



NUCLEAR ENERGY INSTITUTE

**LEGISLATIVE PROPOSAL
TO HELP MEET CLIMATE CHANGE GOALS
BY EXPANDING U.S. NUCLEAR ENERGY PRODUCTION**

Nuclear Energy: A Strategic Part of the Portfolio to Reduce Carbon Emissions

All mainstream analyses of the climate change issue by independent organizations show that reducing carbon emissions will require a portfolio of technologies, that nuclear energy must be part of the portfolio, and that major expansion of nuclear generating capacity over the next 30-50 years is essential.

Analyses of H.R. 2454, the American Clean Energy and Security Act, which passed the House on June 26, by the Environmental Protection Agency (EPA) and the Energy Information Administration (EIA) demonstrate that substantial increases in nuclear generating capacity will be essential to meet the legislation's carbon-reduction goals.

In the EPA analysis, nuclear generation increases by 150 percent, from 782 billion kilowatt-hours (kWh) in 2005 to 2,081 billion kWh in 2050. If all existing U.S. nuclear power plants retire after 60 years of operation, 187 new nuclear plants must be built by 2050. In EIA's analysis, in the "Basic" scenario,¹ the U.S. would need to build 96 gigawatts of new nuclear generation by 2030 (69 new nuclear plants). This would result in nuclear energy supplying 33 percent of U.S. electricity generation, more than any other source of electric power. To the extent the United States cannot deploy new nuclear power plants in these numbers, the cost of electricity, natural gas and carbon allowances will be higher.

A program to expand reliance on nuclear energy to meet U.S. climate change goals, even if it only approaches this scale, will require a sustained partnership between federal and state governments and the private sector, including additional policy support from the federal government.

Increasing America's reliance on nuclear energy will, of course, serve other national imperatives besides production of carbon-free electricity. Construction of new nuclear power plants will create tens of thousand of jobs – to build the plants themselves and to produce the components and materials that go into the plants. A nuclear construction program will also breathe new life into the U.S. manufacturing sector, as it rebuilds and retools to produce the pumps, valves, vessels and other nuclear-grade equipment needed for new nuclear plants.

The Nuclear Energy Institute² has developed proposed legislation designed to support this broad-based expansion. This paper summarizes the policy initiatives in NEI's legislative proposal.

¹ The "Basic" scenario represents an environment where key low-emissions technologies – including nuclear, fossil with carbon capture and sequestration and renewables – are developed and deployed on a large scale in a timeframe consistent with the emissions reduction requirements of H.R. 2454 without encountering any major obstacles.

² NEI is responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory, financial, technical and legislative issues. NEI members include all companies licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

Financing New Nuclear Plant Construction

Financing is the single largest challenge to accelerated deployment of new nuclear power plants. The financing challenge is structural. New nuclear power plants are large capital investments – likely \$6-8 billion for a new reactor – being built by relatively small companies.³ The U.S. electric power sector consists of many relatively small companies, which do not have the size, financing capability or financial strength to finance power projects of this scale on their own, in the numbers required – particularly since the same companies will also be investing in other forms of generating capacity, transmission and distribution, efficiency and demand response programs, and environmental controls.

The financing challenges are different for the regulated integrated utilities than for the merchant generating companies in those states that have restructured. But these challenges can be managed, with appropriate rate treatment from state regulators,⁴ credit support in the form of federal loan guarantees, tax-related stimulus for investment, or a combination of these.

Loan Guarantees. Loan guarantees are a powerful tool and a highly efficient way to expand the availability of private capital. Loan guarantees allow the companies to use non-recourse, project-finance-type structures, so they offset the disparity in scale between project size and company size. Loan guarantees allow higher leverage in the project's capital structure, which reduces the project's cost of capital. These benefits flow to the economy by allowing the rapid deployment of clean generating technologies at a lower cost to consumers.

The loan guarantee program authorized by the 2005 Energy Policy Act was an important step in the right direction, but the scale of the challenge requires a broader financing platform than the program envisioned by Title XVII.⁵ An effective, long-term financing platform is necessary to ensure deployment of clean energy technologies in the numbers required, and to accelerate the flow of private capital to clean technology deployment. Proposals to create a Clean Energy Deployment Administration are included in the energy and climate change legislation moving through the Senate and the House.

Tax Incentives. Federal tax stimulus would serve two purposes – accelerating capital investment in new nuclear power plants and in the critical manpower and infrastructure necessary to build new nuclear power plants in the numbers required to reduce carbon emissions. Tax incentives could refill the pipeline of highly trained personnel needed to build, operate and maintain new nuclear power plants, and restore America's ability to manufacture the components and other equipment that go into nuclear power plants, thereby creating additional jobs.

³ The largest U.S. investor-owned power company has a market value of approximately \$30-35 billion and a book capitalization of about \$10 billion. The other companies in the sector are significantly smaller. In comparison, the larger European electric companies are two or three times larger, and are better able to finance large-scale projects on balance sheet.

⁴ Supportive state policies include recovery of nuclear plant development costs as they are incurred, and Construction Work in Progress or CWIP, which allows recovery of financing costs during construction. Many of the states where new nuclear plants are planned – including Florida, Virginia, Texas, Louisiana, Mississippi, North Carolina and South Carolina – have passed legislation or implemented new regulations to encourage construction of new nuclear power plants by providing financing support and assurance of investment recovery. By itself, however, this state support may not be sufficient. The federal government must also provide financing support for deployment of clean energy technologies in the numbers necessary to address growing U.S. electricity needs and reduce carbon emissions.

⁵ Until new legislation is enacted, the Department of Energy's existing loan guarantee must continue and must be provided sufficient loan guarantee authority. The existing program currently authorizes \$18.5 billion in loan guarantees for nuclear power projects. This is clearly inadequate, given the \$6-8 billion expected cost of a new nuclear power plant. Loan volume authorized for nuclear power projects must be commensurate with the cost of these projects.

NEI's legislative proposal to ensure successful financing of new nuclear power plants includes all of these elements. The tax stimulus proposed for new nuclear power plant construction would provide new nuclear power plants the same tax-related support currently provided to renewable energy sources. To provide financial stimulus, the proposed legislation would:

- 1) Create a permanent financing platform (the Clean Energy Deployment Administration) to provide loans, loan guarantees and other credit support to clean energy technologies, including new nuclear power plants and new nuclear equipment manufacturing facilities.

Both House⁶ and Senate⁷ legislation authorize creation of CEDA. Differences between the two proposals must be reconciled:

- *The House legislation establishes CEDA as a free-standing government corporation; the Senate legislation creates CEDA as an independent entity within the Department of Energy.*
- *Under the Senate legislation, CEDA would absorb the Title XVII loan guarantee program; under the House legislation, it would not. The nuclear industry supports the Senate provision.*
- *The House legislation would impose a limitation of 30 percent on financial support to any single technology; the Senate version has no such limitation. The nuclear industry supports the Senate position.*
- *The House legislation provides sufficient capitalization to support loan volume of at least \$75 billion; the Senate, \$100 billion. The nuclear industry regards \$100 billion as a minimum acceptable additional loan volume for CEDA, in addition to the \$111 billion already authorized for the Title XVII loan guarantee program.*

- 2) Amend the Energy Policy Act of 2005 to:

- Clarify certain provisions of Title XVII to address difficulties that have arisen during implementation of the loan guarantee program.

Both House and Senate legislation include technical corrections to Title XVII, although they are not identical. For the nuclear industry, the most important change involves collateral-sharing, addressed in both House and Senate bills, but imperfectly. The nuclear industry's preferred clarification would make it clear that the Secretary of Energy has discretion to require such collateral for a loan guarantee as the Secretary determines appropriate to protect the interests of the United States in the case of a default. The industry's proposal would also make clear that the Secretary can enter into intercreditor arrangements to provide for sharing of collateral, priority of liens and control of remedies. This clarification is essential to allow co-financing of nuclear projects, in which Export Credit Agencies (ECAs) in other countries or undivided interests provide debt financing side-by-side with the DOE-guaranteed debt.⁸

Other required technical changes include: allowing the credit subsidy cost to be paid by a combination of appropriations and payments by project sponsors; removing the requirement (in Section 504(b) of the Federal Credit Reform Act) for authorization of loan volume in an appropriations bill in situations where the project sponsor pays the credit subsidy fee; and creating a revolving fund under which administrative fees collected by DOE can be recycled to cover the operating expenses of the Loan Guarantee Office. (Absent this provision, the administrative fees collected by DOE are treated as

⁶ H.R. 2454, the American Clean Energy and Security Act, which passed the House on June 26.

⁷ S. 1462, the American Clean Energy Leadership Act, which was approved by the Senate Energy and Natural Resources Committee on June 17.

⁸ A rule change proposed by DOE on August 6 would accomplish this objective. Statutory clarification would be protect against future misunderstandings or misinterpretations, however.

general revenues to the Treasury, and DOE must request appropriations every year to cover the costs of operating the loan guarantee program.)

- Improve the Standby Support risk insurance authorized by the 2005 Energy Policy Act, which protects project developers from schedule delays caused by factors beyond their control, such as licensing inefficiencies or frivolous litigation. The amendments proposed would expand the scope of coverage.

These amendments would:

1. *Retain the six-plant limit in the Energy Policy Act, but allow the coverage to roll over to the next plant if it is not exercised.*
2. *Increase the coverage on all six contracts to \$500 million.*
3. *Allow coverage of all delay costs (not just debt service) incurred by a project developer due to licensing, litigation or political factors beyond the project developer's control.*
4. *Eliminate the requirement that a project sponsor must absorb six months of delay costs before coverage begins.*
5. *Provide for independent arbitration of claims under American Arbitration Association (AAA) Commercial Arbitration Rules, rather than the approach prescribed by DOE in its final regulations (claims adjudicated by a DOE Board of Contract Appeals).*

- 3) Provide tax stimulus for investment in new nuclear power plants, new nuclear-related manufacturing and work force development, and expand the existing production tax credit provided by the 2005 Energy Policy Act.

- Amend the production tax credit authorized by 2005 Energy Policy Act to:
 - a) remove the 6,000-megawatt national megawatt limitation and make the credit available to all reactors placed in service before January 1, 2025
 - b) allow public power entities to transfer credits allocated to them (by virtue of their ownership position in a nuclear power plant) to tax-paying partners in the project, and
 - c) index the credit for inflation.
- If companies so choose, in lieu of the production tax credit authorized by the 2005 Energy Policy Act, provide a 30 percent investment tax credit for investment in new nuclear power plants on which construction begins on or before January 1, 2025, or upgrades to increase output from existing nuclear power plants, available on an annual basis during construction as investments are made (qualified progress expenditure credits). Allow credits to be used against the alternative minimum tax. Allow companies to elect a grant in lieu of the credit.
- Amend the 30 percent investment tax credit (provided in the American Recovery and Reinvestment Act of 2009 for investments in new or expanded capacity to manufacture components for clean energy technologies) to:
 - a) state explicitly that nuclear energy is a qualifying technology
 - b) expand the value of the credit to \$5 billion (from \$2.3 billion), and
 - c) extend from 3 years to 5 years the time period allowed between certification of a project by the Secretary and when the project must be placed in service.
- Reduce and eventually eliminate tariff and non-tariff barriers to international trade in nuclear plant components, including:

- a) suspension of any U.S. tariffs on imported goods and components if no U.S. manufacturing capability exists
 - b) suspension of any U.S. tariffs on imported goods and components if the country of origin eliminates, or has eliminated, tariffs on nuclear goods and components imported from the United States
 - c) investment stimulus to develop U.S. manufacturing capability for nuclear goods and components where such capability does not exist, and
 - d) instruction to the U.S. Trade Representative to negotiate elimination of tariffs on import and export of nuclear components among nuclear supplier nations.
- Provide a tax credit for the expenses of training workers for nuclear power plants and facilities producing components or fuel for such plants. The credit would be graduated and based on a percentage of wages – e.g., 40 percent of the qualified first-year wages of qualified workers, 30 percent of the qualified second-year wages, 20 percent of the qualified third-year wages of qualified workers. The credit would apply to participants in a U.S. Department of Labor Registered Apprenticeship program (or a participant in a State Apprenticeship Program recognized by the U.S. Department of Labor) and participants in an accredited program of the Institute of Nuclear Power Operations’ National Academy for Nuclear Training.
 - Amend Section 468A of the Internal Revenue Code to allow non-rate-regulated licensees that may be required by the Nuclear Regulatory Commission (NRC), as part of their operating license requirements, to pre-fund decommissioning costs to obtain a current income tax deduction as such contributions are made. (For example, some taxpayers may be required to pre-fund decommissioning costs in one year and the tax deduction for such costs should correspond to that one-year period.)
 - Remove new nuclear generating capacity and uprates to existing nuclear power plants from the baseline used to calculate a company’s compliance obligation with any renewable portfolio standard.

Implementing a More Efficient, Transparent Licensing Process

The time to market for the first nuclear power plants to be licensed under the new Part 52 licensing process can be reduced. This can be done by providing clarification on the nuclear plant licensing process established in the 1992 Energy Policy Act, to ensure that the improvements in licensing envisioned in that law are achieved. Greater efficiency can be achieved by eliminating redundancies and duplication in the licensing process and improving the transparency of the process – not by limiting environmental reviews mandated by the National Environmental Policy Act or by limiting public participation.

The amendments proposed should ensure that: (1) the first combined construction/operating licenses (COLs) are issued in 2011, (2) the licensing process does not cause unnecessary delays in authorization to load fuel, and (3) the “first movers” will be able to start commercial operation around 2017. With these amendments, if subsequent COL applications reference an early site permit (ESP) and a certified design, current 9-10-year licensing and construction schedules could be reduced to approximately six years: 24 months for licensing and 48 months for construction and start-up.

The efficiency of the licensing process can be improved by:

- Directing the NRC to use informal procedures for any hearing on Inspections, Tests, Analyses and Acceptance Criteria (ITAAC), and directing the NRC to implement legislative hearing procedures within one year of enactment. This would be consistent with NRC practice for other licensing hearings.
- Eliminating the potential for misinterpretation and misunderstandings during the later stages of construction by amending Section 185(b) of the Atomic Energy Act thus: “Following issuance of the combined license, the Commission shall ensure that the prescribed inspections, tests, and analyses are performed and, prior to operation of the facility, shall find that the prescribed acceptance criteria ~~are~~ *have been* met.”

The word “are” in the second-to-last sentence of Section 185b creates implementation difficulties for the Nuclear Regulatory Commission (NRC) and companies during construction. During construction of a new nuclear power plant and before fuel load, the licensee must perform inspections, tests and analyses of components, systems and subsystems to demonstrate that those components, systems and subsystems meet acceptance criteria set forth in the COL. These are known as ITAAC (for Inspections, Tests, Analyses and Acceptance Criteria) and there are typically as many as a thousand of them included in a COL. These ITAAC will be conducted during construction and accepted by the NRC as they are completed. When all the ITAAC have been met, the facility is eligible to operate, subject to a finding to that effect from the NRC. The use of the word “are” in Section 185b implies that ITAAC acceptance is a continuing process with no defined end point. Changing the word “are” to “have been” simply makes it clear that an ITAAC that has been completed successfully and accepted by the NRC is sufficient.

- Eliminating the mandatory uncontested hearing required before issuance of a combined license or an early site permit for a power reactor.

The mandatory hearing is an artifact of the old two-step licensing process and no longer serves a useful purpose. This would amend Section 189a(1)(A) of the Atomic Energy Act (AEA) to eliminate the requirement to conduct a hearing and make findings on uncontested issues for every COL and ESP application.

Section 189a(1)(A) of the AEA requires the Nuclear Regulatory Commission (NRC) to conduct hearings in two situations. First, if an intervenor has demonstrated the requisite standing and has submitted one admissible contention, then the NRC will conduct a contested hearing on those contested issues raised by the intervenor. In a contested hearing, the parties submit evidence and testimony, which the Atomic Safety and Licensing Board (“ASLB”) uses to make factual and legal findings on the issues raised by the intervenors. Second, independent of any contested hearing or contested issues, the NRC must conduct a hearing on uncontested issues for every Combined Operating License (“COL”) or Early Site Permit (“ESP”) application. This is the so-called “mandatory” hearing. Intervenors are not allowed to participate in the hearing on uncontested issues. In the uncontested hearing, the ASLB is merely to decide whether the Staff’s review of the application has been adequate to support its findings (i.e., conduct a “sufficiency” review). This section amends Section 189a(1)(A) to eliminate this requirement to conduct a hearing and make findings on uncontested issues for every COL and ESP application. Since the proposal does not eliminate hearings on contested issues – that is, issues raised by intervenor – the proposal does not impact intervenors’ existing rights to request a hearing, introduce proposed contentions, or otherwise participate in contested hearings. Instead, the proposal simply eliminates a redundant and unneeded “review of the Staff’s review.”

- Directing the Nuclear Regulatory Commission to seek efficiencies by using the Environmental Impact Statement (EIS) from an Early Site Permit proceeding to analyze and prepare the EIS for a combined license proceeding. This will expedite required environmental reviews in the case where the combined license application is referencing an early site permit.

An early site permit application requires the applicant to submit an environmental report, which is reviewed by the NRC and from which the NRC staff generates the environmental impact statement (EIS) required by the National Environmental Policy Act. A combined license application referencing an early site permit requires an environmental report to be submitted, from which the NRC develops another EIS. The only difference in scope between the early site permit EIS and the combined license EIS should be an assessment of the environmental impact of “new and significant” information. The combined license EIS should build on the early site permit findings and conclusions.

- Directing the NRC to amend its regulations to allow the draft EIS into evidence in a proceeding held on the proposed licensing action, providing an earlier opportunity to adjudicate environmental issues. Hearing proceedings on a combined license and an early site permit should begin on issuance of the draft EIS; they should not wait until the final EIS and the final safety evaluation report have been issued. A final decision in a license proceeding could not occur, of course, until the final EIS has been issued.
- Avoiding unnecessary use of judicial resources by precluding a court from finding liability for a “public liability action” under the Price-Anderson Act if no violation of the applicable regulatory safety standards occurred. This change would simply prevent spurious legal challenges if a licensee is in compliance with all applicable federal radiation protection standards.
- Clarifying the scope and responsibilities of the NRC and the Department of Homeland Security with respect to commercial nuclear plant security, by affirming that the Department of Homeland Security is the governing agency for determining the security threats applicable to all of the U.S. critical infrastructure, including nuclear facilities. The existing NRC-defined design basis threat (DBT) would provide the basis for licensee security strategies and activities that are the subject of NRC security inspections on the date of enactment of this Act.

Federal and state law enforcement and security forces are responsible for defending U.S. critical infrastructure from all credible threats. In the case of nuclear facilities licensed by the NRC, an integrated response by plant security forces and local, state and federal authorities would be implemented for all threats, including those within the NRC’s DBT. Mitigating or responding to any threats beyond the NRC’s DBT, as it exists on the date of enactment, would be the responsibility of local, state and federal authorities, supported by licensee security forces to the extent of their capability. Federal and state law enforcement and security forces shall establish communication and coordination protocols and procedures to ensure effective defense of U.S. critical infrastructure against coordinated attacks by a group or groups of armed terrorists.

- Amending the Energy Reorganization Act to allow a Commissioner of the NRC to continue in office, until whichever of the following occurs first: (1) the Commissioner’s successor is sworn in, or (2) the expiration of the next session of Congress subsequent to the expiration of the Commissioner’s fixed term of office. Such “holdover” provisions are found in the

organizational statutes of most independent regulatory agencies, and prevent gaps in agency leadership.

Providing Direction to the Federal Government's Used Fuel Management Program

NEI's legislative proposal does not include major reorganization and restructuring of the federal government's used fuel management program. Although such restructuring is necessary for the long-term, it should be pursued through regular order, with development of an appropriate hearing record, as a bipartisan initiative, rather than added to current energy/climate change legislation. This set of policy initiatives therefore includes only limited provisions dealing with used fuel – creation of a Blue Ribbon Commission to re-examine used nuclear fuel management (if the Administration has not already established an appropriate scope and staff for the commission), definition of the commission's scope, a statutory finding of waste confidence, and financial incentives for development of interim storage facilities.

- Mandate creation of a Blue Ribbon Commission to re-examine used nuclear fuel management and define the commission's scope, provide a statutory finding of waste confidence, and provide financial incentives for development of interim storage facilities.

The Senate legislation mandates creation of the Blue Ribbon Commission and defines its scope. It does not provide a statutory finding of waste confidence, nor does it provide incentives for states and/or localities to develop and host interim storage facilities. The House legislation has no provision on used nuclear fuel.

Nuclear Fuel Supply

- Enhance uranium market transparency by codifying in law the excess uranium inventory management plan (announced by the Department of Energy on December 16, 2008) should be codified into law. This policy addresses the disposition of excess government uranium inventories, balances the needs of DOE programs, electric utility consumers of uranium, and domestic fuel cycle suppliers.
- To ensure that uranium is recognized as a mineral of strategic importance, Congress should impose a high statutory standard for government land withdrawals, with such actions reviewed and justified every five years.

National Support for Nuclear Energy, Research and Development and Other Provisions

- Obtain a Sense of the Congress resolution on the strategic importance of nuclear energy.
- Create a National Nuclear Energy Council, modeled on the National Petroleum Council, to provide advice and counsel to the Secretary of Energy. This will help ensure that federal resources and efforts are focused on the areas where they will have the greatest effect.
- Authorize a multi-year nuclear energy R&D program for technology development and demonstration of advanced nuclear fuel cycles (including direction to the NRC to develop a regulatory framework and the standards necessary to license facilities necessary to close the nuclear fuel cycle).
- Authorize a multi-year 50-50 percent government-private sector cost-shared program for the development and NRC certification of two small scalable innovative (less than 1,000

megawatts thermal) modular reactor designs that will be certified by the NRC before January 1, 2018.

- Authorize a multi-year 25-75 percent, government-private sector, cost-shared program for the development, NRC review and approval of a combined license for two small modular reactor designs and any first-of-class demonstration of features that are unique to the design and operation of multi-unit modular reactors and that will achieve commercial power operation by January 1, 2021.
- Authorize a federal interagency working group charged with promoting the export of nuclear products and services to the rapidly growing global nuclear market.
- Expand the National Institute of Standards and Technology's Manufacturing Extension Program, which is designed to provide technical assistance to U.S. manufacturers as they improve their processes and increase their competitiveness. This section will direct NIST MEP to support the transition of current manufacturers to enter the nuclear supply chain and create a working capital fund for small to mid-sized businesses to assist in this transition.