

Statement by
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To the U.S. House Committee on Science, Space, and Technology, Subcommittee on Energy
Concerning H.R. 4084, the Nuclear Energy Innovation Capabilities Act
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Mr. Chairman and Members of the Committee, it is a pleasure to appear before you today along with my colleagues to discuss H.R. 4084, the Nuclear Energy Innovation Capabilities Act. As a former chairman of the Nuclear Regulatory Commission, a fellow of the American Nuclear Society, and a research administrator at a major US university, I applaud the committee for introducing this legislation and I hope that it kick starts a broader effort by all the relevant committees of jurisdiction to review and update federal nuclear energy policy.

While I currently serve as the Associate Vice Chancellor for Research at The University of Texas System and serve on two utility boards (Southern Company and Pinnacle West/Arizona Public Service) the comments I make today represent my views and not those of my employer or boards on which I serve.

In order to understand the importance of this legislation, it is important to step back and appreciate the larger global context. While in the US, we are blessed with steady electricity demand, a mature generating and transmission infrastructure, and an abundant supply of inexpensive natural gas, the rest of the world is not similarly endowed. Globally, electricity demand is expected to double between now and 2040, with over 90% of the increase occurring in non-OECD nations. Currently, there are nearly 2 billion people who still lack basic access to electricity, and many more whose current access is unreliable. Add to that the increasing urbanization of the developing world, with its attendant air quality issues, and finally the need to significantly reduce global carbon emissions, and you have what is perhaps the largest civilian technology infrastructure challenge in the history of the world.

One thing is clear, any successful response to this challenge will by necessity include a significant increase in worldwide nuclear energy generating capacity. And if the US wants to exert influence over the safety, security, and non-proliferation norms under which this global growth takes place, it must be a leader in nuclear technology development. We need to face the facts: the US is not the dominant nuclear supplier it once was. Nations such as China, Russia, South Korea, and India are moving

aggressively to develop export oriented nuclear product offerings. If the US is not in a position to compete, we will lose our international influence on key safety and security issues and forgo significant economic and job creation opportunities.

H.R. 4084 is an important first step toward aligning federal nuclear policies with today's realities, and if enacted, I believe would create a more collaborative relationship between government and private sector to advance nuclear science and promote innovation. As nuclear technology development advances into so-called Generation IV designs, it is clear that the government's role must also change. Given current budgetary constraints, I find it difficult to imagine that the federal government will be in a position to spend tens of billions of dollars on 50-50 cost shared development of six types of first-of-its-kind commercial reactor projects.

Conversely, there are some who question the need for government in advancing nuclear science and technology claiming that it is essentially a commercial enterprise. But I challenge them to find any area of modern technology and medicine that does not have at its roots basic and advanced research funded by the government. Many in the science community marked this October as the 25th anniversary of the launch of the Human Genome Project. The Human Genome Project was a 13-year project coordinated by the U.S. Department of Energy and the National Institutes of Health to sequence the 3 billion base pairs that make up human DNA. What is often overlooked is that the enabling legislation for the Project was the Atomic Energy Act of 1954 which authorized the DOE "to conduct research on the biologic effects of ionizing radiation." It was with the support, and I suspect the leeway, of your predecessors on this Committee who authorized the use the Atomic Energy Act to enable one of the most important achievements in modern science. While the government advanced the science, it was the innovators and public-private partnerships that advanced technology and medicine. This has proven to be a successful model for the U.S. system and I believe that same policy approach is enabled in this legislation.

I think the principles that underpin HR 4084 strikes the right balance prioritizing targeted federal investments, such as enhanced modeling and simulation capabilities and a "versatile neutron" scientific user facility that would enable the necessary testing of materials and fuel forms for advanced reactors. The legislation would also create a "National Reactor Innovation Center" to assist private companies in

accessing broadly technological the know-how which exists in the national laboratory system, and provide an accelerated platform for privately funded technology demonstration projects on DOE sites.

It is important to understand, however, that success will require other policy changes that extend beyond the jurisdiction of this committee. For instance, I believe it is inconceivable that any nuclear technology can achieve commercialization without the beneficial scrutiny of the U.S. Nuclear Regulatory Commission (NRC). I know that some may question my use of the term “beneficial” but I believe that defense in depth and adequate protection of people and the environment are fundamental to any successful nuclear energy technology. The NRC remains the best agency to address these requirements. I should note that the Committee staff provided me with the July 2015 testimony of NRC Chairman Burns and of Mr. Todd Garvey, Legislative Attorney for the Congressional Research Service concerning the authority of the NRC to address advanced reactor designs and licensing. After reading their statements I was once again reminded why I became an engineer and not a lawyer. But I believe there was agreement that the NRC has the authority and is fully capable of providing the review and guidance needed to support innovative technologies. The real question is how to provide the NRC with the general funds needed to perform the safety reviews.

My second point is more of a caution directed to my friends at the Department of Energy that they embrace this as an opportunity to change their approach to managing construction projects and public-private partnerships. Frankly, I have been appalled at missteps and poor policies for nuclear projects such as the Mixed Oxide (MOX) facility at Savannah River, the Uranium Processing Facility (UPF) at Oak Ridge, the Hanford Vitrification Plant, and several others. Inadequate planning and poor contract structures are to blame in most cases but application of excessive safety and security requirements that are not risk-informed have crippled and delayed many of these projects as well. Unlike the private sector which is constantly mindful of costs and questioning of changing requirements, there is little to incentivize the DOE project managers to push back. While I applaud the concept of a National Reactor Innovation Center, Congress and the DOE must ensure that the contract structures used minimize uncertainty and project schedule risk. I would encourage the Committee to consider implementing guidance to Section 7 that would direct the Department to identify governance approaches in addition to contractual mechanism that facilitate partnering with the private sector.

My last point is that most nuclear projects these days involve some level of international collaboration and foreign involvement. While continued US nuclear competitiveness is an important issue, we must also recognize the benefits of collaboration with international partners and the potential market for many of these innovative technologies will be overseas. Therefore we must be mindful of the restrictions and barriers that we have to international collaborations. For example, some DOE sites require a minimum of 60-days advance notice before allowing any foreign visitors and overly conservative interpretation of export control regulations makes consulting with foreign nuclear scientists and technologists almost impossible. These barriers are not found in other countries and unless we address this we will continue to lose innovators to those places where they find open and collaborative environments. While not expressly addressed in this legislation, I hope that the Committee may consider guidance that would encourage international collaboration and remove barriers with no loss of our national security goals.

Last month there was a White House summit on nuclear energy convened by Dr. John Holdren, Assistant to the President for Science and Technology. I was gratified that Dr. Holdren embraced, as a matter of Administration policy, "The challenges that we must count on research, development, innovation and public-private partnerships to address....are to reduce capital costs, to maximize safety against malfunction, mistakes, malevolence, and natural disasters, to manage radioactive wastes in ways that are not merely technically sound, but can gain the confidence of the public, and to minimize the pathways by which nuclear energy technology contributes to the proliferation of nuclear weapons." It is my belief, and sincere hope, that this legislation will provide the Congress and the Administration a common ground to rebuild our national nuclear science and technology infrastructure and reinvigorate the collaborative relationship between government and private sector that drives innovation.

Thank you for the opportunity to appear before you today and I look forward to your questions.