

# Nuclear Energy Research Initiative (NERI)

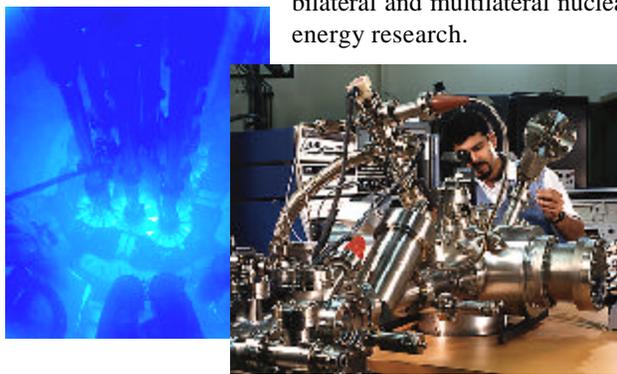
## Background

In January 1997 the President tasked his Committee of Advisors on Science and Technology (PCAST) to evaluate the current national energy research and development (R&D) portfolio and provide a strategy to ensure the U.S. has a program to address the nation's energy and environmental needs for the next century.

In its November 1997 report, the PCAST Panel on Energy Research and Development determined that establishing nuclear energy as a viable and expandable option was important and that properly focused R&D was needed to address the potential long-term barriers to expand the use of nuclear power (*e.g.*, nuclear waste, proliferation, safety and economics). The PCAST panel recommended that the Department of Energy (DOE) reinvigorate its nuclear energy research and development activities in an R&D effort to address these potential barriers with a new Nuclear Energy Research Initiative (NERI). This new initiative would fund research based on competitive selection of proposals from the national laboratories, universities and industry.

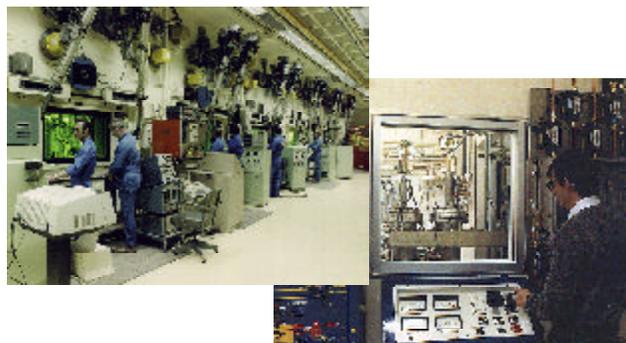
These recommendations were followed by the 1999 PCAST report on International Cooperation on Energy Innovation which recommended that an international component to NERI be created to promote "bilateral and multilateral research focused on advanced technologies for improving the cost, safety, waste management, and proliferation resistance of nuclear fission energy systems."

The Department and Congress endorsed the PCAST recommendations and established the NERI program in fiscal year (FY) 1999 to sponsor innovative scientific and engineering R&D to address the key issues affecting the future use of nuclear energy and to preserve our nation's nuclear science and technology leadership. In FY 2001, the Department proposes to launch a new initiative within NERI, the *International Nuclear Energy Research Initiative (I-NERI)* to further leverage U.S. R&D funding through bilateral and multilateral nuclear energy research.



I-NERI would allow DOE to leverage Federal investment with international resources through specific cost-share

arrangements with each participating country on a wide range of nuclear technology topics. Importantly, I-NERI would further enhance the United States and the Department's influence in international policy discussions on the future direction of nuclear energy.



To achieve these long-range goals, the NERI program has the following objectives:

- Develop advanced concepts and scientific breakthroughs in nuclear fission and reactor technology to address and overcome the principal technical obstacles to the expanded use of nuclear energy;
- Advance the state of nuclear technology to maintain a competitive position in overseas markets and a future domestic market;
- Promote and maintain a nuclear science and engineering infrastructure to meet future technical challenges; and
- Provide an effective means to collaborate with international agencies and research organizations to address nuclear technology development worldwide.

The NERI program conducts innovative scientific and engineering research and development in the following areas:

- Proliferation-resistant reactors and fuel cycles.
- Generation IV nuclear energy systems which will feature higher efficiency, lower cost, and improved safety to compete in the global market.
- Advanced nuclear fuels.
- New technologies for management of nuclear waste.
- Fundamental nuclear science.

NERI features a *competitive, peer-reviewed R&D selection process to fund researcher-initiated R&D proposals* from universities, national laboratories and industry.

I-NERI will also feature competitive investigator-initiated R&D selected through an independent peer-review process by experts from the U.S. and experts from each participating country.

To help guide this shift in the Department's nuclear R&D and shape the future direction of the nuclear technology program, in November 1998, Secretary Richardson established an independent advisory committee, the Nuclear Energy Research Advisory Committee (NERAC). A NERAC chartered subcommittee recently developed a *Long-Term Nuclear and Technology Research and Development Plan* to guide nuclear energy research out to the year 2020. The Department will use this long-term R&D Plan to guide future NERI research activities.

**FY 1999 Major Accomplishments:**

- Established the investigator proposed, peer-reviewed, merit-selected Nuclear Energy Research Initiative as recommended by the President's Committee of Advisors on Science and Technology (PCAST) Panel on Federal Energy Research and Development.
- Awarded 46 NERI awards for nuclear science and technology research.



- NERI awards address the following R&D areas:

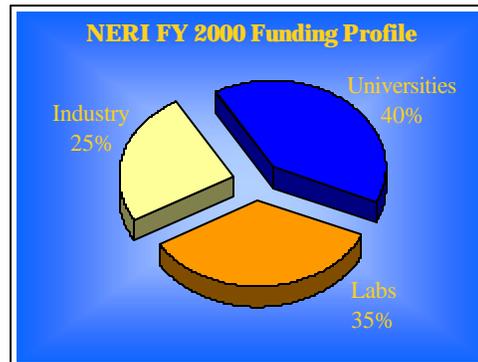
	<u>Awards No.</u>
- Proliferation-Resistant Reactors and/or Fuel Cycles	5
- New Reactor Designs	
> High-Efficiency Reactors	4
> Low-Power Reactors	3
> Economics, Safety & Other	5
> Instrumentation & Controls	6
- Advanced Nuclear Fuel	5
- New Technology for Management of Nuclear Waste	5
- Fundamental Nuclear Science	13

**FY 2000 Planned Accomplishments:**

Advance the state of scientific knowledge and technology development by:

- Continued the research on 44 projects awarded in FY 1999; and completing research on 2 projects.

- Awarded 10 new R&D projects involving 18 U.S. and 6 foreign R&D organizations.



- FY 2000 NERI awards areas:

	<u>Awards No.</u>
- Generation IV Reactor Technology	8
- Proliferation-Resistant Reactor & Fuel Technology	1
- Fundamental Nuclear Science	1
	10

**FY 2001 Planned Accomplishments:**

- Complete funding for the first 3-year phase of NERI research and development, and select feasible and important reactor and fuel cycle concepts for continued development.
- Award approximately 15 new domestic R&D projects.
- Continue the ongoing 54 research projects begun in FY 1999 and FY 2000, one of which will be completed during the year.
- Establish the International Nuclear Energy Research Initiative (I-NERI) to promote bilateral research to improve the cost and enhance the safety, nonproliferation and waste management of future nuclear energy systems by initiating approximately 5 international research projects.

Program Budget NERI (in millions)		
<u>FY 1999</u> <u>Appropriation</u>	<u>FY 2000</u> <u>Appropriation</u>	<u>FY 2001</u> <u>Request</u>
\$18.5	\$22.4	\$35.0