



POSITION STATEMENT

Commercial Nuclear Energy and Technology Leadership

*Adopted by the IEEE-USA
Board of Directors (21 June 2019)*

IEEE USA calls on the U.S. government to take actions that will maintain and strengthen the U.S. nuclear power industry. A strong domestic nuclear power industry will:

- strengthen U.S. competitiveness in an increasingly international marketplace,
- preserve a secure supply chain to meet the requirements of the civilian nuclear power industry and the U.S. Navy,
- help the U.S. retain its leadership in nuclear nonproliferation
- reduce carbon emissions from electric energy generated to meet national demand

Toward these goals, IEEE-USA recommends:

1. **Export Restrictions:** Congress should revise the Atomic Energy Act to remove or ameliorate export restrictions that limit U.S. technologic competition in the world markets, particularly for technologies that are widely available on the open market.

2. **Nuclear Energy Innovation:** Government and industry should support the principles elaborated in the Nuclear Energy Innovation Capabilities Act, signed into law in January 2019, which calls on the Department of Energy (DOE) to prioritize support for advanced reactor concepts, create a National Reactor Innovation Center, and share fees for pre-licensing. Where appropriate, applicable experience should be made available from other Federal agencies, e.g., the U.S. Navy. Also, the Nuclear Regulatory Commission (NRC) should study administrative approaches that might offer faster certification of innovative technologies.

3. **Small Modular Reactors:** DOE should prioritize support for development and licensing of small modular reactors (SMR)¹. Development and licensing of SMR keeps

¹ "Small Modular Reactors: Opportunities for the US Supply Chain," Nuclear Insider White Paper, page 2

U.S. technology current with the state of the art.

4. Spent Fuel, Reprocessing, Management and Storage: DOE should continue to support development of spent fuel reprocessing systems, especially those that minimize risks of diversion, in order to reduce waste volume and storage time. The DOE should further develop improved transportation and storage systems for fuel and wastes. The U.S. DOE should propose, and Congress should enact, a comprehensive spent nuclear fuel management program that would close the fuel cycle, and develop a disposal facility as mandated by the Nuclear Waste Policy Act of 1982.

5. Nuclear Energy Applications: Government and industrial support should prioritize the development of other applications of nuclear energy, such as nuclear hybrid systems, i.e., reactors used in combination with conventional or renewable sources, remote heat/power applications, emergency response power, and applications of nuclear energy to process heating (for example, in chemicals and petroleum industries, in desalination, or in separation of hydrogen). Where appropriate, grants to U.S. universities and/or consortia for such research and development (R&D) can also assist in maintaining knowledge bases for continuing nuclear capability.

6. Global Commercial Supply Chain: DOE should commission a study to identify key elements of the global commercial nuclear energy supply chain that would provide greatest competitive advantage for the U.S. The intent of this study is to articulate actions that would strengthen the U.S. position, or partnerships that would enhance these key advantages.

7. International Collaboration: Diplomatic efforts should be focused on cultivating potential international customers for U.S. nuclear technology. This will build the market for U.S. nuclear technology and encourage international collaboration for civilian applications in order to combat underbidding and utilization of stolen intellectual property by offshore vendors.

8. Education Partnerships: Governments and industry should provide funding for and support the development of partnerships within the education, labor, industry and government sectors, to develop new training programs and to enhance STEM curricula, secondary and post-secondary energy sector workforce training programs, apprenticeships and best practices.

This statement was developed by the IEEE-USA Energy Policy Committee, and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good, and promotes the careers and public policy interests of the nearly 180,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.

BACKGROUND

The United States is in danger of losing its leadership in nuclear technology because of a forecast reduction in nuclear power generation capacity, the resulting erosion of domestic nuclear design and manufacturing capabilities, and strengthening competition abroad. If the U.S. does lose its leadership position in nuclear technology it might be unable to maintain leadership in nonproliferation and might lose the strategic and economic benefits of a domestic supply chain. The U.S. could ultimately lose any influence on nuclear technology worldwide.

The global market for nuclear technology, almost all now offshore, has been estimated at \$2.6 trillion to \$4 trillion over the next two decades, but the growing influence of other suppliers, notably those in Russia and China, raises the risk that the U.S. will not share significantly in that growth. This presents national security implications. The U.S. Navy, for example, requires a robust and secure domestic nuclear energy supply chain.

The ability for our nuclear industry to compete internationally has been significantly hampered by outdated U.S. export restrictions. Under the regulations of the Department of Energy 10 Code of Federal Regulations Part 810, the time required to obtain authorization is lengthy and the outcome unpredictable. This, along with the uncertainty of obtaining NRC design certification, has caused the development and demonstration of some U.S. designs to move abroad.

The export restrictions just mentioned are embedded in the Atomic Energy Act and were intended to assure nonproliferation. The Act gives control to three separate agencies (depending on the technology involved) the NRC, Department of Energy's National Nuclear Security Administration (NNSA), and the Department of Commerce (DOC). The export restrictions are cumbersome, duplicative, and impede America's ability to compete abroad. Foreign competitors are able to react much faster because they are not subject to such overlapping restrictions.

Recent studies show that countries that have received U.S. nuclear technology are actually less likely to get involved in activities that raise proliferation concerns, such as enrichment or reprocessing of special nuclear material (SNM); but the US is not likely to have much influence in countries that purchase reactors from foreign vendors.

Currently, spent nuclear fuel is stored safely at commercial power reactor sites in 35 states awaiting development of a centralized permanent-disposal facility. There are no permanent-disposal facilities or geologic repositories in the United States at the present time.² A disposal facility as mandated by the Nuclear Waste Policy Act of 1982 should be developed in the near future.

² USDOE "Transforming the Nation's Electricity System: The Second Installment of the QER | January 2017, Summary for Policymakers", page S10

Moreover, the U.S. academic base, particularly university programs for nuclear-related science and engineering disciplines, have already declined substantially in number and will almost certainly be reduced further if our national technological advantage is not maintained. The loss of existing nuclear energy facilities and the slow progress on building new ones, particularly complex power generation plants³, also may prove deleterious to the quality of the energy sector workforce in the medium to long term.

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³ The American Energy Infrastructure, "How to Build Nuclear Plants", by Edward C. Shyloski Jr., enr.com May 15/22, 2017, Engineering News Record, page 115