

Energy & Environmental Export News

Published by the Office of Energy and Environmental Industries

www.trade.gov

Winter 2007

Nuclear Energy Industry Enjoying Resurgence

By Sarah Lopp

The United States generates about 20 percent of its electricity from nuclear energy from 104 nuclear power plants. Although growth in the 1960s and 1970s was quite strong, the U.S. civil nuclear energy sector has been largely stagnant in recent decades.

Expansion stopped in the 1980s mostly because of regulatory changes implemented after Three Mile Island in 1979. These changes lengthened the licensing period to an average of 14 years and resulted in large cost overruns. After 23 years of regulatory issues, the last plant came on line in 1996. No new plants were built because (1) public

perception did not support building new nuclear plants, primarily because of Three Mile Island and Chernobyl (1986); (2) the regulatory regime was unpredictable and uncertain, thereby increasing costs of building new plants; and (3) the economics of building nuclear power plants were poor.

That situation is changing. The domestic industry now has more opportunities to build new plants domestically and internationally than it has had in decades. There is growing interest in nuclear energy as an emissions-free source of energy and as a means to reduce foreign dependencies on fossil fuel. To maintain the current 20 percent nuclear share

of overall U.S. electricity generation, the United States needs to commission 50,000 megawatts of electricity (MWe) of new nuclear generation by 2030.

New U.S. plants are expected to come on line in late 2014 to early 2015. Much depends on the licensing process and when construction can start. Currently, 10 companies have announced their intention to file combined (build and operate) license applications for up to

[continued on page 2](#)



The Nuclear Energy Institute and Constellation Energy recently hosted the Office of Energy and Environmental Industries and highlighted industry competitiveness issues at the Calvert Cliffs Nuclear Power Plant in Maryland.

INSIDE

- 1 Nuclear Energy Industry Enjoying Resurgence
- 3 United States Embarking on Civil Nuclear Cooperation with India
- 5 EPA Oil Spill Rule Changes to Have Major Industry Implications
- 6 Spotlight on Greenhouse Gas Trading
- 8 U.S.-China Oil and Gas Industry Forum



INTERNATIONAL
TRADE
ADMINISTRATION

Nuclear Energy

continued from page 1

19 new reactors. All 19 reactors could possibly be on line by 2020, which would represent about 22,000 MWe. Today, plant capacities range from 590 MWe to 1,400 MWe. The new plants will have capacities ranging from 1,175 MWe for the Westinghouse AP1000 to 1,500 MWe for the General Electric ESBWR (economic simplified boiling water reactor) and 1,600 MWe for the Areva EPR (European pressurized water reactor).

The Energy Policy Act of 2005, which was signed into law on August 8, 2005, provides strong new incentives for expanding nuclear power. The act provides several incentives to encourage construction of new nuclear plants, including production tax credits (\$200 million per year for 1,600 MWe power plants), loan guarantees, and risk protection and standby support for companies pursuing their first new reactors (\$500 million for the first two plants and \$250 million for the next four plants).

Nuclear power is becoming an attractive source of clean energy for many other countries as well. Approximately 435 nuclear power plants in 31 countries provide about 16 percent of the world's electricity. Countries that generate the largest percentage include Lithuania, France, Slovakia, and Belgium. Top nuclear power-generating countries include the United States, France, Japan, and Germany. There are approximately 24 nuclear plants currently under construction worldwide, and an additional 39 units have been announced. More nuclear reactors are being constructed in Asia than anywhere else. China plans to have 27 gigawatts (roughly 30 new plants) of additional nuclear power-generating capacity by 2020. This number represents the most growth in nuclear plants (more than \$50 billion market) in the world. Japan and South Korea are also planning to build on their already strong base of nuclear power plants.

Although nuclear exports are currently prohibited to India, if and when nuclear energy cooperation is permitted, the market potential is estimated at more than \$100 billion.

The Baltic States, Romania, Russia, and Turkey are excellent markets for refurbishing and upgrading existing nuclear plants as well as, in some cases, for building new reactors. Western Europe and the United States, mostly because of economics, perceived investment risk, political pressure, and regulatory hurdles, have not been strong growth areas for new nuclear facilities during the past decade. This view is shifting, however. Finland, the United Kingdom, and the United States are planning to add significant new nuclear power capacity. Germany has announced that it will shut down all of its nuclear facilities by 2025. Belgium and Sweden have also indicated that they may begin phasing out nuclear plants so as to become "nuclear-free" over the next two decades. However, given the low marginal costs of nuclear electricity, relatively few existing reactors are expected to be retired during the next two decades.

The disadvantages of nuclear energy include safety perceptions (although there has been a positive shift in public acceptance of nuclear energy), storage of nuclear waste, financial risks involved in constructing new plants, and risk of proliferation.

Safely handling and storing spent fuel is a major issue in the United States. Creating a permanent federal geologic repository for spent fuel is one of the most important issues facing the industry today. About 49,000 tons of nuclear fuel is stored in temporary facilities, such as pools or dry casks. Those sites are located in cities, suburbs, and rural areas. The Yucca Mountain National Repository in Nevada (originally sched-

uled to open in 2010) has been proposed as a long-term solution to the storage situation of U.S. radioactive waste. If the opening of Yucca is delayed or is not licensed, there are alternatives, such as building additional pools and dry casks. Reprocessing the spent fuel, as some other countries do, may be a viable option in the long term. Several plants now require expanded temporary on-site storage for waste fuel.

Other challenges for the industry include the lack of domestic nuclear engineers and highly skilled manufacturing personnel, including steel welders, and the lack of domestic capacity to manufacture a key component for the industry. For example, the main manufacturer (Japanese) that creates a vital steel forged reactor piece has a very long queue of companies wanting to obtain this component. Because nuclear power plants require many long lead-time materials and licenses, it is particularly difficult to secure private financing for building new plants.

Inadequate nuclear liability regimes pose another challenge to the global growth of the industry, because without an adequate liability insurance framework, privately owned companies (as opposed to state-owned companies, such as France's Areva) cannot solely accept the risk of fault and liability in the unlikely case of a nuclear accident. The industry, therefore, strongly urges all countries developing their nuclear sector, including India, to adopt international liability standards, such as the International Atomic Energy Agency's Convention Supplementary Compensation.

U.S. companies have a competitive advantage because their technology and design teams are generally viewed as some of the most technologically advanced in the world. Nearly 60 percent

continued on page 8

U.S. Embarking on Civil Nuclear Cooperation with India

By Justin Rathke

From November 28 to December 5, 2006, the Office of Energy and Environment Industries (OEEI) led a delegation of representatives from the U.S. civil nuclear energy industry on a trade mission to India. The mission was part of the U.S. Business Development Mission led by Franklin L. Lavin, under secretary of commerce for international trade.

Close to 20 nuclear energy companies and related associations participated in the mission. Reactor builders; architecture, engineering, and construction firms; parts suppliers; fuel converters and enrichers; miners; legal experts; and standards experts were all represented in the delegation. The U.S.-India Business Council and the Nuclear Energy Institute also participated and were important partners in planning and executing the robust program of meetings.

American nuclear suppliers are knocking on the door of the Indian market, just as U.S. law is changing to allow for U.S.-India civil nuclear trade. On December 9, 2006, the Senate passed a bill to exempt the United States from certain requirements of the Atomic Energy Act of 1954, moving the two countries one step closer to peaceful nuclear cooperation. For American companies to sell nuclear technology to the Indian market, the Nuclear Suppliers Group (NSG) must still grant an exception for all NSG members to sell to India, and the United States and India must sign a bilateral "123 Agreement," which will dictate the terms of their cooperation.

India must also take a number of steps to bolster non-proliferation, including signing the Safeguards Agreement with the International Atomic Energy Agency. For the private sector to participate in

India's nuclear program, the country must amend its laws and adopt adequate liability coverage to minimize risk to private companies in the unlikely case of a nuclear accident.

The mission gave the Department of Commerce officials and the U.S. companies the opportunity to press India to

its electric grid. The delegation heard from Indian government officials about their plans to increase current capacity of 132,000 megawatts (MW) to 350,000 MWe by 2050, which will increase India's nuclear power capacity from 3,400 MW to 63,000 MWe during that time. Indian planners anticipate both domestic and international efforts to enhance India's



Left to right: OEEI Director Joe O. Neuhoﬀ III; Chairman and Managing Director S. K. Jain of the Nuclear Power Corporation of India; and U.S. Under Secretary of Commerce for International Trade Frank L. Lavin in India during the recent business development mission.

make progress in areas of concern, such as the liability issue, and to learn from high-level policymakers about plans for developing India's nuclear power sector. The United States has not been involved in India's nuclear energy program since General Electric sold two boiling water reactors to India for installation at the Tarapur Atomic Power Plant in the 1960s. India has been off limits to U.S. nuclear companies after a series of Indian nuclear weapons tests in the 1970s.

The fast-growing Indian economy is in desperate need of energy to power

nuclear power capacity. The head of India's Nuclear Power Corporation told the delegation that 20 to 25 atomic power plants would have to come from foreign sources if India is to achieve the 63,000 MWe target. Experts estimate that at least \$100 billion worth of investment will be needed to develop nuclear energy in India during the next 20 years.

The U.S. participants represented numerous subsectors within the nuclear industry. They included the following:

- American Society of Mechanical Engineers is a professional organization

continued on page 4

India mission

continued from page 3

focused on technical, educational, and research issues of the engineering and technology community. It sets internationally recognized industrial and manufacturing codes and standards that enhance public safety.

- Bechtel Power Corporation is a full-service nuclear design, construction, and operation firm with experience on more than 150 plants worldwide.
- Black and Veatch is an engineering, technology, consulting, and construction firm in the power sector.
- BWX Technologies manages complex, high-consequence nuclear and national security operations.
- ConverDyn is a provider of uranium conversion services, uranium ore storage, state-of-the-art sampling techniques, and strategic uranium hexafluoride inventories at enrichment facilities.
- Fluor Corporation is an engineering, procurement, construction, and maintenance services company that serves clients in a range of sectors, including power.
- GE Energy is a supplier of power-generation and energy-delivery technologies, with expertise and experience in thermal, renewable, and nuclear energy.
- Contractors International Group on Nuclear Liability advocates on behalf of

10 U.S. nuclear suppliers for the United States and other countries to adopt a liability regime for nuclear accidents.

- Nuclear Energy Institute is a policy organization for the nuclear energy and technologies industry that represents more than 280 corporate members in 15 countries.
- Parsons Brinckerhoff is a design, engineering, architecture, planning, project management, construction management, design-build, operations and maintenance, consultant, and related services firm.
- The Shaw Group is a provider of engineering, design, construction, maintenance, fabrication, and manufacturing services to clients across industries, including nuclear power.
- Supersonic Services Inc. is an equipment supplier to the civil nuclear energy industry, offering a range of products.
- Thorium Power Ltd. is a firm engaged in the design of thorium-based nuclear fuels, with patented nuclear fuel designs for use in certain existing and future commercial nuclear power plants.
- Transco Products is a provider of engineered solutions to the commercial nuclear power industry, with products

in service at every U.S. nuclear plant and more than 200 units in 15 countries.

- USEC Inc. is a supplier of enriched uranium fuel for commercial nuclear power plants worldwide.
- U.S.–India Business Council is an advocacy organization representing the largest U.S. companies investing in Indian firms. It promotes economic reforms with an aim to deepen trade relations and broaden commercial ties between the United States and India.
- Westinghouse Electric Company is a worldwide supplier of commercial nuclear power-generation and delivery technologies.
- WM Mining Company owns, develops, and trades uranium mines in Kazakhstan, Mongolia, and the United States.

For additional information on the civil nuclear energy component of the trade mission, please contact Justin Rathke of OEEI, tel.: (202) 482-7916 or e-mail: justin.rathke@mail.doc.gov. For more information on the U.S. nuclear industry at large, please contact Justin Rathke at contact information above, or Sarah Lopp, tel.: (202) 482-3851 or e-mail: sarah.lope@mail.doc.gov.

EPA Oil Spill Rule Changes to Have Major Industry Implications

Rachel Halpern

In December, the Environmental Protection Agency (EPA) signed off on a set of amendments to its Spill Prevention, Countermeasure, and Control (SPCC) Rule. Promulgated in 1973, the SPCC Rule requires operators of facilities that store more than 1,320 gallons of oil to maintain a written spill-contingency plan (certified by professional engineer) and a secondary containment. The amendment allows facilities that store less than 10,000 gallons of oil and meet other criteria to self-certify their SPCC plans without an engineer's approval. Several other proposed changes affect facilities with oil-filled operational equipment, motive power containers, and mobile refuelers. Several industries will be affected by this rule, including manufacturers in many different sectors, auto service facilities, food processors, and more. Many industry representatives backed an approach that would even allow facilities that store less than 5,000 gallons of oil to use a simplified checklist in lieu of a full spill-contin-

gency plan. EPA did not include this approach in the final amendments, but it indicated that it would consider the approach in a rule that it will propose in early 2007 called the SPCC Loose Ends Rule.

The Office of Energy and Environment Industries (OEI) leads the SPCC Team, an inter-office team that was created as part of the Manufacturing and Services' Regulatory Review program. The SPCC Team is participating in the development of the Loose Ends Rule, which will also address issues that affect the energy industry, particularly the oil and gas industry. The oil and gas industry has not yet had to comply with some major changes that were made to the SPCC Rule in 2002, which extend the rule's coverage to more types of oil and gas equipment, including produced water treatment facilities, process vessels, and flow and gathering lines. A recent study by the Department of Energy estimates that compliance with those changes will

cost the oil and gas industry \$4.6 billion. The Loose Ends Rule may provide the industry with some relief.

The SPCC Team has already met with representatives of the oil and gas industry, and it is working on an analysis of the industry's estimated compliance costs as a complement to the already completed study performed by the Department of Energy and ongoing analysis by EPA. The SPCC Team may also more closely examine the effect on other energy sectors.

Realizing that the Loose Ends Rule will probably significantly alter many industries' SPCC compliance obligations, EPA has also proposed to extend the compliance deadline to July 1, 2009.

For additional information or to discuss any SPCC-related issues, please contact Rachel Halpern, tel.: (202) 482-4423 or e-mail: rachel.halpern@mail.doc.gov.

Spotlight on Greenhouse Gas Trading

By Marc Lemmond

With the increased social and political attention being given to global climate change issues, systems to facilitate lower emissions of greenhouse gases have emerged. One of the systems is greenhouse gas trading mechanisms. In such systems, organizations make voluntary or regulatory commitments to lower their greenhouse gas emissions. Then those organizations gain and trade emissions credits through changes in processes, equipment, and organizational practices, as well as by undertaking environmental projects that will reduce the volume of carbon dioxide in the air (offset projects). Any combination of those measures allows organizations to ensure their compliance with the agreed-on emissions cuts. Trading emissions credits allows flexibility in how organizations meet their commitments to reduce emissions. Some organizations may also become involved in emissions credit trading for strictly investment purposes. Others see it as a way to gain the maximum benefit from technology or process improvements or to satisfy any international emissions reductions requirements. Still others may participate in reducing greenhouse gas emissions and trading emissions credits as a way to have a positive effect on social environmental concerns.

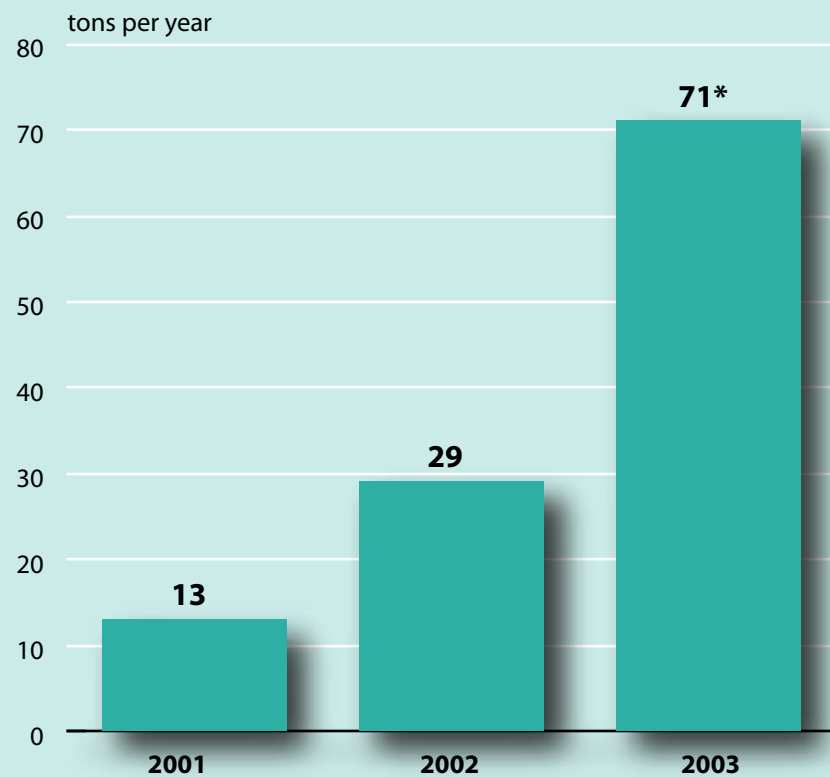
Although sulfur dioxide and nitrogen oxide have been traded in the United States since the mid-1990s, the trading of carbon dioxide (CO₂) has risen dramatically in recent years. Federal and state regulations continue to be considered, but organizations are not

required to trade CO₂ emissions credits. Even so, voluntary trading in CO₂ credits is skyrocketing. Figure 1 illustrates the phenomenal growth of estimated global CO₂ trading volumes from 2001 to 2003.

The Office of Energy and Environment Industries (OEEI) continues to monitor and analyze this dynamic issue. For more information on greenhouse gas

trading markets, contact Marc Lemmond of OEEI, tel.: (202) 482-3889 or e-mail: marc.lemmond@mail.doc.gov.

Figure 1. Total Traded Volume of CO₂, 2001–2003



* Figure for 2003 includes only the first three quarters of the year.
Source: Environmental Business International.

U.S.–China Oil and Gas Industry Forum

By Sarah Lopp

The Seventh U.S.–China Oil and Gas Industry Forum (OGIF) was held in Hangzhou, China, September 10–12, 2006, and successfully continued the bilateral energy dialogue that was first established in 1998. The U.S. Department of Commerce (DOC), the U.S. Department of Energy (DOE), and the Chinese National Development and Reform Commission (NDRC) co-hosted the forum.

OGIF is the only bilateral vehicle available for the oil and gas industry and government to address together commercial energy issues. The International Trade Administration's Office of Energy and Environment Industries (OEEI) has organized the forum every year, working closely with the industry and DOE. The OGIF U.S. steering committee includes representatives from the U.S. oil and gas industry, U.S.–China Business Council, U.S. Energy Association, DOC, and DOE. The previous OGIF was held in New Orleans, Louisiana, in June 2005, and deputy secretaries David Sampson (DOC) and Clay Sell (DOE) were the highest-ranking representatives of the U.S. government.

This year's OGIF focused on policy, resources and markets, technology, and the government's role in the oil and gas sectors. Energy efficiency was a common theme as well. Joe O. Neuhoff III, director for OEEI, was the highest-ranking DOC representative. Jeffrey Jarrett, assistant secretary for DOE, was the most senior U.S. government official present. Minister Zhang Guobao, vice chairman of NDRC, was the highest-ranking Chinese official at the event.



OEEI Director Joe O. Neuhoff III and international trade specialist Sarah Lopp at the U.S.–China Oil and Gas Industry Forum in Hangzhou, China, in September.

This year's event provided U.S. industry access to key Chinese energy policy decision-makers from NDRC, Sinochem Corporation, CNOOC, PetroChina, China United Coal Bed Methane Corporation, and Sinopec. Industry representatives at OGIF felt that they had a much better understanding of China's energy plans and views on foreign investment in China's oil and gas industry.

OEEI staff members are currently following up with industry representatives and U.S. government colleagues to capitalize on the momentum built from the numerous meetings and to ensure OEEI is supporting the advancement of the industry's interests in China. OEEI staff members are developing a pro-

posed work plan to address the multiple opportunities in China that OEEI can be involved in. For example, a possible environmental sector industry and government forum similar to OGIF is being considered.

For more information on OGIF or the oil and gas industry in China, please contact Sarah Lopp of OEEI, tel.: (202) 482-3851, e-mail: sarah.lope@mail.doc.gov.

Nuclear Energy

continued from page 2

of the world's reactors are based on the pressurized water reactor (PWR) design pioneered by Westinghouse. Each year, billions of dollars in nuclear power-generation equipment are exported from U.S. companies.

Unlike American companies, some foreign competitors receive government subsidization and support, which often results in below-market pricing when weighed against American competitors' bids. U.S. companies must also obtain various licenses before they can legally export or discuss their nuclear technology. Those licenses can take six months to obtain, which can affect the industry's ability to compete for international projects.

The growing market demand for domestic and international nuclear power is projected to yield positive economic effects for the United States because the nuclear industry spurs innovation, is high-tech, pays well, has large export potential, and ensures the retention of high-skilled manufacturing personnel in the United States. The industry may also create new jobs.

In light of the reemergence of nuclear power as a major energy source throughout the world and, in particular, the increased emphasis placed on developing nuclear power in countries such as India, the Department of Commerce just took about 20 U.S. nuclear companies on a trade mission to India. The mission, which was led by Under Secretary for International Trade Frank Lavin, had a robust nuclear component. A summary of this mission component is included in this issue of Energy & Environmental Export News.

Calendar of Events

POWER-GEN Renewable Energy
Las Vegas, Nevada
March 6–8, 2007
<http://pgre07.events.pennnet.com>

Building Energy 07
Boston, Massachusetts
March 13–15, 2007
<http://www.buildingenergy.nesea.org/>

Offshore West Africa
Abuja, Nigeria
March 14–16, 2006
<http://owa06.events.pennnet.com/>

WINDPOWER 2007
Los Angeles, California
June 3–6, 2007
<http://www.awea.org/events/>

Air & Waste Management Association (A&WMA) Annual Conference
Pittsburgh, PA
June 26–29, 2007
www.awma.org/ace2007