platts

www.platts.com

Nucleonics Week

Volume 49 / Number 8 / February 21, 2008

US nuclear MWh cost inches up, led equally by operations, capital

The average cost of generating a US nuclear megawatt-hour, including operations, fuel and capital, has risen about $4/MWh in the five years from 2003 to 2007 with about half the increase due to operations and maintenance and half due to capital spending, according to industry data analyzed by the Electric Utility Cost Group. Fuel accounted for only 4% of the increase in the period, which was slightly higher than inflation.

According to EUCG figures, the total nuclear generating cost for 2007 averaged $28.66/MWh, of which $18.32 was operations, maintenance, and administrative support, $4.49/MWh was fuel, and $5.85/MWh was capital. Five years before, in 2003, the average cost was $24.63/MWh, with $16.28/MWh spent for O&M, $4.32/MWh for fuel and $4.03/MWh for capital investment. Top quartile performers in 2007 averaged spending $22.85/MWh, of which $14.27/MWh was for O&M, $4.23/MWh was fuel and $4.35/MWh was capital. In 2003, the first quartile cost averaged $19.21/MWh, with $11.90/MWh spent for O&M, $4.86/MWh for fuel and $2.45/MWh for capital.

Cost and output trends indicate total nuclear generating costs may be under pressure for further increase in 2008. In the 2003-07 period, however, nuclear operators did keep their spending in line with inflation, according to EUCG figures. During those five years,

(Continued on page 10)

ElBaradei advises Sarkozy to go slow on sales of new nuclear plants

IAEA Director General Mohamed ElBaradei last week cautioned French President Nicolas Sarkozy against any initiative to sell nuclear power plants to countries that may not be ready for them, according to a source familiar with the discussion.

ElBaradei has expressed concern that Sarkozy's recent "nuclear diplomacy" may be going too fast, said a diplomat who requested anonymity. The French president has initiated and/or concluded nuclear cooperation agreements with three countries in northern Africa and the Middle East and promised to support reactor sales to them by state-owned Areva.

The diplomat said, "From the IAEA's point of view, there are a large number of stages needed before a country can safely build and operate a nuclear power plant. It cannot be rushed."

The IAEA has a mandate to promote nuclear power but its staff has consistently warned against hasty, insufficiently prepared nuclear power programs. The IAEA last year published a booklet outlining the "milestones" needed before a country can safely turn to nuclear power, including having a competent and powerful regulatory authority and trained manpower.

(Continued on page 13)

Progress Energy files for license for Harris site

Progress Energy Carolinas filed an application February 19 with the NRC for a construction permit-operating license, or COL, for two potential new reactors at its Shearon-Harris station in North Carolina.

This was the first COL application filed in 2008, and the fifth since last year. Entergy is expected to submit by next week a COL application prepared by NuStart Energy for a GE-Hitachi ESBWR at Grand Gulf in Mississippi.

Progress Energy said in a February 19 statement that it does not plan to make a final decision on whether to build for at least a year. If the company does decide to build, it said it is targeting the two Westinghouse AP1000s to come online in 2018 or later. Shearon Harris, also known as Harris-1, is at a site about 20 miles southwest of Raleigh on about 35 square miles of land, which had originally been planned to accommodate four reactors.

Inside this Issue

The company announced in May 2007 that it was deferring potential nuclear construction in North Carolina while it pursued energy conservation measures (NW, 7 June '07, 1). This week, the company said it was pursuing a three-prong "balanced solution" strategy to meet future electricity demand. It is looking at saving 2,000 MW of power through energy efficiency programs, and also generating electricity from renewable sources, Progress Energy spokesman Rick Kimble said. The third part of its approach is to build new "state-of-the-art" baseload generation, which might be a nuclear plant, Kimble said. At least 1,100 MW of electricity is projected to be needed, and possibly twice that amount, he said.

The final decision on whether to move forward with construction will be made after the company puts together a business case that looks at factors such as the forecast need for electricity, economic trends, and fuel prices, Kimble said.

Progress Energy is separately considering building two new AP1000s at a greenfield site in Levy County, Florida, about eight miles from its existing Crystal River-3 reactor. The company said the site is going through detailed assessments, including environmental and weather studies. Subsidiary Progress Energy Florida anticipates filing a need case with the Florida Public Service Commission in early 2008, it said. Those units, if built, could be in service as early as 2016 to 2017, it said.

The company has said it plans to submit a COL application for the Florida units around July 30 (Inside NRC, 21 Jan., 1). Kimble said this week that the company is saying only that the application would be submitted this summer. Progress Energy said it is focusing on developing the Florida site first because of the greater projected electricity demand in that part of its service territory.

—Tom Harrison and Jenny Weil, Washington

NRC, DOE, industry to investigate LWR life extension beyond 60 years

The operating life of current US power reactors can and should be extended beyond 60 years, government officials and industry representatives said at a workshop this week. However, they said, a great deal of research must be undertaken to determine if that is feasible and how it should be done.

Co-sponsored by NRC and DOE, the three-day workshop in Washington, DC explored life extension policy and technical issues. So far, 48 of 104 US power reactors have had their original 40-year operating licenses renewed for an additional 20 years, and it is not too early to start planning for "life beyond 60," NRC Executive Director for Operations Luis Reyes said in his presentation. Reyes also read a statement from NRC Chairman Dale Klein, who said that additional life extension "may be possible in theory, if we can address all the technical issues." Conducting the necessary

platts *Nucleonics Week*

Volume 49 / Number 8 / February 21, 2008
(ISSN: 0048-105X)

Nucleonics Week is published 51 times yearly by Platts, a division of The McGraw-Hill Companies, registered office: Two Penn Plaza, 25th Floor, New York, N.Y. 10121-2298.

Officers of the Corporation: Harold McGraw III, Chairman, President and Chief Executive Officer; Kenneth Vittor, Executive Vice President and General Counsel; Robert J. Bahash, Executive Vice President and Chief Financial Officer; John Weisenseel, Senior Vice President, Treasury Operations.

To reach Platts

E-mail: support@platts.com

North America
Tel: 800-PLATTS-8 (toll-free)
+1-212-904-3070 (direct)

Latin America
Tel: + 54-11-4804-1890

Europe & Middle East
Tel: +44-20-7176-6111

Asia Pacific
Tel: +65-6530-6430

Advertising
Tel: +1-720-548-5583

research "may require lead times of 10 to 15 years," Klein said in his statement.

Dennis Spurgeon, assistant secretary for nuclear energy at DOE, said in his presentation that 40 to 45 new units must be built by 2030 if nuclear power is to maintain its share of about 20% of US electricity generated. On the order of 300 gigawatts of new capacity will be needed if the US is to generate 30% of its electricity from nuclear by 2050 to reduce carbon emissions, and the operating life of current plants must be extended to 80 years if that goal is to be achieved, Spurgeon said.

If this does not occur, new nuclear plant construction will be needed simply to offset the retirement of the current fleet, which would result in "a strain on our capital markets and a strain on our ability to produce [electricity] that will be extraordinarily difficult to make up," Spurgeon said. DOE requested $10 million in its fiscal 2009 budget as "seed money" to "get the process started and identify what we need to do" to extend reactor life beyond 60 years, he said.

Joe Sheppard, president and CEO of STP Nuclear Operating Co., which operates the two-unit South Texas Project plant, said at the workshop that he sees no reason why operational life cannot be extended beyond 60 years and that continued operation of the current fleet is required "to have any meaningful impact on carbon emissions." Such life extension would provide "valuable lessons and a test bed on how to do life cycle management, which is going to be very important to the new plants" that will be built in the US, Sheppard said.

The industry has learned how to replace "nearly every major component" except the reactor vessel itself, and could probably do that if needed, Sheppard said. The "economics are excellent" for life extension in both regulated and deregulated electricity markets, and the capital investment that would be required, though significant, would be "modest compared to the payback," he said.

The "vast majority" of industry executives believe that life extension beyond 60 years is "likely," and "more than half" believe it is "very likely," but a "significant public-private partnership" will be required to make that a reality, Sheppard said.

Samson Lee, deputy director of NRC's division of license renewal, said the agency's license renewal program is "very successful" and there is no need to develop a different process for reviews of future requests to operate units beyond 60 years.

Reyes noted "a significant change from the past" in that nuclear operators now recognize that preventive investment in their plants is preferable to risking prolonged shutdowns in the future, and every company now has long-term planning to address such issues.

Public opinion

Sheppard said at the workshop that there are "prevalent" misconceptions in public opinion that conservation and renewables can meet future electricity demand without more nuclear power and that carbon sequestration technology is feasible on a large scale for fossil-fuel plants. But such erroneous beliefs are dispelled "when you do the math," he said.

Reyes said that strategies to respond to public opinion "need to be more localized than national," because opposition to nuclear power varies widely by region. Lee agreed, adding that the public tends to be less concerned with engineering approaches to specific safety issues than it is with broadly cast issues such as "no nukes versus jobs."

Several workshop participants emphasized during the comment period the importance of programs to cultivate engineers and other skilled workers, which they said are crucial for both life extension and construction of new units. Reyes said that the NRC had just awarded three grants for engineering scholarships and faculty development at universities, community colleges and trade schools.

Topics of other presentations scheduled for the workshop included radiation resiliency, primary system corrosion, and aging management issues for vessel internals, concrete structures, cable and buried piping, and large components. Presentations will be posted online at http://www.energetics.com/nrcdoefeb08/.—*Steven Dolley, Washington*

FPL says cost of new reactors at Turkey Point could top $24 billion

Building two new reactors at Turkey Point would cost as much as $24.3 billion, depending on the technology chosen, Florida Power & Light Co. has told the Florida Public Service Commission.

The company said the cost for building the two units ranges from $12.1 billion to $17.8 billion for Westinghouse's AP1000, and $16.5 billion to $24.3 billion for General Electric's ESBWR.

FPL spokesman Mayco Villafana said last week that the company reached its cost estimates by revising a 2004 study of overnight costs done by a consortium of companies, led by the Tennessee Valley Authority in coordination with DOE. That study found the cost of building two ABWRs would be $1,611 per kilowatt. In updating those figures for 2007, FPL said, it found that costs for materials, equipment and labor had risen more than 50% by some indexes since 2004.

In its revisions, FPL determined that overnight costs for the power plant island and supporting construction would range from $6.7 billion, or $2,444/kW, to $9.8 billion, or $3,582/kW. FPL added owner's costs, including security, cooling towers, site work and land costs ranging from $1.27 billion, or $466/kW, to $1.96 billion, or $717/kW. Additionally, FPL estimated transmission costs and allowance for cost risk ranging from $541.7 million, or $198/kW, to $663.6 million, or $242/kW.

According to testimony submitted to the PSC, the total overnight cost for building two Westinghouse AP1000's would range from $3,108 per kWh to $4,540 per kWh.

FPL then added an 11% carrying charge for construction costs and factored in cost escalation over the scope of the project to reach its final figures of $5,780/kW to $8,071/kW depending on the scope of the project and inflation.

Villafana said FPL wanted to provide the most comprehensive cost estimate possible to the PSC so commissioners have an understanding of what such a project will entail.

"We decided to move on this early and make sure that our commission and our regulators realize that if we are going to maintain the option for nuclear, we need to start the process today … so they would be able to appreciate what its going to take for us to build these."

In October 2007, Moody's Investor Service released a report "New Nuclear Generation in the United States" that estimated total costs of a nuclear plant, including interest, would be between \$5,000 and \$6,000/kW. A June 2007 study by the Keystone Center, titled "Nuclear Power Joint Fact-Finding," concluded that overnight estimates for a new reactor would be \$2,950/kW, or between \$3,600 and \$4,000/kW with interest.

Technology

During PSC hearings late last month, FPL President Armando Olivera said the key to which technology the company chooses is cost. He said FPL is negotiating with GE and Westinghouse — vendors whose technology it is considering using — to get the best commercial terms possible for its customers.

"And at this time, we are in heavy discussions with both entities trying to figure out how much of that price, for example, can be a fixed price and how much of it is going to be a variable price," Olivera told the commission.

The company expects to make a decision on the technology later this year, before it moves ahead with the site certification process with the state's Department of Environmental Protection. FPL intends to file an application with NRC in 2009 for a combined construction permit and operating license.

PSC Commissioner Nathan Skop said during the hearings that by FPL's own admission in previous discussions with the PSC, the company is "in further depth of discussions with one particular vendor, and they're using that as the basis for a lot of the things that have come before us … If I were a betting man, I think I could make a judgment call on which technology they may go with." Skop didn't say which technology he believed FPL favors.

Need determination

The three-day technical hearing in Tallahassee, Florida was about FPL's request to certify the need for two new reactors at Turkey Point. FPL has requested the need determination in order to move forward with plans to have the new reactors online in 2018 and 2020.

In its request for the need certification, FPL said, "Failure to initiate development of the Project now, which would be the immediate consequence of the Commission not granting this petition, would irrevocably foreclose the possibility of adding new nuclear capacity by 2018 and in fact would preclude the addition of such capacity before 2021."

The PSC staff is expected to issue its recommendation on need for the new reactors by March 6, and the five-member commission is expected to vote on the request March 18.

During the hearing, Olivera said the only way to meet the company's projected need for an additional 8,200 MW in 2020, without increasing the company's dependence on natural gas, is through more new nuclear generation. Even with the addition of two new units at Turkey Point, and demand side management practices, the company will have a shortfall of between 3,120 MW and 3,960 MW to meet summer peaking loads in 2020, according to company testimony.

"Based on everything we know today, this is the only best option that we have that contributes meaningful reductions in greenhouse gas emissions," Olivera said. "It provides needed base load capacity. It improves fuel diversity, and it reduces Florida's dependence on natural gas and oil fuel."

With the new units, FPL's nuclear generation would increase from 16% to 27%, according to an opening statement by FPL's general counsel, Wade Litchfield, who represented the utility in the hearing. The two new units at Turkey Point could contribute 76% of the greenhouse gas emissions reductions that FPL would be called on to provide by 2021 under a plan proposed by Florida Governor Charlie Crist. Litchfield also said that the new units are the most cost effective option for new generation.

In addition to certifying the need for the new units, FPL also requested that the PSC approve the company spending \$16 million this summer to reserve a forging spot at Japan Steel Works. Florida's Office of Public Counsel, the state's consumer advocate arm, argued that determination should be made at later cost recovery hearings.

Water concerns

A handful of opponents to the plan addressed the commission before testimony began. Most were concerned with the water use of the plant and nuclear waste.

Barry Parsons, who identified himself as a citizen from Madison County, said he was concerned about nuclear waste and plant safety. "I find it incomprehensible that this commission and this state is actually seriously considering approving a new nuclear power plant."

Dawn Shirreffs of Florida's Clean Water Action told the commission that construction of the units doesn't qualify under Florida law because it is not the most cost effective alternative. "Florida Power has not addressed the most basic issues regarding cost, feasibility and water before coming to you today. Instead, they await your approval so that risky investments into due diligence can be done on the ratepayer's dime while Florida Power & Light earns interest," Shirreffs said.

Intervenors include the Orlando Utilities Commission, a municipal utility that is seeking a minority ownership interest in the new FPL units, and Seminole Electric Cooperative, which said it was spurned by FPL when it approached the company about a stake in the new units.

One of the key issues raised in questioning was the water source for cooling the new units, which will need 80 million gallons of water a day. Villafana said recently that the company is focusing on several options, including treated waste-water, and has made a commitment not to use drinking water for cooling.

FPL won approval from the Miami Dade County Commission in December 2007 for zoning variances that would allow the company to build the new units at Turkey Point.*—Pam Radtke Russell, New Orleans*

STP's biggest owners to pursue expansion as city of Austin opts out

The biggest owners of South Texas Project-1 and -2 are moving ahead with plans for new reactors at the site after the smallest owner, the city of Austin, decided against participating in an expansion.

The City Council of Austin said last week it would be "unwise" and "imprudent" to participate in plans to build two new 1,350-MW General Electric ABWRs at the site. The city is a 16% owner in South Texas-1 and -2.

NRG Energy owns 44% of South Texas-1 and -2. CPS Energy, San Antonio's municipally owned utility, owns 40%. CPS has already agreed to participate in expansion plans.

NRG spokesman Dave Knox said last week the company is still "bullish" on the project and Austin's decision would not have an impact.

NRG and CPS will move forward in a 50-50 partnership to develop the new reactors, he said, but added that NRG is leaving the door open for another entity to join in the expansion.

"We'd be very interested in talking with them," if the "right" partner expressed an interest, Knox said, but he would not define what NRG wanted in another partner.

NRG in September 2007 submitted the first full construction permit-operating license application to NRC. But last month, STP Nuclear Operating Co. — which manages the plant for its owners — asked the NRC to postpone review of design-related portions of its application because of ongoing discussions with vendors (Inside NRC, 18 Feb., 1).

In December, NRG gave Austin 90 days to decide whether it would participate in the expansion. NRG estimated the city's portion of the estimated $6 billion cost to build the reactors would be $962 million and the units would provide the city with about 432 MW. NRG expects the new units to be online in 2015 and 2016.

After evaluating the proposal, city-owned utility Austin Energy said it had determined that the cost and schedules for the new units were "overly optimistic." In a letter to the City Council, Austin Energy General Manager Roger Duncan wrote that the expansions "include an unacceptable degree of uncertainty and risk for a commitment of this size. The additional cost to construct the project could be in excess of $1 billion and take more than two years longer than estimated by NRG."

On February 14, the seven-member council voted unanimously not to participate in the expansion, and echoed Duncan's comments in his letter. In addition to lack of information about the expansion plans, the council said, there wasn't enough time to receive public input about the expansion.

For the fiscal year that ended September 30, 2007, the plant provided about 29% of Austin's power, according to an Austin Energy spokesman.

—Pam Radtke Russell, New Orleans

IEA: Long-term policy needed for investment in new US reactors

A significant US nuclear renaissance will require a long-term policy framework to encourage investment in nuclear capacity, the OECD International Energy Agency said last week.

It suggested the US government should provide support beyond currently envisaged financial incentives, which the agency said would be "necessarily limited to the first few new reactor orders."

In a review of US energy policy, the Paris-based IEA said the US should develop "a framework that will allow the market-driven construction of new nuclear plants beyond the first few units of capacity for which generous support mechanisms were included in the [Energy Policy Act of 2005]." In particular, it said the government could include nuclear power "in the scope of a potential CO2 trading scheme or a clean energy portfolio standard."

The US should also strive to implement plans to deploy a final high-level waste disposal site by 2020 and consider "interim arrangements for the storage of used nuclear fuel," the agency said.

The recommendations were contained in the IEA's publication, Energy Policies of IEA Countries – United States 2007 Review, unveiled by IEA Executive Director Nobuo Tanaka at a briefing February 15 in Washington, DC. The review is one of a series of periodic peer reviews conducted by IEA-organized teams. The 2007 US review was led by Claire Durkin of the UK Department of Trade and Industry and the lead author was IEA Energy Analyst Andreas Biermann.

The review said the US lags behind most other OECD countries in areas such as energy efficiency and new technologies to reduce carbon emissions due to lack of market signals. Reducing CO2 emissions will "require a price signal from the market, and at present, there is no government policy in place that would assign a value to CO2," the agency said in a statement accompanying the report's release. As a result, "investors will continue to delay projects that could secure the future of US energy supply," it said.

"Emitting CO2 has a cost," Tanaka said in the statement, "and this needs to be reflected in the price we pay for energy. The lack of a valuation of CO2 emissions means that it is very doubtful if the new technologies the US is developing, such as clean coal or nuclear, will be competitive and be deployed on a sufficient scale to make an impact."

The IEA report commended progress made in US nuclear energy policy since the last such review in 2002, including steps taken to ensure continued successful operation of the existing nuclear plant fleet, to encourage new plant investment, and to support R&D and demonstration of "advanced nuclear plants and fuel cycles for the longer term." It said the measures, in particular financial and tax incentives included in the 2005 Energy Policy Act, "appear to have had the desired effect, with plans being prepared for over 30 new nuclear units and 13 license applications expected by the end of 2008."

But the review noted that final decisions by utilities and investors to build new reactors have yet to be made, and said further measures "may be necessary to encourage continued nuclear investments beyond the initial units supported by the EPAct measures, within the broader framework of energy and environmental policy."

The IEA reviewers also noted the "significant delay" in DOE's schedule to open a deep-geologic repository at Yucca Mountain, Nevada, and that the project faces stiff opposition from the state of Nevada.—*Ann MacLachlan, Paris*

NRC review schedule for Bellefonte foresees major studies done by 2011

NRC anticipates issuing the Bellefonte final environmental impact statement, or EIS, in January 2010 and the final safety evaluation report, or SER, in February 2011 — the two major parts of its review for an application for a combined construction permit-operating license, or COL.

The schedule, issued February 15 and posted this week on NRC's electronic database, is the first complete schedule drafted for a COL application. Bellefonte is the "reference," or lead, application for a Westinghouse AP1000.

The schedule did not establish a timeline for the hearing process, which will be set by the NRC commissioners and an NRC Atomic Safety and Licensing Board. Nor did it project a final date for a decision on issuing the COL by the commissioners, which will act once the hearing has concluded.

NRC separately issued a letter February 15 to Westinghouse, setting out a schedule for the review of the AP1000 design certification amendment. That schedule projects the NRC staff issuing a final SER in March 2010 and completing a rulemaking with the changes to the reactor design in February 2011.

Because the Bellefonte application incorporates by reference the AP1000 amendment, a "substantial portion" of the review schedule "is dependent" on the AP1000 review, NRC senior project manager Joseph Sebrosky said in the February 15 letter to the Tennessee Valley Authority. TVA is the COL applicant and would be the owner and operator of the proposed Bellefonte-3 and -4.

Last month, NRC told TVA that there were three areas of the review where the staff raised initial questions — the "incomplete recirculation screen design" in the AP1000, the seismic source characterization of the region, and the "numerical model used to determine the design basis flood at the site."

For the latter concerns about the seismology and hydrology, the staff established near-term milestones, Sebrosky said in the letter. It will make adjustments to the schedule after issuing requests for additional information or completing a site visit and review of an expected white paper, he said. The chapter in the SER on site characteristics regarding hydrology and seismology is "on the critical path for the review," he said.

Sebrosky said the NRC schedule estimates that TVA will respond to the staff's questions about Bellefonte within 30 days of receiving them, and within 45 days of receiving questions relating to "standard content" for all AP1000 applications.

For the AP1000 review schedule, the staff's milestones are based in part on its assumption that Westinghouse will provide needed documentation by April 30 on the sump screen design. William Gleaves, NRC senior project manager for the AP1000 design certification, said in the letter to Westinghouse that sump information provided the "critical path" for the review. He warned that "any slippage in the Westinghouse schedule will delay the Bellefonte schedule and possibly other subsequent COL applications that reference the AP1000 [design certification] amendment."

—*Jenny Weil, Washington*

Fourth reactor could come online at Olkiluoto in 2018, analysis says

A nuclear reactor with 1,000 MW to 1,800 MW of installed capacity could be online at Olkiluoto around 2018, according to an environmental impact assessment released February 14.

The assessment was prepared by consulting company Poeyry Energy for Teollisuuden Voima Oy or TVO. The BWRs that TVO is considering are General Electric's ABWR (1,500 MW) and ESBWR (1,600-1,700 MW), Toshiba/Westinghouse's ABWR (1,600 MW) and Areva's SWR 1000 (1,250 MW).

The PWRs being looked at are Mitsubishi's APWR (1,600-1,700 MW), Korea Hydro & Nuclear Power Co. Ltd.'s APR-1400 (1,400 MW), Westinghouse's AP-1000 (1,100 MW), Gidropress' VVER-1000 (1,000 MW) and Areva's EPR (1,700 MW). Areva and Siemens are currently building the Olkiluoto-3 EPR for TVO.

The assessment assumes that units with greater installed capacity could eventually be uprated to reach the 1,800 MW figure.

The assessment report authors noted that other suppliers might also be considered. Any unit would have to be modified to meet Finnish nuclear safety requirements — as was Olkiluoto-3 — and the report said that feasibility studies for doing so would be made for "some of the plant types."

The assessment estimates that between 22,000 and 28,000 man-years of work will be created as a result of building a new reactor. The reactor would need 150 employees and the assessment said that services needed as a result of its being built would mean the equivalent of another 100 jobs, which would be contracted out.

It also posits that the economic impact of another unit will be positive, based on the economic impact of Olkiluoto-3.

"More homes have been built in Rauma during the construction phase of Olkiluoto-3 than in the whole decade before the project started," the assessment said. Rauma is the nearest large town to Olkiluoto and many of the foreigners involved with the project are living there with their families

But the authors also noted that "local residents have suffered from the way foreign workers have interpreted the right of public access." Most land in Finland is open for public use, but that is sometimes taken to mean that camping, fishing and other activities are allowed on property close to private homes, which is not the case.

One key area is the amount of cooling water that will be needed and the effect on water temperature when it is returned to the sea. The assessment said the unit would need 40 to 60 cubic meters per second of cooling water and the temperature of the water would increase by 11 to 13 degrees C.

Water could be discharged at the same place where Olkiluoto-1 and -2, and eventually Olkiluoto-3, discharge water or a new discharge system could be built, according to the assessment. Olkiluoto-4's thermal discharges would increase the area of thin ice around the plant.

If a reactor is built, 925,818 metric tons of carbon dioxide emissions could be avoided annually if production were 8 terawatt-hours, the assessment authors estimate. If production were 14 TWh, 1.6 million mt could be avoided, they said.

The assessment also estimates that because of increased vehicle traffic during construction, carbon dioxide emissions in the Olkiluoto area will rise to 9,359 metric tons annually as opposed to 2,236 mt if a unit is not built. The higher figure would be about 12% of total emissions in the area, based on 2006 levels.

In the event of a severe accident, with radioactive release to the air, the assessment estimates that those living one kilometer from the reactor would receive doses of 200 milliSieverts in the first 24 hours; those three kilometers away would receive doses of 70 mSv; and those 10 kilometers away would receive doses of 20 mSv. The closest vacation homes to the reactor are about two kilometers away, with year-round homes slightly farther.

Over 50 years, the total doses would be 300, 200 and 70 mSv for the respective locations.

The assessment notes an average Finn receives a dose of 200 mSv over 50 years, but does not specify how that breaks down.

However, the assessment also said that "in the case of an accident protective measures would be taken. They would substantially reduce the radiation doses exceeding 20 milliSieverts."

The assessment reviews environmental impact for two different sites at Olkiluoto, but said it is not practical for TVO to consider building elsewhere because building necessary infrastructure would make the project too expensive.

At one point, TVO and Fortum were considering jointly building a reactor, possibly at Fortum's Loviisa site, but Fortum is now pursuing its own project. Fennovoima is also looking at building a reactor.

The assessment bases the need for more electricity in Finland on 2005 figures from the Ministry of Employment and the Economy, but does not take into account recent pulp and paper mill closings, which could reduce the demand.

Nor does it look at how the EU's new requirements for an increased share of renewables in a country's generation mix might affect the need for more nuclear or other types of power.

Because of those factors, Minister of Employment and the Economy Mauri Pekkarinen recently said he does not think more than one reactor should be considered during the current political term, which ends in March 2011 (NW, 14 Feb., 14).—*Ariane Sains, Stockholm*

Swedish climate panel sidestepped nuclear issues, lawmaker says

The majority of members of Sweden's Climate Committee "have completely dodged the question of how power from our 10 reactors will be replaced" after decommissioning, a Liberal Party committee member asserted February 18, saying the committee should tell the government new nuclear power is needed.

Carl Hamilton's comments came after a last-minute squabble that prevented the committee from agreeing on a long-term strategy for greenhouse gas emissions reduction.

Sweden has a legal ban on building new reactors, although the government has backed off from early shutdown of the existing units.

In a summary of its recommendations to the government, the committee said the EU target of a 30% GHG emissions reduction by 2020 should be Sweden's benchmark, but members could not reach agreement on a definitive reduction target.

The committee's full report will be delivered to the government in early March. Committee members represent all of the parties in the Riksdag, Sweden's parliament. They include the Liberals, the Center Party, the Conservatives and Christian Democrats, which form Sweden's coalition government, as well as the opposition Left, Social Democrat and Green parties.

At a press conference February 18, members of the four government parties said they were in agreement on a 38% cut in emissions from 1990 levels by 2020, 30% of it domestically and 8% coming from joint implementation projects and clean development mechanisms that give credits for help in reducing emissions in foreign countries.

At the same time, members of three opposition parties, at a separate press conference, blasted that target and said the reduction should be 40% in Sweden.

While the Liberals agreed with their coalition partners on the reduction target, Hamilton said they could not agree on the nuclear issue. He said the committee's full report does not discuss either replacement of existing nuclear reactors or building new ones.

Building more reactors would mean Sweden could reduce its GHG emissions by an additional 20 million metric tons annually, he said. He added that the Liberals' conservatively estimate that with continued use of nuclear power, Sweden would be able to cut domestic emissions 60% by 2020, far outstripping the goals of both the coalition or the opposition.

The Liberals recently proposed that the ban on new reactors be lifted and four units be built (NW, 17 Jan., 5). When the coalition government took power in October 2006, however, it agreed it would not consider new reactors during its four-year term.

Minister for Enterprise, Energy and Communications Maud Olofsson told the Riksdag February 12 that the government would stick to its nuclear policy. She added that the EU's proposed new climate and renewable energy strategy requires Sweden to focus on increasing the share of renewable energy in its generation mix.

—Ariane Sains, Stockholm

DOE may apply to NRC this summer for license for Yucca Mt. repository

DOE might send a repository license application to NRC this summer, but the department won't have a potential operating date until Congress changes the way the program is funded, the head of the DOE repository project said this week.

"Until we get this [funding] issue fixed, we can't say with any certainty when a repository can open" at Yucca Mountain, Nevada, Edward Sproat told state electric utility regulators at a National Association of Regulatory Utility Commissioners conference February 18 in Washington, DC. He added that if the program continues to receive allocations from the Nuclear Waste Fund, a federal trust fund, in the range of $300 million to $450 million a year, a repository will never be built.

The fund, which Congress set up in 1983 to bankroll the disposal of utility spent nuclear fuel using a special fee collected from nuclear utility ratepayers, has about $20.5 billion in it now, according to Sproat. It earns interest at the rate of roughly $900 million a year, and nuclear utility customers collectively pay about $750 million into the fund annually, he said.

DOE wants Congress to give the program greater access to the annual waste fee payments. However, some program observers acknowledge that may not be an easy task. Over the last 10 years, legislation changing the program's funding structure has been introduced but has not been voted on.

DOE budget projections have estimated program costs in excess of $1 billion a year during repository licensing and construction.

According to past projections, program costs were expected to cross the $1 billion mark in fiscal 2009, which begins October 1. Instead, the administration is seeking $494.7 million for the program next fiscal year. The request is near level with the administration's $494.5 million FY-08 request, which lawmakers slashed to $386.5 million by the time an omnibus funding bill was enacted late last year. In a one-two punch, the reduction came after the program had received stopgap funding at the higher FY-07 level for three months.

"If this was the 'old DOE,'" Sproat said, referring to the way the program operated before he changed the management process, there's "no way" the department could still get a license application to NRC this year.

Sproat said he is "fairly confident" DOE can submit a repository license application to NRC this summer. He said the projection reflects what the department now knows about the potential impact of the 21% cut in the program's FY-08 spending. Shortly after the cut occurred, Sproat said in January that he was "cautiously optimistic" an application could be sent to NRC sometime this calendar year.

Sproat told reporters after his speech at the Naruc meeting that the projected window for submitting an application will be narrowed further as program officials get a firmer grasp on the affect of the reduced spending.

Meanwhile, the program is expected to soon issue a congressionally mandated report on the interim storage of utility spent fuel from shutdown reactors. The report, Sproat said, outlines what the DOE waste program can and cannot do on interim storage and what legislative authority it will need to undertake such activities. The report is expected to be issued in late spring, he said.

Separately, Marshall Cohen of the Nuclear Energy Institute told regulators that a volunteer process in which communities agree to host interim storage facilities could provide utilities with a means to move spent fuel off reactor sites before a repository opens at Yucca Mountain.

"Maybe the Nuclear Waste Fund should be looked at for a small, one-time hit to move this along," he said. It could cost the fund between $300 million and $500 million and "seems to be worth considering," he said. Communities could economically benefit from a storage facility, he said, noting that jobs involving cask manufacturing and/or research in connection with nearby universities could spring up there.

Cohen said that industry officials have been visiting communities and have found a few with interest in having an interim storage site. No tribal sites have been visited, he said.

Sproat said that informal discussions continue at DOE about potentially merging the Yucca Mountain Project with the Global Nuclear Energy Partnership program into a government corporation focused on the back-end of nuclear fuel cycle (NuclearFuel, 28 Jan., 1). GNEP aims to close the fuel cycle through the use of advanced reprocessing and fast reactor technologies. The Nuclear Waste Policy Act, which governs the Yucca Mountain Project, is not clear on whether GNEP would be able to receive waste fund money, Sproat said. The law, he said, would have to be changed.*—Elaine Hiruo, Washington*

Oregon regulators stick to plan to issue single ruling in Trojan case

The Oregon Public Utilities Commission last week stood firm on its intent to issue a single ruling on two central issues involving the shutdown Trojan reactor — whether the commission has the authority to retroactively order refunds and for how much.

The February 13 ruling by the OPUC denied a motion that had sought separate and speedy decisions on whether the commission has authority to order PGE to issue refunds on interest the utility collected while recovering its investment in the shutdown reactor, Standard & Poor's Ratings Services said in a February 14 release on the OPUC ruling.

The OPUC ruling "hinted that it [the state commission] is likely to conclude that it does have authority to issue refunds" but stressed this finding is preliminary, S&P said. "If the OPUC is ultimately found to have the jurisdiction to resolve the matter, this could ultimately be favorable for bondholder interests because the range of possible refund levels is more uncertain if the courts determine they are the sole arbiter of the Trojan case," it added. S&P, like Platts, is a unit of The McGraw-Hill Companies.

PGE permanently shut the 1,178-MW unit in 1993 as its least-cost option after concluding the plant was plagued with steam generator problems and could not compete with cheaper fuels (NW, 7 Jan. '93, 1). It took PGE roughly two years to file a case with the OPUC to recover its remaining investment in the plant, said Ed Busch, administrator of the OPUC's electric and natural gas division. Because state regulators saw the shutdown as benefiting ratepayers, it let PGE recover 87% of the rest of the utility's investment during the remaining 16 years of Trojan's licensed life. PGE, as a result, was allowed to collect interest on that money, which some have called profits and argued should be returned to ratepayers.

Busch said the shuttered reactor was included in PGE's rates from April 1995 through October 2000, when legal issues caused that cost recovery to cease. By then PGE's unrecovered investment was $180.5 million, he said. The utility had to absorb that cost.

S&P said the possibility that state regulators or the courts would require PGE to make a "sizable refund to retail customers … has been a looming issue for credit quality." It added that an OPUC ruling would likely clarify the issue's ratings consequences for PGE but that legal challenges of any OPUC ruling on the Trojan refund issue were likely. "The matter is unlikely to be resolved in 2008, even if the OPUC issues its orders," it said.—*Elaine Hiruo, Washington*

AECL, consultant to review events leading to NRU shutdown

A Washington-based international consulting firm, Talisman International LLC, has been hired to conduct a joint review of the circumstances that led up to the extended outage of Atomic Energy of Canada Ltd.'s NRU reactor and the subsequent shortage of medical isotopes that it produces.

The company had already been retained by the Canadian Nuclear Safety Commission in December to analyze the shutdown and has now been retained by AECL under a separate contract to prepare a joint report that is expected in the spring.

What was to have been a four- to five-day routine maintenance outage at the 50-year-old NRU reactor at Chalk River was extended to complete safety upgrades demanded by the CNSC when the unit's operating license was renewed in August 2006. However, CNSC staff discovered in November 2007 that the company had not completed an emergency backup power supply to two heavy water coolant pumps that the CNSC considered a provision to its license renewal. AECL voluntarily extended the outage, creating the shortage of isotopes.

The outage resulted in the passage by Parliament of emergency legislation to restore the unit to service and the January 15 dismissal of CNSC President Linda Keen. Keen is pursuing legal action against the federal government.

The joint review will examine all actions taken by both the CNSC and AECL and the performance of staff in both organizations during the period leading up to the NRU license renewal and the period that preceded the outage in November and December.

Talisman is expected to offer recommendations for improvements in the performances of both AECL and the CNSC.—*Rennie MacKenzie, Ottawa*

EBRD sees shortfall in funding for cleanup of northwest Russia

About Eur 1.7 billion (US$2.5 billion) will have to be spent in the next 17 years to help dismantle nuclear submarines and deal with spent fuel in northwest Russia, "and there is a huge shortfall in funding this," Vince Novak, director of the Nuclear Safety Department at the European Bank for Reconstruction & Development, said in an interview February 11.

Besides additional multilateral aid, Novak said, Russia needs to earmark more money for the work. The Russian budget will be revised in 2010 and "hopefully they'll put more money into this," he said. He added that coordination of financing needs further improvement.

The strategic master plan for cleanup of the region, including a target for all spent fuel removal by 2018, was completed at the end of last year.

Novak said that he hopes work can begin within a few months on a study for dealing with the spent fuel at the Andreeva Bay naval base as well as certain emergency repairs that need to be done there. Work will take about a year, he said. "I don't at all have a clear picture for what the solution for storing spent fuel should be," he said.

A summary of the master plan noted that dealing with the spent fuel at Andreeva and Gremikha, also a naval base, could become even more difficult because "skilled personnel needed to perform this work are being rapidly lost in these remote regions."

There is spent fuel equivalent to about 130 reactor cores at the bases. The master plan summary said that money is lacking to upgrade roads, facilities and equipment so that work to secure the spent fuel can go on.

International donors recently approved work on the vessel Lepse, in which spent submarine fuel is being stored under improper conditions, Novak said. But because responsibility for nuclear vessels is being transferred from the Murmansk Shipping Co. and various ministries to the new Rosatom state nuclear corporation, the line of authority has to be clear before work can proceed, Novak said.

The master plan also includes a program for improving radiation monitoring systems and emergency response in case of a nuclear accident in Arkhangelsk, similar to what has been done in the Murmansk region. Novak said he hopes to get approval for that work in the spring from the donors to the Northern Dimension Environmental Partnership nuclear fund. He said work will be based on a 2007 IAEA review of emergency response in Arkhangelsk. But "what remains to be tested is the enthusiasm of the local authorities" for the project, he added.

Separately, the Norwegian government reiterated February 7 in its revised program for nuclear safety and the environment in northwest Russia, that it will continue with its bilateral aid program in addition to contributing to multilateral projects.

"As long as there is nuclear activity and the need for cleanup in areas close to Norway, it is in our interest to have close cooperation with Russia on these issues," the government said.

The government also said it wants to help the Russians develop a decommissioning plan for the power reactors at Kursk, Kola, Smolensk and Leningrad. Those reactors' lifetimes have been extended beyond the original 30-year design value.

The reactors "represent the greatest danger for radioactive release and damage in Norway," it said. "A serious accident at Kola would mean acute health problems in the nearby area." The Kola plant is the closest to the Norwegian border.

Norway is also involved in dismantling the nuclear submarines at Andreeva Bay and Gremikha and is working with the UK on dismantling a fifth sub during 2008-2009.

The government said it will review its program again in 2012, when the G8 countries' Global Partnership program ends. In 2002, the countries involved agreed to pledge US $20 billion for nuclear cleanup in Russia over 10 years.

—Ariane Sains, Stockholm

GE-Hitachi Nuclear Energy CEO shifted to new position in company

Andrew White, the president and CEO of GE-Hitachi Nuclear Energy, was transferred last week to a new position within GE Energy and replaced by Jack Fuller, another GE veteran.

Fuller has been with GE for 33 years, including 14 years in the nuclear energy business. For the past seven years, Fuller has headed Global Nuclear Fuel, GE said. GNF is the joint venture nuclear fuel fabrication business owned by GE, Hitachi and Toshiba.

The timing or reason for the leadership change was not detailed by GE, which issued a brief statement saying only that White would continue to report to GE Energy CEO John Krenicki and that he would be "exploring potential partnerships and technologies in adjacent spaces to some of Energy's core businesses."

An announcement sent internally February 14 said White would be president and CEO of a new GE unit called New Energy Ventures, in charge of "new global partnerships and technologies that will reach across the entire GE Energy portfolio."

World Nuclear Association Director General John Ritch said February 20 that White had told him the new business would focus on "rationalizing and speeding development of all non-carbon technologies" within GE. White is to assume chairmanship of the WNA in April, Ritch said.

White, who has been with the company for more than two decades, became president and CEO of GE-Hitachi Nuclear Energy in June 2007 after the two companies formed an alliance to provide global nuclear power plant engineering, manufacturing and construction services. Before that, he was president and CEO of GE Energy's nuclear business, based in Wilmington, North Carolina. After joining the company in 1981 as an electrical engineer in London, he began moving to various management positions within GE Power Systems and its successor, GE Energy.

While White will maintain an external industry role in the potential revival of the global commercial nuclear sector, he will no longer be the voice of GE-Hitachi's nuclear business.

In addition to serving as incoming chairman of WNA, White also will continue to represent GE on the executive committee of the Nuclear Energy Institute.

In his old position, White had kept GE Chairman and CEO Jeffrey Immelt closely informed on his negotiations with the industry in promoting GE-Hitachi's new ESBWR design and GE's ABWR, which has been built in Japan. WNA's Ritch said that White, in his new job, "will be in an even better position" to support development of nuclear power." Moreover, he said, White's new position "will be seen as an expression of confidence in his ability."

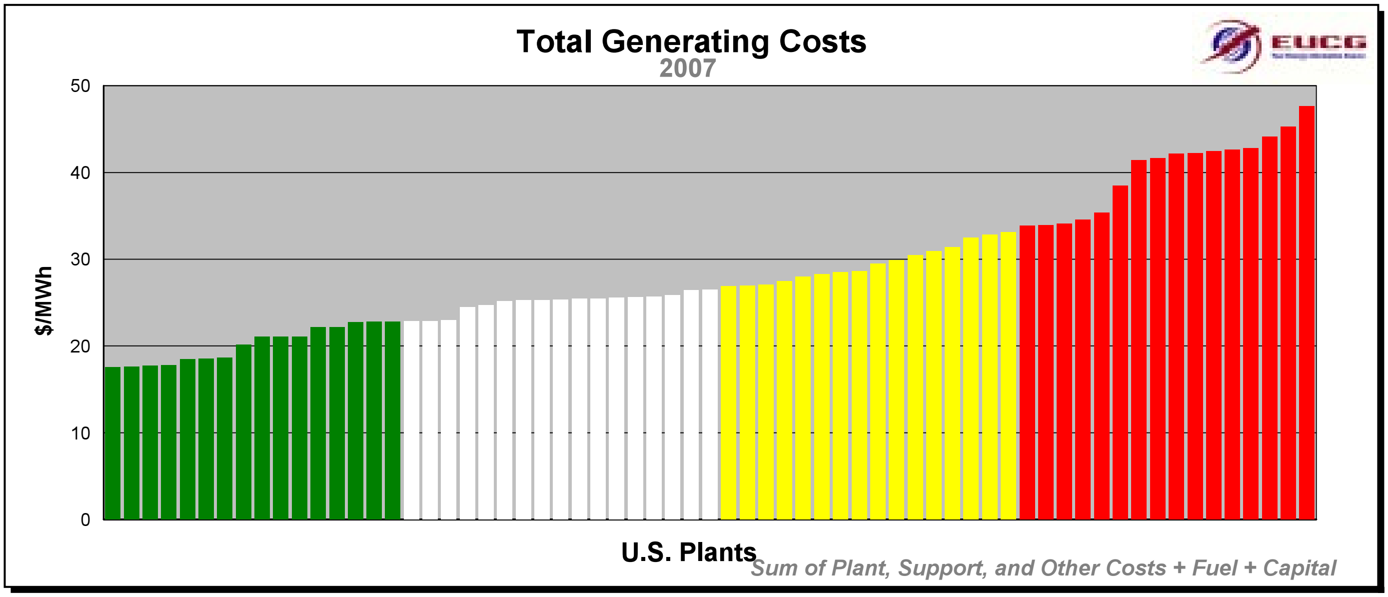
—Jenny Weil, Washington; Ann MacLachlan, Paris

US nuclear costs ... *from page 1*

according to federal figures, the consumer price index inflation ran 2.3% to 3.4% annually, totalling about 15.6% for the five years. US nuclear operators' variable costs, for O&M plus fuel, increased 10.7% and overall costs, including capital, went up 16.4%.

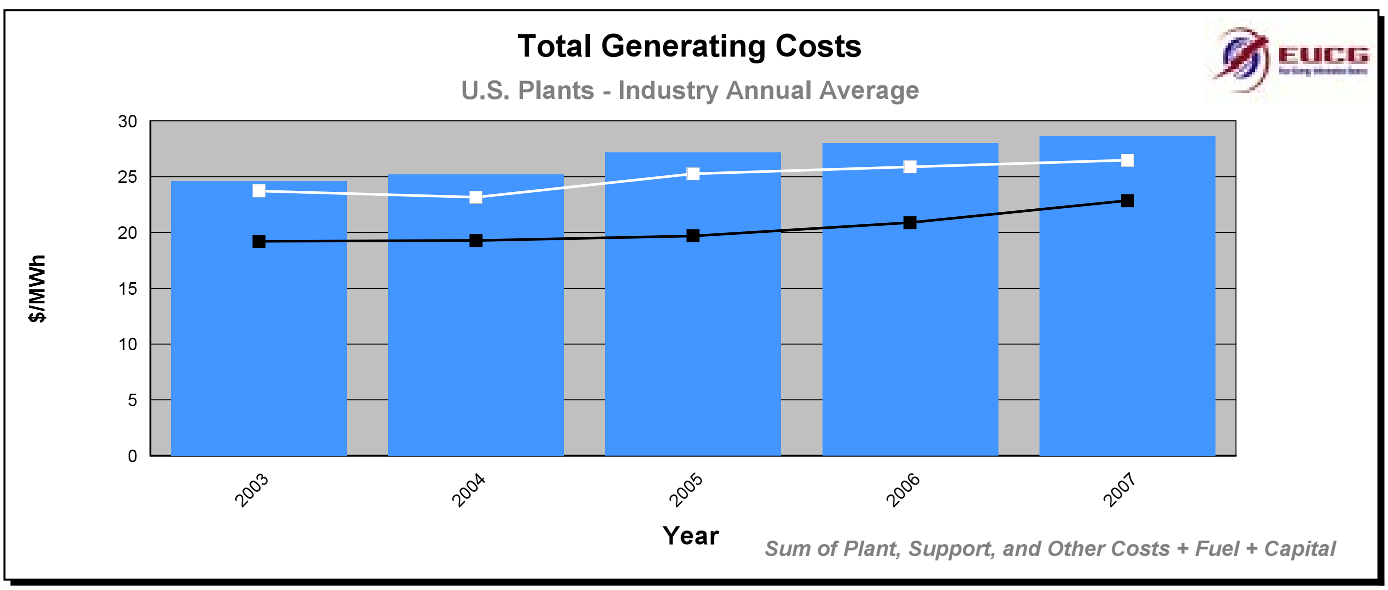
With US on-peak power costing an average of

(Continued on page 12)



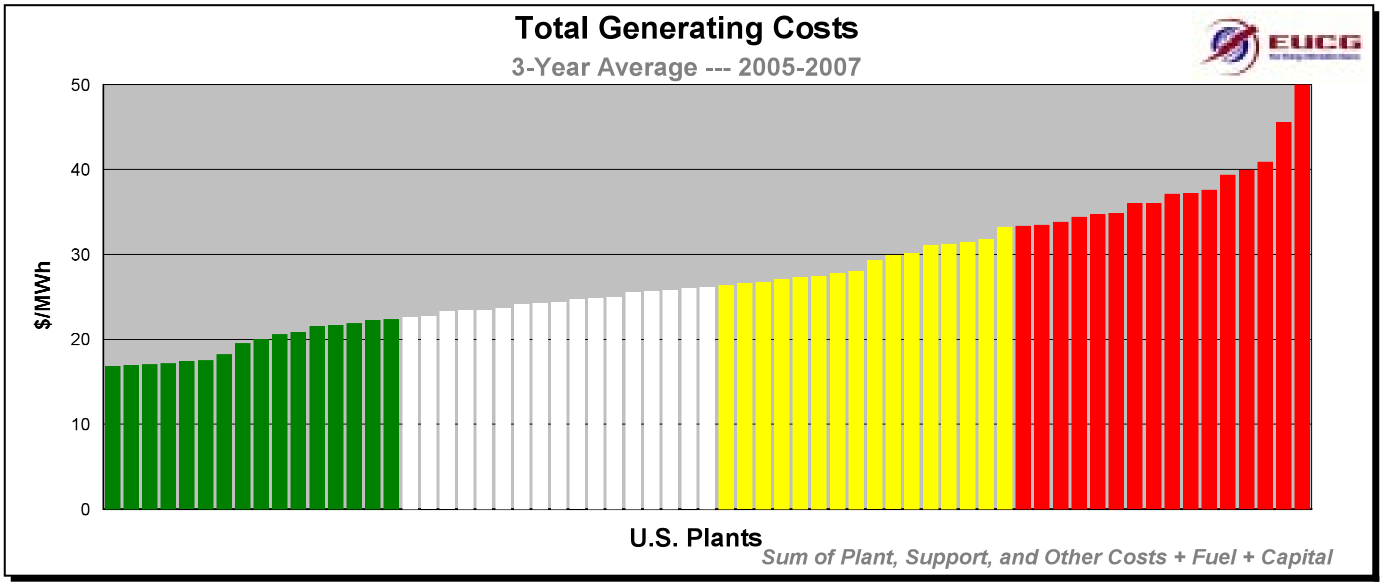
- EUCG Data as of 2/19/2008

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
Value	$22.85	$26.47	$33.49	$47.67
Min Plant	$17.58	$22.87	$26.90	$33.88
Max Plant	$22.83	$26.47	$33.09	$47.67
Average Plant	$20.16	$25.03	$29.52	$40.17



- EUCG Data as of 2/19/2008

	1st Quartile	2nd Quartile	Average
2003	$19.21	$23.71	$24.63
2004	$19.27	$23.16	$25.21
2005	$19.69	$25.26	$27.17
2006	$20.89	$25.88	$27.99
2007	$22.85	$26.47	$28.66



EUCG Data as of 2/19/2008

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
Value	$22.50	$26.11	$33.31	$71.31
Min Plant	$16.86	$22.65	$26.34	$33.37
Max Plant	$22.34	$26.11	$33.25	$71.31
Average Plant	$19.51	$24.46	$29.12	$39.11

(Continued from page 10)

$65.07/MWh in 2007, according to Platts' data, nuclear units appear to remain profitable. The comparable figure in 2003 was $48.47/MWh, so wholesale power has gone up, on average, 34% over the period.

For comparison, coal plants in states with electricity regulation, collated by Platts Energy Advantage for 2006, reported baseload US coal generation averaged spending $24.07/MWh for O&M plus fuel, before any capital costs. The comparable EUCG figure for all US nuclear stations was $22.36/MWh.

Among the 65 US nuclear stations, total 2007 generating costs ranged from $17.58/MWh to $47.67/MWh, with seven stations spending under $20/MWh and 10 exceeding $40/MWh, according to EUCG data.

To smooth out the spending spikes associated with refueling and maintenance outages, the EUCG also calculated spending over the three years 2005-07. In those calculations, per-plant costs ranged from $16.86/MWh to $71.31/MWh, with eight stations below $20/MWh and only three over $40/MWh, meaning 95% of US nuclear units generated at costs under $40/MWh in the period. Most US nuclear stations are now fully amortized, so capital spending represents reinvestment to ensure reliable operation and enable 60-year operation.

The EUCG, a voluntary association of energy professionals involved with electricity generation from all sources, collects information and analyzes it to produce uniform data that members can utilize to benchmark their plants. EUCG members come from the US and Canada, China, France, Japan, Spain, Switzerland and the UK. As of 2007, all US nuclear operators are participating. The EUCG Nuclear Committee made selected composite nuclear data available to Platts; no individual plants were identified.

Unlike Federal Energy Regulatory Commission Form 1 data, the only data available to the public (NW, 13 Sept. '07, 1), the EUCG data are considered by participating members to be more uniform and allow a better assessment by nuclear utility management of units' relative performances, said James Szivos, head of fleet benchmarking for Constellation Energy and its representative on the EUCG. EUCG Nuclear Database Manager Christine Messer said that, in return for contributing data, EUCG members receive benchmarking reports based on cost, staffing and performance, and can analyze data in slices relevant to their situations, such as benchmarking for only a single-unit or only a dual-unit plant site. The EUCG Nuclear Committee also has periodic workshops and maintains an online forum.

The 2007 data illuminate the upward pressure on costs, particularly because the year saw record output by US nuclear generators. The 104 reactors pumped out 807.5 million net MWh, handily breaking the 2004 record of 788.5 million MWh (NW, 14 Feb., 1). Since costs are compared, year to year, on a per-MWh basis, record output should mean lower costs per MWh. In 2004, as expected, costs held fairly steady or went down for some generators, only to rise again in 2005 and 2006.

But in 2007, despite the record generation, costs continued to move upward not only for the average, but even for the top two quartiles. On average, the spending increases were nearly equally divided among O&M, fuel and capital. In 2008, at least 39 of the 104 units are leaving the grid to refuel in the first six months of the year alone, which will make it challenging for US generators to match their 2007 output. That would push up per-MWh costs in 2008 even if operators can hold the line on O&M costs. But those costs have been steadily increasing for four years now.

Moreover, the EUCG data show that, over the past five years, operators have benefited from consistently low fuel costs. For the top quartile operators, fuel costs have actually decreased in the period, counteracting increases in general operations or capital spending. But in 2008, the last three years' rises in uranium prices are widely expected to begin showing up in annual fuel costs. Uranium is bought several years in advance so it can be enriched and fabricated into fuel, and fuel costs are generally reported as amortized over the operating cycles when the fuel is in reactors.

In addition, operators in the top quartile of EUCG data over the past five years have reported significantly lower capital costs than the average. In the years 2003-06, top quartile plants had 40-60% as much capital spending as the average unit. In 2007, that percentage jumped to just under 75%. With many operators experiencing longer outages due to replacement of aging equipment and plant modernization and upgrades (NW, 31 Jan., 1), and ongoing inflation in heavy construction of all sorts, that capital spending category appears to be under upward stress.

—Margaret L. Ryan, Washington

ElBaradei ... *from page 1*

ElBaradei's concerns match those voiced by German officials at a German Atomic Forum meeting February 6 in Berlin (NW, 14 Feb., 1).

ElBaradei met with Sarkozy in the presidential palace in Paris February 14, and later had lunch with Foreign Minister Bernard Kouchner. He also met with Areva CEO Anne Lauvergeon, who serves on a high-level committee studying the IAEA's future strategy.

In a statement after the talks, the Elysee Palace, France's equivalent of the White House, said Sarkozy had "underlined the major importance of the [IAEA] in promoting nuclear energy for peaceful purposes, development of nuclear safety and security, as well as nonproliferation." It said Sarkozy had "recalled France's policy in favor of access to civilian nuclear energy for all countries that meet international standards" of nonproliferation.

The Elysee added that Sarkozy and ElBaradei had "noted the crucial importance of civilian nuclear energy in energy policies and in favor of sustainable development" and had agreed that the goals of the IAEA and France in the area "converge" and that they should work together to implement them.

The statement said the two men had also talked about the need for "progress in development of collective instruments such as nuclear fuel assurances and the creation of a fuel bank at the IAEA."

An Elysee spokesman said February 19 that ElBaradei had "not criticized France's civilian nuclear cooperation" initiatives during the talks. He said most of the conversation was taken up by the issue of the IAEA's investigations into Iranian nuclear activities.

Iranian nuclear activities

A source in Vienna confirmed that information, but said that after the lunch with Kouchner at the Foreign Affairs Ministry, ElBaradei and two senior members of the IAEA staff — safeguards chief Olli Heinonen and nuclear safety director Philippe Jamet — met with a group of ministry officials led by Director General for Political and Security Affairs Gerard Araud.

During that meeting, the source said, the issue of nuclear power infrastructure needs was discussed at length, and the French officials said they would seek support from the IAEA to help develop regulatory and other needed infrastructure in countries where France concludes nuclear cooperation agreements.

The ministry officials pledged to "provide resources" so that the IAEA can carry out that mission, the source said.

Paris observers said that Sarkozy's main thrust in the talks was to convey what the Elysee called "concerns of the international community about Iran's nuclear and ballistic activities" and to convince ElBaradei to press Iran to accept a longstanding European proposal for civilian nuclear trade in exchange for giving up its uranium enrichment program.

Sarkozy, the Elysee statement said, had "encouraged the agency to pursue its investigative work in Iran over the long term and with determination."

In advance of ElBaradei's visit, major French press outlets reported that the French government is frustrated with what it perceives as the IAEA chief's softness on Iran and fears that ElBaradei's next report on the Iranian nuclear program, due February 22, will not provide a sufficient basis for a new package of sanctions from the United Nations.

—Ann MacLachlan, Paris

Areva wants to sell EPRs to Turkey, but awaiting invitation to bid

Areva is interested in selling EPRs to Turkey, the French vendor confirmed February 19, but a spokesman said it is too soon to talk of a formal bid.

An Areva spokesman said the French company was "looking forward to studying any invitation to bid" for reactor business in Turkey, but that so far "there are no elements to bid on."

The Turkish Electricity Trade & Contract Corp., Tetas, is expected to receive proposals from reactor vendor companies and consortia beginning February 21 to build the country's first nuclear power plant (NW, 31 Jan., 1). On February 12, the Turkish energy ministry indicated the first plant would be built at Akkuyu, on the Mediterranean Sea.

Akkuyu has been under consideration for a nuclear power plant since the 1970s and is already licensed. The alternative, Sinop on the Black Sea, is still in the licensing process.

Gabriel Saltarelli, Areva's regional manager for Turkey, was quoted in the February 20 Le Monde newspaper as saying Areva "isn't going to ignore a country with such a [big] potential ... There's business [in Turkey] for everyone." He was accompanying French foreign trade secretary Herve Novelli on a visit to Turkey February 18. During the visit, Novelli visited the Areva transmission and distribution factory near Istanbul and said he was "supporting Areva at an important time" in Turkey, in reference to the upcoming contest for the nuclear power plant business.

But observers said French companies in general, and Areva in particular, are at a disadvantage compared to some competitors because of France's leadership in the condemnation of the 1915 mass killing of Armenians in Ottoman Turkey, and President Nicolas Sarkozy's longstanding position against Turkey joining the EU.

Companies expected to file initial proposals to sell power reactors to Turkey include Areva, Atomic Energy of Canada Ltd., Atomstroyexport, General Electric-Hitachi, Westinghouse, and Korea Electric Power Corp., officials said last month.

Turkish officials said last month they hoped to select a reactor vendor by the end of this year.

—Ann MacLachlan, Paris

BE trying to increase AGRs' output as it pursues new construction

British Energy is attempting to reverse the plummeting output from its aging, second-generation advanced gas-cooled reactor, or AGR, fleet as it jockeys for "a central role" in new, third-generation nuclear construction.

BE's plans were the subject of conference calls CEO Bill Coley held with journalists and investors February 13.

Annual output from BE's eight-station nuclear fleet has fallen by just over a quarter the past eight years — from 69 terawatt-hours in fiscal year 1998/99 to around 5l TWh in FY-06/07, according to BE's data.

After seemingly stabilizing at around that level in the current fiscal year ending March 31, annual output could conceivably drop further, to around 42 TWh in FY-08/09, according to generation projections accompanying BE's latest quarterly report. That drop could happen if current plans to return shutdown reactors to service are unable to be met or further generation losses prevented.

The historic data show annual unplanned losses have doubled from 9.1 TWh in FY-2001/02 to the 18.7 TWh reported February 3 for FY-07/08, a figure likely to increase further by the end of the fiscal year.

Coley said February 13 that unplanned reactor shutdowns and lower electricity prices caused a drop in net profit for the nine months ending December 31, 2007 over the corresponding period in 2006. Adjusted net profit "decreased slightly" from 433 million pounds to 420 million pounds, he said.

BE had achieved a "record low" in small unplanned losses over the nine months due to the company's focus on improving work practices and the fabric of much of the fleet, he said. "However, the level of large losses is having a significant impact on nuclear output," he noted (NW, 14 Feb., 11).

Total nuclear output to February 3 for the current financial year ending March 31 was 43.8 TWh, he said. This was after total non-routine nuclear losses for the period of 18.7 TWh, he said.

BE's quarterly report shows that non-routine nuclear losses comprised 9.8 TWh of losses attributable to the Hinkley Point B and Hunterston B boiler tube cracking issues, 5.5 TWh attributable to the corroded wiring found in some vessel penetration caps that is currently keeping Hartlepool and Heysham A offline, and 3.4 TWh attributable to other stations.

Coley said that though the design maximum of the fleet is around 87 TWh, the "theoretical maximum output" achievable in 2008/09 is 74 TWh because of planned "statutory" maintenance outages, refueling requirements and a small load restriction at Heysham A.

However, the losses anticipated from known events will reduce that 74 TWh to 55 TWh. These included losses arising from the continuing load restrictions and work required at Hinkley Point B and Hunterston B and losses incurred until the currently estimated phased return to service of the four reactors at Heysham A and Hartlepool between July and December this year.

BE published a chart with its quarterly results that shows the 55 TWh has been calculated before taking into account the usual amount of small losses or the possibility that other large losses might occur, such as the possibility that Heysham A and Hartlepool might not be able to be brought back online on the dates anticipated.

Warnings

Warnings of the deterioration in the material condition of BE's AGRs over time came when BE completed its financial restructuring in January 2005 after its financial crisis in late summer 2002. That crisis was caused by the collapse of electricity prices below nuclear generating costs. Since then, prices have risen significantly.

BE identified three years ago that the most significant technical problems with its AGRs were those connected with refueling equipment and processes; turbine generators; tendons; boilers; boiler feed pumps; gas circulators, which are used to pump carbon dioxide coolant gas around the reactor core; and the seawater coolant system (NW, 20 Jan. '05, 6).

The deterioration in the materials condition occurred because of previous under investment, BE said at that time.

BE's annual nuclear plant investment and maintenance spending to tackle such issues is growing: 130 million pounds in FY-04/05, including the costs of staff involved in the work; 290 million pounds in FY-06/07, including the costs of staff involved; and between 330 million and 355 million pounds estimated for FY-08/09, excluding the costs of staff involved. *—Pearl Marshall, London*