Providing One-Fifth of our Electricity

Nuclear energy is a crucial source of energy in the United States, supplying approximately 20 percent of the Nation's electricity and over 70 percent of our clean, non-carbon-emitting electricity. More than 100 nuclear power plants currently operate within the United States, providing reliable and affordable electricity with little or no air pollution or emission of harmful greenhouse gases.

According to the U.S. Energy Information Administration, the United States will need 26 percent more electricity by 2030—roughly equivalent to 127 new power plants of 1,000 megawatts electrical (MWe) each. The U.S. Department of Energy (DOE) projects the need for 40 to 50 large nuclear plants to be built and start operating within the next 20 years for nuclear to maintain or increase its present share of U.S. electricity supply. This is in addition to the current nuclear fleet, which must be safely maintained and updated.

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A Lifetime of Service

Safely Operating Nuclear Power Plants for 60 Years or Longer

U.S. DEPARTMENT OF ENERGY | Nuclear Energy

print brochure

October 2010

Long-term Commitment, Long-term Value •••

Historically, the United States has been a leader in the global nuclear marketplace, especially in reactor development, nuclear safety, licensing, and repository science. Safely operating nuclear power plants for more than a half-century, the United States has also led advances in nonproliferation and nuclear security.

1957

- First power from civilian nuclear unit – Santa Susana, California
- First large-scale plant in Shippingport, Pennsylvania

Today

- 104 nuclear power plants in safe operation
- 19.4 percent of Nation's electricity production
- 70 percent of Nation's non-carbon-emitting electricity

Advances in nuclear technologies since the late 1990s have enabled existing nuclear plants to increase electricity generation by 178 billion kilowatt hours (kWh)—an amount equal to the output of 23 large power plants using the old technologies. This increased output was due to efficiency gains and improvements in both equipment and fuel.

Extending Operations, Ensuring Safety •••

By 2030, most existing nuclear power plants in the United States will be reaching the end of their 60-year operating licenses. Replacement of this large 100 GWe generating capacity with other conventional fossil plants would lead to larger carbon dioxide (CO_2) emissions. Other options—renewable solar, wind, water, and geothermal energy—cannot yet produce enough energy to fill the void.

Extending the lives of existing nuclear power plants beyond their 60-year licenses is a low-risk option, costing a fraction of what it would to build all new plants. To ensure public health and safety, it is necessary to demonstrate that such extended plant operations may continue to be conducted in a safe manner. Both technical and economic aspects of plant aging must be addressed, in addition to evaluating the potential environmental impact of extended plant operations.

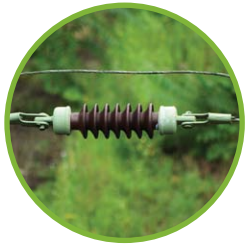
Increasing Generation through Advanced Technologies •••

DOE has funded research and development of technologies to extend the lives of standard light water reactors in use at all U.S. nuclear power plants. By adapting new technologies to current reactors, the Nation can produce more low-carbon electricity with the same facilities.

Existing nuclear plants produced more electricity—178 billion kilowatt hours—between 1997 and 2007 due to technological advancements, and the trend will continue to grow another 26 percent by 2030. These increases are due to:

- Improved operational, safety, and technical efficiencies, and
- Reactor advancements leading to increases in the maximum power level at which a commercial nuclear plant can operate.

The Federal government retains responsibility for management of special nuclear material and disposition of nuclear waste, a major challenge requiring focused research and development (R&D). Federal R&D also enables the United States to play a meaningful role in all aspects of global nuclear energy development, which is important to U.S. energy security, economic competitiveness, and national security.



Finding Solutions •••▶