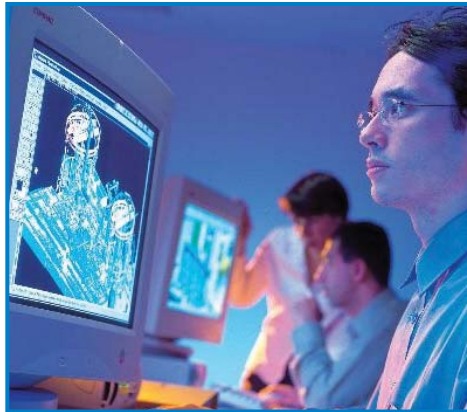


# Building New Nuclear Plants

The U.S. Department of Energy's Office of Nuclear Energy

*Nuclear Power 2010 is a cost-shared government-industry program to remove barriers and secure industry decisions to deploy new nuclear plants.*



- New baseload nuclear generating capacity is required to support the National Energy Policy objectives of enhancing U.S. energy supply diversity and energy security. The Nuclear Power 2010 (NP 2010) program addresses issues affecting near-term nuclear plant deployment.

- The Department of Energy is actively engaged with industry to address issues affecting future expansion of nuclear generation. The NP 2010 program, initiated in 2002, is a cost-shared government-industry effort to:

- – Demonstrate untested regulatory processes,
- – Identify sites for new nuclear power plants,
- – Develop and bring to market advanced, standardized nuclear plant technologies, and
- – Evaluate the business case for building new nuclear power plants.

- Accomplishing these program objectives paves the way for an industry decision to build advanced, light-water reactor nuclear plants in the United States that would begin operation by the middle of the next decade. The NP 2010 program is based on expert industry recommendations documented in *A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010* and *The Business Case for New Nuclear Power Plants in the United States*.

## Meeting Energy Demand

- Electricity demand in the United States is expected to grow sharply in the 21st century, by almost 50 percent by 2030 according to the Energy Information Administration (EIA), requiring new generation capacity. Global electricity

demand is expected to almost double by 2030. These projections could go even higher if electricity demand continues to grow at the rates experienced in recent years.

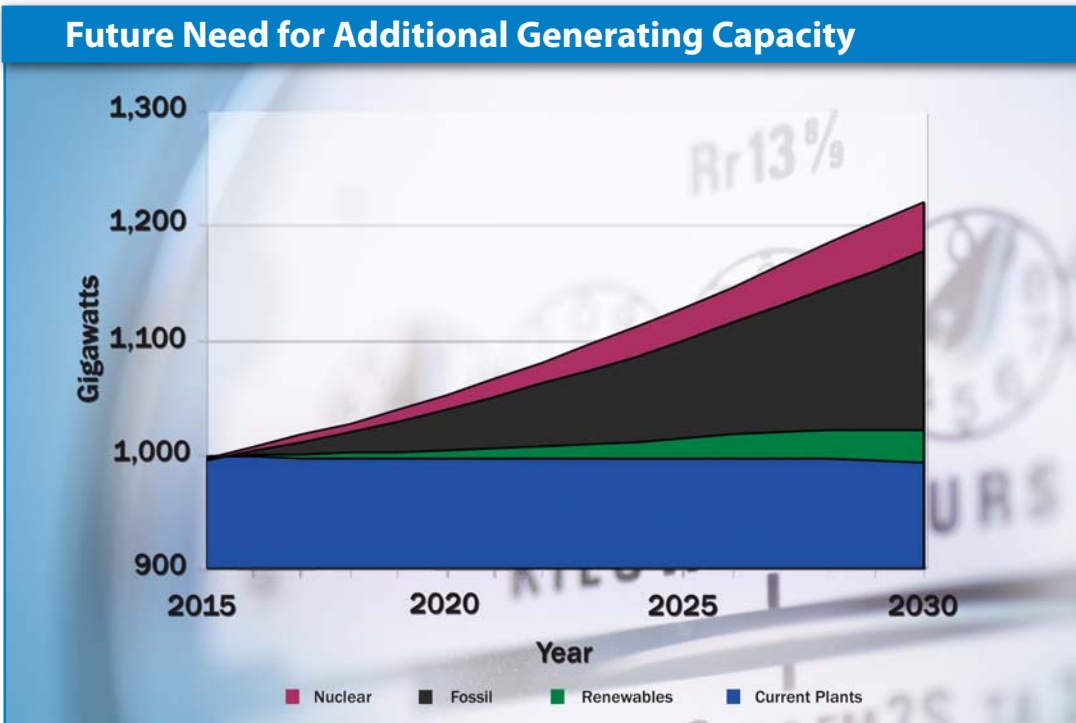
Despite the excellent performance of current nuclear power plants, no new plant has been ordered in this country for more than 25 years, although nuclear plant owners have

- Ease the pressures on natural gas supply.

With the volatility of natural gas prices, power companies have begun submitting combined Construction and Operating License applications to the Nuclear Regulatory Commission (NRC). It is likely that construction will start on several new nuclear plants if final design costs can be mitigated and the new licensing process can be demonstrated.

### Deploying Advanced Nuclear Power

The NP 2010 program is focused on reducing the technical, regulatory, and institutional barriers to deployment of new nuclear power plants. The technology focus of the NP 2010 program is on Generation III+ advanced, light-water reactor designs, which offer advancements in safety and economics over current nuclear plant designs and the nuclear plant designs certified by the NRC in the 1990s.



Source: Energy Information Administration data and projections.

#### Assumptions:

- Total capacity is from the EIA Annual Energy Outlook 2007 projection
- Nuclear capacity is assumed to be that necessary for nuclear to provide 20% of the mix in 2030
- Fossil capacity is reduced from the EIA Annual Energy Outlook 2007 projection by extra assumed nuclear capacity
- All unplanned capacity additions not broken out in EIA tables are assumed to be renewables

This growth will require building a significant number of new power plants over the next two decades.

The National Energy Policy of 2001 has recommended maintaining and possibly expanding the role of nuclear energy as a major component of our Nation's energy picture. Today, nuclear power plants generate approximately 20 percent of the electricity produced in this country. To maintain nuclear power's contribution to the National energy portfolio, we will need to bring on line new nuclear plants at a rate of three to four per year, starting in 2015.

been obtaining license renewals and electrical power generation increases. Recent new electricity-generating stations have been fueled primarily by natural gas.

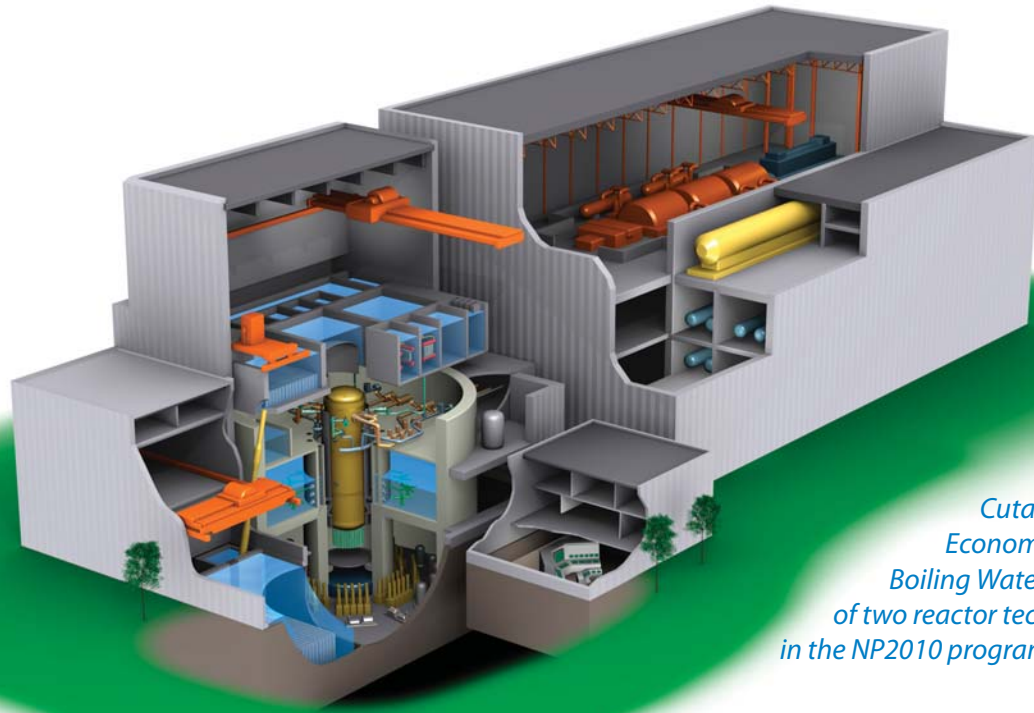
Over-reliance on a single fuel source, such as natural gas, is a potential vulnerability to the long-term security of our Nation's energy supply. Bringing new nuclear plants into operation will:

- Reduce energy supply vulnerability,
- Address increasing concerns over air quality and climate change, and

### Regulatory Issues and Licensing

— To enable deployment of the new Generation III+ nuclear power plants in the United States in the relatively near-term, it is essential to complete first-of-a-kind Generation III+ reactor design activities and to demonstrate the untested Federal regulatory and licensing processes for the siting, construction, and operation of new nuclear plants.

One process, the Early Site Permit (ESP), is a licensing process to approve sites for new nuclear plants prior to a power company's commitment to build. The other process, the combined Construction



*Cutaway view of an Economic Simplified Boiling Water Reactor, one of two reactor technologies in the NP2010 program.*

and Operating License (COL), is a ‘one-step’ licensing process by which the NRC approves and issues a license to build and operate a new nuclear power plant.

**Cooperative Projects** — In 2002, the Department initiated cooperative projects with industry to obtain the NRC’s approval of three sites for construction of new nuclear power plants under the NRC’s ESP process. In 2003, three ESP applications were submitted by power companies to the NRC for review, which were approved in FY 2007 and early FY 2008.

In 2005, the Department, in cooperation with industry teams, initiated two New Nuclear Plant Licensing Demonstration Projects to demonstrate the licensing process to build and operate new nuclear power plants and complete the certification and first-of-a-kind designs for Generation III+ reactor technologies. These industry consortia developed and submitted to the NRC in early FY 2008 COL applications for two commercial nuclear plant sites for the Westinghouse Advanced Passive

Pressurized Water Reactor (AP-1000) and the General Electric (GE) Economic Simplified Boiling Water Reactor (ESBWR) technologies. The two industry consortia involve power companies currently operating more than two-thirds of the existing U.S. commercial nuclear power plants.

**Standby Support** — To mitigate some of the financial risk associated with new nuclear power plants—thus encouraging the construction of new nuclear plants in this country—Title VI, Section 638, “Standby Support for Certain Plant Delays,” of the Energy Policy Act of 2005 (EPAAct 2005) allows the Secretary of Energy to pay certain costs to project sponsors if construction or full-power operation of an advanced nuclear facility is delayed. The standby support provision covers costs attributed to either regulatory delays or litigation that delays full-power operations of these new nuclear plants. The Secretary is permitted to pay the delay costs for a total of six reactors, up to certain limits.

## Planned Program Accomplishments

### FY 2008

- Support industry effort to obtain issuance of final ESP by NRC in the first quarter of FY 2008.
- Prepare and submit two COL applications to the NRC in the first quarter of FY 2008.
- Support industry interactions with the NRC to address questions on the COL applications, including development of response to NRC Requests for Additional Information (RAIs).
- Continue first-of-a-kind design finalization activities for the standardized AP1000 and ESBWR designs and prepare the engineering analyses and calculations, design criteria documents, design technical information, and total cost and schedule necessary for an industry purchase of a new nuclear plant.

- Resolve open items related to the ESBWR design certification to allow NRC to issue the Safety Evaluation Report (SER).
  - Receive and review request for conditional agreements.
- FY 2009**
- Continue industry interactions with NRC on the COL applications including responses to NRC RAIs, meetings with the Advisory Committee on Reactor Safety, and issuance of SERs and Final Environmental Impact Statements.
  - Continue first-of-a-kind design finalization activities for the standardized AP1000 and ESBWR designs and preparation of the engineering analyses and calculations, design criteria documents, and design technical information.
  - Accelerate design finalization activities necessary to complete vendor component/equipment procurement specifications and allow the utilities to issue contracts to initiate fabrication of modular plant components and other long lead equipment. Initiate additional First-of-a-Kind Engineering and design details to increase standardization of component design, selection, and qualification and formulate training and procedure programs.
  - Lower the risk of new plant construction by ensuring better price stability and cost control resulting in power company decisions to execute Engineering, Procurement, and Construction contracts.
  - Resolve open ESBWR certification items to allow the NRC to issue the Final Design Approval and initiate the design certification rulemaking. Support NRC issuance of SER for design certification.
  - Complete review of application requests and issue conditional agreements for standby support.
  - Begin to receive and review required documentation for standby support contracts.

<b>Program Budget</b>			
<b>Nuclear Power 2010 (\$ in Millions)</b>			
	FY 2008 Request	FY 2008 Actual	FY 2009 Request
<b>NP 2010</b>	\$114.0	\$133.8	\$241.6