

Clean Power for the Future

By Jim Reinsch



With the world's population projected to grow 50 percent by 2050, global energy needs are projected to soar 130 percent. Given this reality, assuring secure and diverse energy supplies will present a major challenge for developed and developing countries alike in coming decades.

As concerns about global warming and protecting the environment continue to rise, the world is now looking toward clean coal, hydro, new renewable energy sources, and nuclear to lead the way. Nuclear generation is notably clean, safe, reliable, and affordable. Promoting energy security/energy independence, nuclear's abundant fuel is less subject to price volatility than many other fuels. The expanded use of nuclear energy is a good match with sustainable development principles — powering the world's growing economies while protecting our environment and finite resources for future generations.

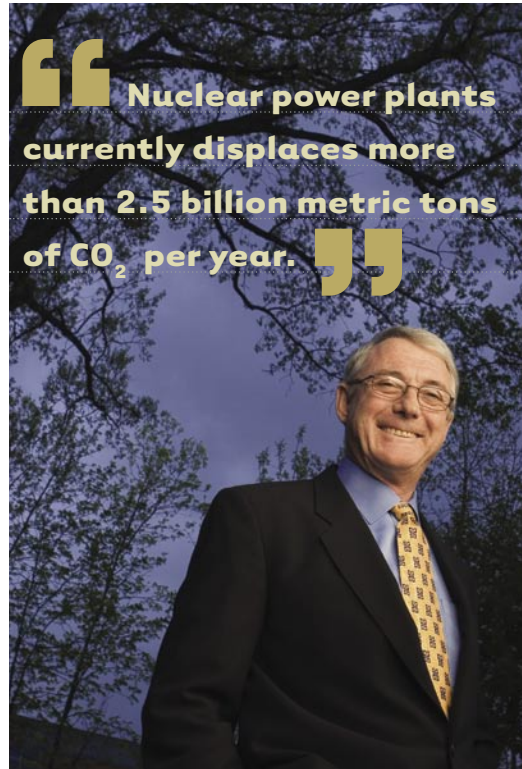
Today's nuclear reactors generate vast amounts of dependable, affordable electricity, with the smallest footprint of any emission-free electricity source. More than 441 nuclear power plants provide 16 percent of the world's electricity while emitting no greenhouse gases. This fleet of nuclear power plants currently displaces more than 2.5 billion metric tons of CO₂ per year and operates around the clock as reliable, efficient sources of base load electricity.

In 2004, the world's nuclear reactors set an all-time production record of approximately 2,696 million megawatt hours. This record was attributable to particularly high performance in the United States and Sweden, along with restarts and commissioning of new units elsewhere.

U.S. Perspective

Soon to be joined by the restarted Browns Ferry Unit 1, America's 103 nuclear power plants produce more electricity than any other energy source except coal, powering one of every five homes and businesses in the country.

The U.S. Department of Energy (DOE) projects that the United States will need 50 percent more electricity by 2025 to drive the economy and sustain our quality of life. America must increase electricity output to provide energy for an ever-expanding population without damaging the environment.




Providing this new electricity supply and maintaining clean air are dual national imperatives. The nuclear energy industry is poised to build new, advanced nuclear plants to meet energy demands and clean air objectives.

Environmental Considerations

Nuclear energy must play a significant role in our future energy mix if we are to protect our most valuable asset: Earth. Today, approximately 30 percent of America's electricity already comes from sources that do not produce air emissions or greenhouse gases, including nuclear energy, hydropower, and renewable energy. Nuclear energy represents 72 percent of this non-emitting electricity supply.

The carbon emissions prevented by U.S. nuclear power plants are equivalent to the emissions from approximately 130 million passenger cars. Without nuclear energy, U.S. electric-sector carbon emissions would be approximately 30 percent higher.

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Improving Efficiency

Since 2000, the nation's commercial reactors collectively have operated at a 90 percent capacity factor — making them the most efficient baseload power generation plants.

The improved efficiencies of nuclear plants have met much of the nation's rising electricity demand over the past 10 years. These increases have been equivalent to adding 19 new 1,000-megawatt plants to the country's electricity grid. To put this statistic into perspective, a single 1,000 megawatt plant would power a city the size of Boston or Seattle.

In view of this record, most U.S. utilities are extending the operating licenses for nuclear power plants by 20 years. In fact, approximately three-quarters of America's nuclear power plants have either renewed their licenses or indicated their intention to do so.

Business Incentives

The nuclear energy industry and the federal government are collaborating to bring the benefits of new, advanced nuclear power plant designs to market. Congress and the current administration are creating and implementing programs to provide greater certainty to those who would risk capital on such projects. To this end, the U.S. government has undertaken a sustained, multi-year program with several major components, including:

- 1) Cost-shared between industry and the DOE, the DOE's Nuclear Power 2010 program (NP2010) would validate the new licensing process and establish a well-defined, predictable, and stable process; support detailed design and engineering on advanced reactor designs to provide cost and schedule certainty; and demonstrate the early site permit (ESP) and combined construction and operation license (COL) processes.
- 2) Proposed legislation to offer financial incentives for utilities and suppliers to take the initiative necessary to secure financing for building the first few new nuclear power plants.
- 3) Proposed "risk insurance" for unexpected delays caused by regulation or political obstacles. Under the current administration proposal, risk insurance would be limited to the first two nuclear plants of each design under the NP2010 program. Up to \$500 million in coverage would be available per reactor for qualified designs.

Doing Their Part

The nuclear energy industry is taking steps so that utilities will be ready to order a new nuclear power plant when market conditions are right. These include testing the new licensing process and creating favorable business conditions so that utilities can invest in new nuclear power plants.

On the technology front, nuclear system vendors have engineered new designs that promise significantly lower construction and operating costs, greater reliability, and advanced passive safety systems. Several advanced designs being made ready for deployment include:

- General Electric's Economic Simplified Boiling Water Reactor (ESBWR),
- Westinghouse's AP1000 reactors, and
- Framatome ANP's EPR.

Members of a utility-led consortium, NuStart Energy Development, which includes Constellation Energy, Entergy, Exelon, FPL Energy, Progress Energy, Southern Nuclear, TVA, Dominion Generation, and Duke Power, are reviewing their options for future nuclear generation under the federal government's NP2010 solicitation.

Bechtel, which has performed engineering or construction on more than half of the commercial plants in the United States, has played a critical role in extending their lives in recent years by replacing steam generators and reactor pressure vessel heads. With 30 steam generator replacement projects completed or ongoing worldwide, Bechtel has set records for the lowest radiation exposure, shortest reactor outages, and best employee safety performance on such projects.

It's hard to imagine an energy future for America without a prominent and dynamic role for nuclear power. As the nation's utilities prepare to invest in the next generation of nuclear plants, Bechtel will be there with other utilities, suppliers, engineering firms and stakeholders to support the U.S. nuclear renaissance. ☒

Jim Reinsch is president of Bechtel Nuclear and president of the American Nuclear Society.

