

# Pulsing the Future of Nuclear Energy

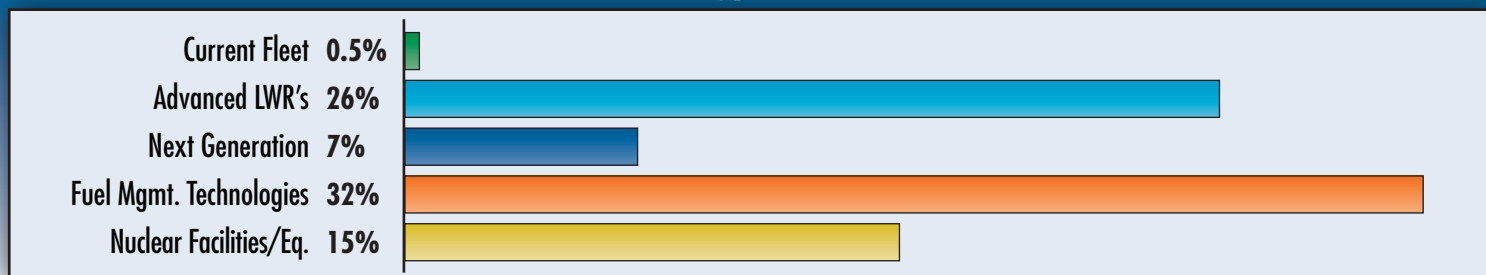
## Report

## Synopsis

Current Fleet  
Advanced LWR's  
Next Generation  
Fuel Mgmt. Technologies  
Nuclear Facilities/ Eq.  
Work Force \*\*

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<b>Nuclear Energy: Policies and Technology for the 21st Century</b> Nuclear Energy Advisory Committee November 2008	This report was prepared and adopted by the DOE NE Advisory Committee. NEAC formed two subcommittees to prepare the study: (1) The Policy Subcommittee explored the critical choices and implications in U.S. nuclear energy policy, framing options for the next president; (2) The Technical Subcommittee reviewed facilities available for nuclear energy programs discussed in reports produced for DOE-NE (includes most of the reports in this document).	F	F	S	F	U	F
<b>A Sustainable Energy Future: The Essential Role of Nuclear Energy</b> DOE National Laboratory Directors August 2008	This report reflects the commitment of DOE national laboratory directors to U.S. energy security. It highlights the important role nuclear energy can and should play by identifying the components of a strategy that can integrate across DOE and other federal agencies with a concentrated effort to rebuild the necessary nuclear enterprise using a broad-based R&D effort and engaging industry and the international community. It describes decisive leadership and a strong public-private sector partnership as key to ensuring a successful effort.	F	F	F	F	U	F
<b>Nuclear Energy for the Future-Executive Recommendations for R&amp;D Capabilities</b> Battelle in conjunction with domestic nuclear energy industry, the academic community, and the national laboratories, July 28, 2008	Battelle led a team of representatives from domestic nuclear energy industry, the academic community, and the national laboratories at the request of DOE NE to identify and prioritize gaps in the necessary capabilities to achieve nuclear energy industry goals. This report identifies the current and future nuclear R&D capabilities required to make this happen. The capabilities support: (1) continued, safe operation of the current fleet of nuclear plants; (2) the availability of a well-qualified and trained work force; (3) demonstration of next generation nuclear plants; (4) development of a sustainable fuel cycle; (5) advanced technologies for maximizing resource utilization and minimization of waste; and (6) advanced modeling and simulation for rapid and reliable development and deployment of new nuclear technologies.	F	F	F	F	U	F
<b>Review of DOE's Nuclear Energy Research and Development Program</b> National Research Council of the National Academies; ISBN: 0-309-11125-0 2008	The National Academy of Sciences recommended priorities for DOE NE R&D programs given the likelihood of constrained budgets. It evaluated Nuclear Power 2010, Generation IV, the Nuclear Hydrogen Initiative, the Global Nuclear Energy Partnership/Advanced Fuel Cycle Initiative and the Idaho National Laboratory's facilities program. The NAS report suggested high priority be given to: (1) NP 2010 and research supporting the current commercial fleet of LWRs and (2) university infrastructure support, which they view as largely a government responsibility. It recommends medium priority for: (1) Generation IV, NGNP, NHI, AFCI; and all long-term R&D programs with defined down-select decision points that could change the course of R&D and (2) INL programs to reduce deferred maintenance and to build a capacity that sustains a useful scientific capability. It gave low priority to major facility deployment (large demonstration plants or initial commercial plants) in GNEP. U.S. industry does not urgently require the construction of such facilities.	F	F	F	F	U	F
<b>Report on Proliferation Implications of the Global Expansion of Civil Nuclear Power</b> International Security Advisory Board April 7, 2008	This report, prepared by the International Security Advisory Board (ISAB) provides recommendations to assist the State Department in mitigating nuclear weapons proliferation as the demand, development, and expected use of civil nuclear fuel expand internationally. It concludes that the best way to prevent expansion of sensitive nuclear technology and increased proliferation risk is through cooperation with the suppliers of nuclear energy technologies. The ISAB report provides strong support for the goals of DOE NE's Advanced Fuel Cycle Initiative.	S	F	S	S	F	S
<b>Managing the Nuclear Fuel Cycle: Policy Implications of Expanding Global Access to Nuclear Power</b> Congressional Research Service Report for Congress Updated January 30, 2008.	In response to recent renewed interest in nuclear power, the Congressional Research Service provided this report to Congress. It outlines the current debate over proposed strategies to redesign the global nuclear fuel cycle. It examines the factors prompting the renewed interest in nuclear power, the industry's current state of affairs, and the interdependence with the nuclear fuel cycle. It also reviews several proposals aimed at limiting the number of countries that would produce nuclear fuel. The fuel-generating countries would adequately supply nuclear fuel to non-producing countries for power generation, while limiting any supply that could be diverted to weapons technology.	N	N	N	N	N	N
<b>Nuclear Power Joint Fact-Finding</b> The Keystone Center June 2007	This report, released by the Keystone Center (an independent, nonprofit public policy and education organization), describes the circumstances impacting the future of nuclear power. It discusses: the economics of nuclear power, safety and security, waste and reprocessing, and proliferation. It concludes that the best option for storage of spent nuclear fuel is a deep underground geologic repository. In the interim, it suggests spent fuel can be stored safely and securely in either on-site spent fuel pools or dry casks. It also recommends centralized interim storage as an alternative for managing waste from decommissioned plant sites. The report highlighted shortcomings in current IAEA safeguards and the international community, the concern being proliferation and the diversion or theft of material from bulk fuel handling facilities. It indicates that the GNEP program could encourage the development of hot cells and reprocessing R&D centers in non-weapons countries resulting in experts trained in plutonium chemistry and metallurgy, all of which could pose an increased proliferation risk.	F	F	S	N	U	S
<b>The Future of Nuclear Power – An MIT Interdisciplinary Study</b> Massachusetts Institute of Technology ISBN 0-615-12420-8 2003	This report supports expanding the international nuclear power fleet for global energy security and climate change mitigation. Through safeguards, dual-use technology, and technical and regulatory capability for safe reactor and reprocessing facilities design and operation the report examines the viability of nuclear power on an international scale. It concludes that in the near term, the open, once-through fuel cycle is best to meet the challenges of cost, waste, safety and proliferation and it supports NP 2010 to reduce costs. It recommends that DOE broaden its long-term waste R&D program to include improved engineered barriers, investigation of alternative geological environments, and deep bore hole disposal. It also recommends centralizing facilities to store spent fuel prior to geologic disposal; aligning R&D programs to focus on the open, once-through fuel cycle; conducting an international uranium resource assessment; establishing a large nuclear system analysis, modeling, and simulation project; and halting development and demonstration of advanced fuel cycles until the results of the nuclear system analysis project are available. It asserts that the U.S. should encourage standardization of international rules and regulations for waste transportation, storage and disposal.	F	F	F	F	U	N

### Nuclear Energy Investments



**\*\*20% R&D budget to be used for work force development through university programs (\$18M in new starts for FY-09)**

F Favorable Supports priority  
N Neutral Mentions but doesn't state position  
U Unfavorable Does not support priority  
S Silent Does not address

\*Deployment - near term construction/operation of fuel cycle facilities.

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