOD to do a study on development of nuclear power plants on military installations. This includes addressing the feasibility of SMRs.
- DOD mandate on reducing fossil fuel use also helps.
- Vendors for technology are important but the utilities need to be ready to operate it.
- For DOD, energy security and assurance are important factors.
- First-of-a-kind expenses can be paid by a combination of DOE, vendors and direct congressional funding.