

U.S. NRC

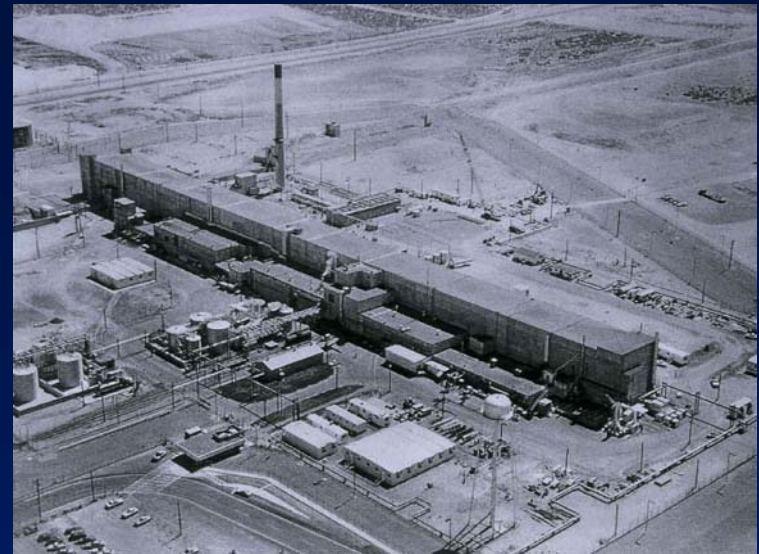
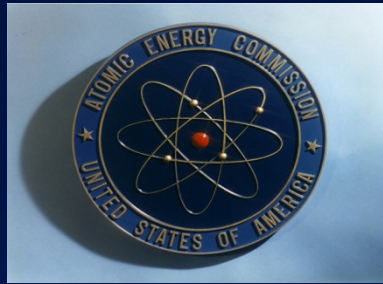
UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

NE(R)AC: A Look Back

**DOE Nuclear Energy Advisory Committee
December 13, 2011**

*William D. Magwood, IV
Commissioner*



Clockwise: December 1951 photo of EBR-1 team after the first production of electric power from atomic energy. Hanford PUREX Process "Canyon" Building, circa 1956. Shippingport Atomic Power Station outside Pittsburgh, PA, circa 1957. All photos courtesy the U.S. Department of Energy.



Milestones in the Evolution of Federal Nuclear Energy Activities

- 1974 – Energy Reorganization Act Created ERDA and NRC
- 1977 – President Carter Creates DOE
- 1993 – President Clinton Takes Office
- 1998 – The Crossroads



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A Look Back *The Future Outlook 15 Years Ago*

“The AEO96 reference case forecast assumes that all nuclear units will operate to the end of their current license terms, with **49 units (37 gigawatts) retiring through 2015.**”

Given these assumptions, **61 nuclear units are projected to provide 10 percent of total electricity generation in 2015...**”

U.S. Energy Information Administration
Annual Energy Outlook 1996



Getting Lucky: PCAST

November 1997: “Report to the President on Federal Energy Research and Development for the Challenges of the Twenty-First Century”

Two Key Nuclear R&D Recommendations

- \$10 million cost-shared for R&D for current plants
- \$50 million for the Nuclear Energy Research Initiative



Key NERAC Reports and Activities

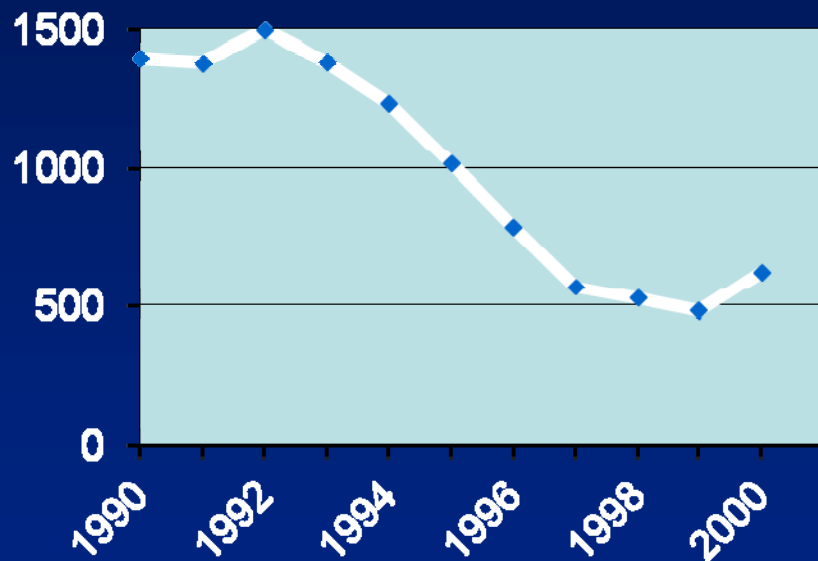
- Nuclear Infrastructure Roadmap
- TOPS
- Advanced Nuclear Transformation Technology
- Generation IV Roadmap
- Nuclear Power 2010 Roadmap
- Future of University NE Programs and Reactors



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U.S. Nuclear Technology Education *A Decade of Decline*

Undergrad Nuclear Engineering Enrollment (1990-2000)



Through the 1990s,
the U.S. experienced:

- A sharp decline in number of research reactors (66-24)
- Collapse in enrollment in nuclear engineering programs
- A negative shift in public perception regarding the future of nuclear energy

Generation IV Nuclear Energy Systems

Nuclear Power for a New Century

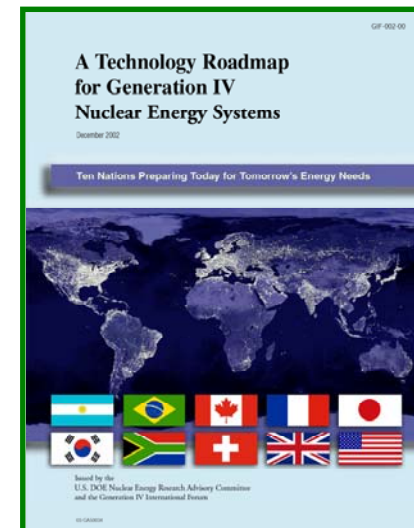
◆ In September 2002, the Generation IV International Forum selected six system concepts for further development:

- Very High Temperature Reactor
- Supercritical Water Cooled Reactor
- Gas Cooled Fast Reactor
- Lead Cooled Fast Reactor
- Sodium Cooled Fast Reactor
- Molten Salt Reactor

◆ In December 2002, the Generation IV Technology Roadmap was issued

- Summarizes and prioritizes the R&D activities necessary to develop the six system concepts

December 2002



<http://nuclear.gov/nerac/FinalRoadmapforNERACReview.pdf>



The Evolution of Nuclear Power

From Atoms for Peace to Atoms for Prosperity

Generation I



Early Prototype Reactors

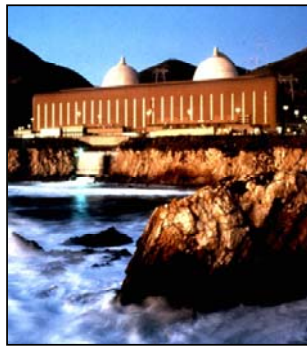


- Shippingport
- Dresden, Fermi I
- Magnox

Generation II



Commercial Power Reactors

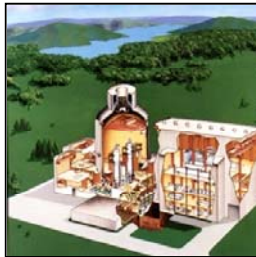


- LWR-PWR, BWR
- CANDU
- VVER/RBMK
- AGR

Generation III



Advanced LWRs



- ABWR
- System 80+
- AP600
- EPR

Generation III+

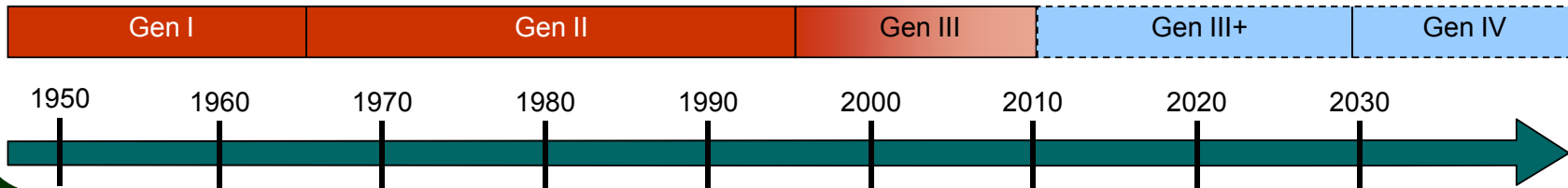


Generation III Evolutionary Designs Offering Improved Economics

Generation IV



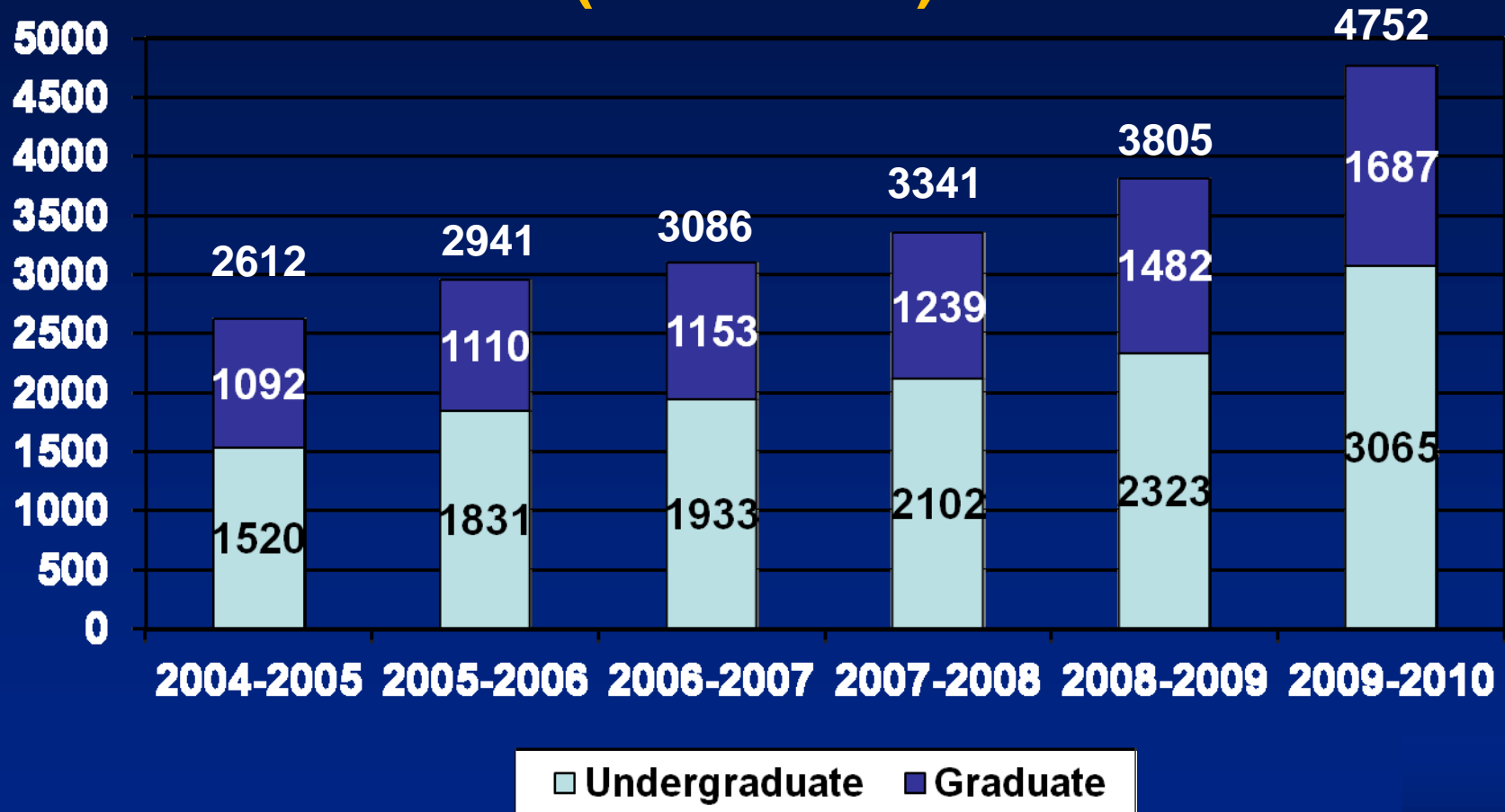
- Highly Economical
- Enhanced Safety
- Minimize Wastes
- Proliferation Resistant



Office of Nuclear Energy, Science and Technology



Nuclear Engineering Enrollment (2004-2010)





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