

Testimony for the Record

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The Nuclear Energy Institute¹ (NEI) appreciates the opportunity to provide testimony on Department of Energy programs to the House Appropriations Subcommittee on Energy and Water Development.

NEI encourages Congress and DOE to continue to focus R&D and research infrastructure investments on efforts that can help sustain the existing nuclear fleet, incentivize new build, and accelerate the near-term development and deployment of new nuclear energy technologies. We also urge DOE and Congress to break the logjam on nuclear waste and resume a program that can lead to near-term progress toward a long-overdue solution.

NEI's FY2020 recommendations are focused on funding priorities for the DOE Office of Nuclear Energy, the Loan Programs Office, and the Advanced Research Projects Agency – Energy. Regarding environmental cleanup, NEI supports DOE in its critical mission to complete the safe cleanup of all legacy sites resulting primarily from decades of nuclear weapons development and other defense activities. Adequate funding for DOE is necessary to meet commitments to affected communities and states. This is particularly true for the cleanup of DOE's shutdown uranium enrichment facilities. These plants were operated exclusively for nuclear weapons and national defense programs for the first 15 to 20 years of operation, after which they began to provide commercial enrichment services. Despite the fact that the majority of the production at these sites was for U.S. government needs, the nuclear industry has already paid a total of \$2.6 billion toward cleanup via a congressionally-imposed fee; therefore, federal funding should be provided to complete the decontamination and decommissioning of these sites.

Office of Nuclear Energy

In total, NEI recommends \$1.495 billion for Office of Nuclear Energy programs in FY 2020. Recommendations for specific program elements are set forth below.

Nuclear Energy Affordability Initiative – DOE's Office of Nuclear Energy should establish a Nuclear Energy Affordability Initiative to focus its R&D program to significantly increase

¹ NEI is responsible for establishing nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear material licensees, and other organizations and entities involved in the nuclear energy industry.

emphasis on reducing the cost and schedule to construct new nuclear plants (particularly small modular reactors (SMRs) and other advanced reactors), and to reduce the operation and maintenance costs for both existing and new nuclear plants. The Nuclear Affordability Initiative should not become a program, but rather a national initiative focused on driving deployment by setting aggressive affordability targets for nuclear plants and then focusing R&D dollars on areas of research that offer the most promise in meeting those targets. As such, the Initiative should not receive funding separate from other programs, but rather would focus the funding of relevant programs to partnerships with industry, laboratories, universities and others to achieve mutually-agreed goals.

Demonstration Program – The Nuclear Energy Leadership Act that was recently introduced in the Senate authorizes the Secretary Of Energy to enter into agreements for the demonstration of advanced reactors. In preparation for the passage of this authorizing legislation, Congress should establish an initial level of funding to support a private-public partnership program for multiple advanced reactor demonstrations by the mid to late 2020s. Maturing these first-of-a-kind technologies enough to be considered for commercial deployment is critical to ensure international competitiveness of U.S. designs in the global nuclear market in the next decade.

Reactor Concepts R&D (FY 20 Recommendation – \$383 million)

The Reactor Concepts R&D program is vital to continued development and ultimate deployment of advanced reactors of all sizes and coolants. Funding for existing advanced reactor concepts cooperative agreements should be continued. The DOE Funding Opportunity Announcement initiated in FY18 was a good start and has been successful in spurring innovation. Within Reactor Concepts funds, the following programs should be funded as noted:

- **Advanced Reactor Technologies (\$123 million)** – Conduct R&D to support the development of advanced reactor technologies. Continue support for the technology-inclusive regulatory framework development activities. Augment on-going DOE work with R&D needs identified by industry technology working groups to accelerate technology development for molten salt, high-temperature gas, and liquid metal advanced reactors.
- **Advanced SMR R&D Support (\$110 million)** – Private-public partnerships are essential to reduce the barriers to efficient, timely, and cost-effective development, demonstration, and deployment of new technology. The DOE Funding Opportunity Announcement initiated in FY18 has been successful in spurring innovation. Funding should continue to support technical, first-of-its-kind engineering and design and licensing activities of next generation light water and non-light water reactor technologies, including small modular reactors.
- **Light Water Reactor Sustainability (\$50 million)** – The highly-successful program to establish the technical basis for extending the operating licenses for commercial reactors out to 80 years should evolve to address operational barriers and facility modernization in support of long-term operation. New work should focus on cost-shared R&D that can facilitate reduced operating costs while maintaining or enhancing safety and reliability.
- **Versatile Test Reactor (\$100 million)** – As recommended by the DOE Nuclear Energy Advisory Committee and authorized by the Nuclear Energy Innovation Capabilities Act of 2017, DOE should continue the effort to design and construct a versatile fast-spectrum test reactor to serve the needs of a broad range of users. In order to broaden the support for the

VTR, the DOE should be encouraged and required to explore the potential for international collaboration and cost-sharing.

Fuel Cycle R&D (FY 20 Recommendation – \$360 million)

The Fuel Cycle R&D program supports both the domestic fleet of reactors and the development of advanced reactors and advanced fuel cycles while maintaining laboratory expertise in various fuel cycle technologies and supporting international collaborative R&D efforts. Within the Fuel Cycle R&D funds, the following programs should be funded as indicated:

- **Accident Tolerant Fuels (\$85 million)** – Accelerate the commercial development, testing, and licensing of accident tolerant nuclear fuels that offer improved economic and safety performance and reduced nuclear plant operational and regulatory costs including the potential for higher fuel utilization and longer cycle lengths. Within this amount \$55 million is recommended to continue the participation of the industry-led teams in the cost-shared research and development program and \$30 million to support accident tolerant fuels development at the national laboratories and other facilities, including test reactors.
- **High Assay Low Enriched Uranium (\$68 million for processing of spent HEU fuels and \$40 million for the enrichment demonstration with Centrus)** DOE should provide a pathway to ensured supply of high-assay low-enriched uranium (HALEU) with uranium enrichment levels between 5 and 20 percent to support advanced reactors and advanced fuel designs. Appropriations should be provided to continue and accelerate HALEU efforts. \$60 million should be for highly enriched uranium recovery preparation and testing utilizing the ZIRCEZ process at INL and, in addition to the funds provided from Idaho Facilities Management, \$8 million should be for additional efforts supporting processing of EBR-II fuel. In addition to processing spent fuel stocks, the enrichment demonstration program with Centrus should be funded at a level of \$40 million. DOE should also address the development of a new shipping package for HALEU in various forms.
- **Nuclear Waste Management (\$116 million)** Opportunity now exists to resume the long-stalled federal program. A balance of over \$39 billion remains in the Nuclear Waste Fund, which earns over \$1.5 billion in interest annually. Meanwhile, estimated taxpayer liability for DOE's failure to satisfy its obligation has reached over \$30 billion with approximately \$7 billion already being paid from the taxpayer funded Judgment Fund. This amount increases by over \$800 million per year and the rate of growth is likely to increase in the future if the DOE does not begin fulfilling its obligation. This growing liability, and the increasing amount of used fuel stranded at shutdown plants, provides a renewed impetus for action. The current situation simply cannot be allowed to continue. DOE should resume the Yucca Mountain licensing effort while pursuing the development of interim used fuel storage capability.

Nuclear Energy Enabling Technologies (FY 20 Recommendation – \$166 million)

The Nuclear Energy Enabling Technologies (NEET) program supports a wide variety of efforts including development of cross-cutting technologies, modeling and simulation and the widely successful Gateway for Accelerated Innovation in Nuclear (GAIN) Initiative. Within available funds, the GAIN initiative should have a minimum of \$10.3 million to support the GAIN

management and funding for the GAIN vouchers that help provide industry access to the national laboratory complex. The NEET program should work to encourage transformative and creative solutions to manufacturing challenges and component development efforts that support a variety of advanced reactor technologies. A new Innovative Supply Chain Manufacturing program to reduce the supply chain manufacturing risks for advanced reactors, including light-water SMRs should be established. This program would support the manufacturing and demonstration of transformative and innovative first-of-a-kind components during the licensing phase to allow fabrication of commercial units to occur at lower costs and in a compressed delivery schedule by incorporating lessons learned. Within available funds, the following program should be funded as noted:

- **Modeling and Simulation (\$50 million)** Consistent with the enacted Nuclear Energy Innovation and Capabilities Act a modeling and simulation program should enhance the capabilities to develop advanced reactor technologies. This program should encompass the combined capabilities of the Nuclear Energy Advanced Modeling and Simulation (NEAMS) program and the Consortium for Advanced Simulation of Light Water Reactors and should support both advanced reactor development and efficient and cost-effective power plant operations for the existing fleet. This program should also focus on verification and validation and baselining of NEAMS modeling tools using vendor experimental data.

DOE Loan Program Office

The successful Section 1703 loan guarantee program should be continued. The benefits of the program are felt far beyond the participants, and also impact American jobs, domestic energy security, and U.S. global leadership and energy dominance. The loan guarantee program for nuclear energy differs from that for other fuel sources in that the program is designed not to cost the taxpayers any money, as the credit subsidy is fully paid for by the loan guarantee recipients. The program reduces the cost of electricity by lowering the financing costs of new reactors, and incentivizes private investment. The program is vital to the deployment of SMRs and other advanced nuclear reactor facilities, with applications under review and others anticipated in the near future.

Advanced Research Projects Agency – Energy (ARPA-E)

ARPA-E provides a valuable mechanism for funding of potentially transformative high-risk high-reward technologies that the private sector may not be in a position to develop independently. This agency is vitally important and funding should be continued for a full range of clean energy R&D programs, including the Modeling-Enhanced Innovations Trailblazing Nuclear Energy Reinvigoration (MEITNER) program.