

Summary: Small Modular Nuclear Reactors

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Economic and Employment Impacts of Small Modular Nuclear Reactors By David Solan and Steven Peterson

In a recent event sponsored by CSIS Energy and National Security program, Dr. David Solan, *Director, Energy Policy Institute, Boise State University*, and Dr. Steven Peterson, *Department of Business, University of Idaho* shared their research findings on the economic impacts of Small Modular Nuclear Reactors (SMRs) with the audience. SMRs are small scale nuclear reactors that are manufactured in centralized factories and could be easily deployed to plant sites. While SMRs are still at the pre-license stage, this new technological advancement had shown great potential in solving the paradox of meeting the increasing energy demand and simultaneously reducing carbon emissions at a reasonable cost. Dr. Solan and Dr. Peterson took this opportunity discussing cost-effectiveness and energy market impact of SMR commercialization, in addition to other issues. They presented a recent report on SMRs' economic and employment impacts that was authored by a group of leading university experts, and which was sponsored by the American Council on Global Nuclear Competitiveness.

The research looked into the potential impacts of the manufacture, construction, and operation of SMRs in the United States through 2030. They estimated that a “generic” 100 megawatt (MW) SMR would cost approximately \$500 million to manufacture and install on-site and would create nearly 7,000 jobs. Under the report model, the commercial impact of SMRs is significant, generating \$1.3 billion in sales: \$627 million in value-added, \$404 million in earnings (payroll), and \$35 million in indirect business taxes. The annual operation of each 100 MW SMR unit is estimated to create about 375 jobs and generate \$107 million in sales: \$68 million in value-added, \$27 million in earnings (payroll), and \$9 million in indirect business taxes.

Based on this estimated data and operating under four identified scenarios depending on policy approach, ranging from no green gas legislation to strong green gas legislation, the study suggests that SMRs could have great economic impact, particularly if accompanied by green gas legislation. In the case with the strongest policy approach, value-added economic impact (increase in GDP) could reach 36.4 billion and the job creation could be as high as 200,000. Dr. Solan and Dr. Peterson concluded that besides mitigating carbon emission, SMRs also could strengthen the U.S. industrial base and contribute to job creation.

Small Modular Reactors: Beyond Conventional Nuclear Energy Market

Dr. Edward D. Arthur, *Director, Center for Nuclear Non Proliferation Science and Technology, University of New Mexico*, in his presentation, argued that the greatest potential of SMRs may lie in the unconventional energy market, more specifically, energy-intensive heavy industry sites that use off-grid electricity as major energy source. He identified a number of industries could become great niche market for SMRs including water desalination plants and unconventional oil recovery. Dr. Arthur made a point of noting that the United States could capture a “first to market” position advantage if this proves to be the chosen path to commercialization. He recommended streamlining the regulatory process and establishing private-public partnership to better facilitate the SMR industry.

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Dr. Thomas TerBush, *Nuclear Power Strategy, Communications and Technology Transfer, Electric Power Research Institute (EPRI)*, pointed out that, assuming that legislation regulating carbon emissions will be passed, the utilities industry will have to cut back its emission level. Without non-emitting technologies like nuclear power, the electricity supply would have to be cut back substantially and electricity price would increase in order to achieve such reductions. For this reason, SMRs would be a unique fit in the big picture of future energy supply. He pointed out that in order to make this work, however, many different stakeholders will have to work together to streamline the regulation, improve and standardize the reactor design, and incorporate better built-in safety feature.

Small Modular Reactor: Security & Proliferation Considerations

Sharon Squassoni, *Senior Fellow & Director, Proliferation Prevention Program, CSIS*, discussed another aspect of the issue of expanding use of nuclear power, the danger of proliferation. She pointed out that a large number of developing countries which do not have nuclear power plants now are interested in nuclear power. Because many of these countries have only limited transmission and distribution grids, they would likely be well-served by SMRs. However, widely dispersed reactors present many security challenges: proliferation-resistance, management/operational concerns and nuclear waste. Within these challenges, the most concerning one is proliferation. Ms. Squassoni concluded that the government and the industry must work on improving the proliferation-resistance of SMRs to minimize the threat, both on the institutional level and the technology level.