

Florida's plans to finance new nuclear plants

U.S. utilities looking to finance new nuclear plants are running into formidable barriers. Florida's regulating and cost recovery plans are an attempt to surmount them.

BY LYNNE HOLT & THEODORE J. KURY

THIS YEAR, FOR THE FIRST TIME SINCE WORLD WAR II, the population of Florida may decrease, although the most recent projections call for zero growth. That compares with the period from 2000 to 2006, when Florida's population increased by an average of almost 400,000 people per year. Over the same period, the state's electricity demand increased more than 18 percent. In the last two-and-a-half years, however, population increase has ground to a halt due to a devastating series of hurricanes, high property insurance rates, a weakened economy, and the housing market collapse.

For a state with such fluctuating booms and busts, decisions by utilities planning long-term energy investments, such as whether to build new power plants, can be difficult. And in Florida, compared to many other U.S. states, electricity demand is shaped predominantly by residential customers. In 2007 they accounted for more than 88 percent of all the state's electricity consumers and they purchased more than one-half of its electricity.¹ By comparison, residential customers in the nation as a whole purchased only 36 percent of the country's electricity in that year.²

Florida's electric utilities and regulators are therefore confronted with the risky question of whether last year was an anomaly or whether slower population growth and associated lower electricity demand will continue in Florida for the foreseeable future. Utilities are also constrained by the significant capital requirements and time necessary to build new power plants. This is particularly true in the case of new nuclear plants, which have historically taken 9.3 years to build and cost at least 3.5 times more than natural gas plants, which would presently be the most likely alternative.



The Florida Legislature and the state's five-member Public Service Commission (PSC), which regulates Florida's electric utilities, have adopted measures to mitigate the economic risks associated with nuclear's long lead times and high capital costs. Although other states are trying to provide more favorable conditions for companies to build new nuclear plants as well, Florida leads the country in attracting nuclear power investment, with Florida Power & Light and Progress Energy Florida planning to build a total of four reactors in the state.³ Many states, and even countries, are waiting to see how Florida will do, particularly in the current economic downturn.

In 2007, 75 percent of Florida's electricity generation mix relied on natural gas and coal, and nuclear power accounted for only 13 percent, compared to the U.S. average of more than 19 percent for nuclear power.⁴ With the addition of a proposed nuclear project, Florida Power & Light reported that it will be able to supply approximately 27 percent of its electricity from nuclear power as opposed to 16 percent in 2008. Its reliance on natural gas would also be reduced by roughly the same amount. Progress Energy Florida would be even more affected by a new nuclear project, allowing it to generate 38 percent of its electricity from nuclear power, rather than 14 percent as in 2008. Without the proposed project, Progress Energy Florida's reliance on natural gas would increase to more than 50 percent from approximately 30 percent.

The lure of nuclear power has been that it generates electricity without emitting carbon dioxide and that it has low variable operating costs (roughly four times lower for nuclear plants as compared to gas-fired plants, due to the relatively low cost and small amount of enriched uranium fuel required). Yet construction costs for new nuclear plants are absolutely staggering relative to past costs and construction costs for other types of power plants.⁵ The total overnight cost—the cost for a project without factoring in interest on debt, as if the project were completed “overnight”—for an advanced nuclear plant in 2008 was estimated to be \$3,018 per kilowatt (in 2007 dollars), compared to \$2,058 per kilowatt for a new scrubber-equipped coal plant, or \$948 per kilowatt for an advanced gas/oil combined cycle plant.⁶ Florida Power & Light estimates that the cost of building 2,200 megawatts of new nuclear power would be between \$12.1 billion and \$18 billion.⁷ Progress Energy Florida estimates it will cost \$14 billion for similar capacity.⁸

Without the existence of several supportive federal policies these companies would not even be able to consider such capital-intensive projects. Federal initiatives include a streamlined construction and operating license process at the Nuclear Regulatory Commission (NRC) aimed at reducing delays, an \$18.5 billion federal loan

guarantee program that guarantees project debt for up to 80 percent of the total cost, production tax credits of 1.8 cents per kilowatt-hour for the first eight years of a plant's operation, and debt service coverage for the first six plants if there is a delay in commercial operation due to litigation or the failure of the NRC to meet a predetermined licensing schedule.

These programs can only do so much, however. While the federal loan guarantee program is intended to reduce the overall project cost by lowering investor risk, it is already oversubscribed. The Energy Department, which administers the program, has received 19 applications from 17 companies around the country, totaling \$122 billion requested. Yet no more money has been allocated for the program.

States that regulate their electricity markets, such as Florida, have also strived

to reduce construction costs and project uncertainty themselves, largely through favorable regulatory policies and tax incentives. The use of legislation establishes ground rules that state regulators, such as the Florida PSC, use to determine whether a new nuclear plant project is needed in the state and how the utility's construction costs should be recovered from ratepayers. In individual proceedings, the PSC has already determined that both Florida Power & Light and Progress Energy Florida's proposed nuclear projects are needed and so has allowed a recovery of costs to begin, before the plants are even online.⁹

To arrive at this decision, the commission was required by the legislature to consider the need for the state's electrical system to be reliable and the issues of fuel diversity, supply reliability, base-load generating capacity, and a desire for adequate electricity at reasonable cost for Floridians. The commission also had to consider whether the plants were the most cost-effective option available and whether the utilities could make use of renewable or energy conservation measures to mitigate their need and whether the new plants would help reduce air emission compliance costs.

Another reason that utilities and the PSC have considered nuclear plants is the volatile price fluctuations of natural gas and oil. The price of natural gas, for example, more than doubled from 2002 to 2005 before declining last year. Such price increases are also passed on to ratepayers, when allowed by the PSC.

For base-load plants, an alternative fuel to nuclear power is, of course, coal. Yet if and when state or federal governments pass carbon reduction legislation, such as cap-and-trade schemes or carbon

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emission taxes, the compliance costs for coal may be higher than other fuel types, particularly nuclear or renewables. In Florida, and elsewhere, recent plans to construct conventional coal plants have been stopped by political pressure. In 2007, the PSC denied a proposal by Florida Power & Light to construct a 1,960-megawatt coal-fired plant for \$5.7 billion. Under pressure from Florida Governor Charlie Crist, other electric utilities scrapped their coal plant plans for Florida as well.

New nuclear plants, however, won't be available until close to 2020. Despite the call for greater fuel diversity, natural gas is increasingly viewed as the transitional fuel of choice as electric utilities wean themselves off coal and plan for alternative energy sources such as nuclear power, wind, solar, and biomass. The largest 11 Florida electric utilities are required to submit 10-year site plans to the PSC describing their strategies for meeting projected electricity demand. The PSC's December 2008 report on the submitted plans shows that the amount of natural gas used to generate electricity in Florida will increase from 39 percent of all fuels in 2007 to 54 percent in 2017. Without additional nuclear generation, or increased use of wind, solar, geothermal, or greater efficiency, Florida's reliance on natural gas will only increase further, thereby exposing consumers to greater fuel price volatility, decreased reliability of fuel supply, and more carbon emissions.

Legislating cost recovery for nuclear builders. After Florida's PSC determined that the nuclear plant proposals from Florida Power & Light and Progress Energy Florida were in fact needed, the utilities petitioned the commission to expedite cost recovery for their investments. This is a departure from earlier years when plants had to be completely constructed and commercially operational before regulators would determine that a utility could recover its costs from its customers. The multi-year time lag between site planning and commercial operation significantly increased uncertainty for plant financing, pushing many companies in the previous nuclear expansion into bankruptcy. Florida was the first of several electricity-regulating states to adopt such policies. (States with similar measures include Georgia, Kansas, Louisiana, Michigan, Mississippi, North Carolina, South Carolina, and Virginia.) Expedited cost recovery should help lower interest rates on a company's debt and reduce cash-flow constraints in years 5-10 of a plant's construction, when costs are at their highest.

Accelerated cost recovery is usually viewed as a benefit for the utility and the utility's investors since it lowers the risk of default, but is seen as coming at the expense of the ratepayer. Yet since it can reduce the cost of a company's long-term debt by enhancing (or maintaining) its credit rating, it can lower the cost of capital for the

utility as a whole, which can mean lower rates in the long-run for its customers. For nuclear plants with long lead times, the effects of compound interest over the period of construction can more than double the costs that the customer eventually pays. For example, if expenses of \$400 million are deferred for 10 years and compound-

ed at a 10 percent interest rate, the debt will have grown to more than \$1 billion by the time electricity rates reflect the costs. Under an accelerated cost recovery scheme as is now the case in Florida, the customer pays \$400 million now, instead of \$1 billion in 10 years. Furthermore, the utility's capital is available for other investments during the period in which its costs are recovered.

In Florida, the PSC bases its decisions on whether a utility deserves to recover costs by applying what is called a "prudent-investment standard." An investment

is judged to be prudent by the PSC based on what information was available to the utility at the time of the project decision regardless of future developments and market prices. Under the prudent-investment standard, if the project is considered the most cost-effective way to meet projected demand its customers will benefit. If that turns out not to be the case but the decision was deemed prudent by the PSC at the time, customers will still have to pay higher rates.

Florida's approach of allowing accelerated cost recovery places an enormous emphasis on the commission staff's ability to analyze the prudence of project costs. The PSC's oversight responsibilities and its decisions on investments therefore become vitally important to what the state's electricity customers will pay in the future. If the PSC makes a mistake and decides that costs for a nuclear power plant were prudently incurred, when in fact they turn out not to have been, Floridians will still have to pay for that mistake. In many other states, those decisions come later, after there is more information about the project to determine whether the investment was a good one. That scenario is a much riskier one for utilities, however.

Florida and several other states (including Georgia, Iowa, Mississippi, North Carolina, and South Carolina) also have provisions in the law allowing utilities to abandon work on a nuclear project and still recover prudently incurred costs. Florida authorizes cost recovery for all prudently incurred preconstruction and construction costs following the PSC's determination that the plant was in fact needed, even if the plant isn't finished. To the extent that costs of this sort are incurred and are recovered in rates, customers will bear the burden but won't receive the benefits of expanded generation.¹⁰

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The opportunity to recover costs in the event of plant cancellations should mitigate the risk to investors for committing to projects of this magnitude where so much uncertainty exists. If a plant is canceled, however, customers will still be required to pay for what in hindsight turned out to be a poor investment.

Public Response. Support for nuclear power has grown nationally in recent years. A March Gallup poll showed that 59 percent of Americans support nuclear power, up from the mid-50 percent range in recent years. But, such numbers shouldn't be relied upon by industry or utilities as public support has been anything but steady. A review of nuclear history is a cautionary tale: The Three Mile Island and Chernobyl accidents doomed public support for nuclear power in previous decades, and financial boondoggles such as the \$6 billion Shoreham Nuclear Power Plant debacle in New York, which didn't generate any electricity but inflicted Long Island residents with high electricity rates, left a bitter taste for nuclear power among ratepayers and investors.

Progress Energy Florida experienced the public's quick change of opinion when it tried to raise rates as part of the accelerated cost recovery scheme for its proposed plant. Effective January 2009, the PSC approved a 24 percent rate increase on residential bills of 1,000 kilowatt-hours, a popular ratemaking benchmark. Of that increase, 13 percent was related to higher fuel costs for currently operating plants and 11 percent to the recovery of preconstruction costs for the nuclear plant. A public outcry ensued when the increase was announced, and in response to pressure the company agreed to reduce its rates and delay the increase until 2010. This type of tension is endemic in utility planning decisions. Utilities need to plan for long-term demand, but customers are more likely to react to rate hikes in the short term.

Florida Power & Light had its own public relations problem this year after news broke that the company paid the NRC a fine of \$130,000 for violations involving six guards at the company's Turkey Point plant who fell asleep on the job or served as lookouts for sleeping guards on duty. Florida Power & Light also paid a fine in 2008 for another set of guard-related violations at Turkey Point. In Florida and throughout the country, safety continues to be a vital issue for the public. The March 2009 Gallup poll asked respondents their views on nuclear power plant safety, 56 percent felt they were safe, while 42 percent felt they were not.

Of course, utility customers are not a homogeneous group and neither are their supporters or opposition, but opposition based on environmental grounds draws significant traction. Florida-based groups that oppose nuclear plant expansion include the Green Party of Florida, the Ecology Party of Florida, the Florida Public Inter-

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est Research Group, and the Southern Alliance for Clean Energy (SACE).¹¹ At a hearing before the PSC on Progress Energy Florida's proposed nuclear plant, SACE testified that renewable energy or conservation measures would make the plant unnecessary and were more cost effective. In addition, members of the public who testi-

fied at the hearings expressed their concern about radioactive waste, the adequacy of available water supplies for reactor coolant, health risks from potential exposure to radiation, plant security, and the placement of transmission lines. Some supported the plant applications as well.

Further challenges. Florida's electric utilities, and those elsewhere, face myriad challenges in the years ahead. Utilities must balance planning for new plant construction at a time of economic slowdown and tight capital markets, uncertainty

about future electricity demand, environmental policies that might encourage nuclear development, and unpredictable costs for fossil fuels such as natural gas used in existing plants.

A proposed nuclear project in Missouri has already been canceled by AmerenUE, which announced in April that it would cease its plans to build a second 1,600-megawatt reactor at its Callaway nuclear plant in central Missouri, which provides electricity to St. Louis. The company cited the fact that Missouri had failed to pass legislation allowing it to recoup capital costs before the plant was operational.

Even with the Florida PSC's approval of the proposed plants and the cost recovery mechanisms to be used, Florida Power & Light and Progress Energy Florida face many difficulties going forward with their projects. Since the last nuclear building boom in the 1970s–1980s (since then there has been no plant started in the United States), the pool of U.S. nuclear construction managers and experienced specialized workers has been in short supply. To complicate matters, 46 percent of current workers in the nuclear power industry may be eligible for retirement or may leave in the next five years.¹² These pressures will undoubtedly drive up labor costs in Florida and other states pursuing new nuclear plants. Companies will need to be creative in staffing nuclear plants in the future, as they will be dealing with a far less experienced workforce and higher turnover than in the past.¹³ Mitigating labor pressures to some extent, the proposed Florida Power & Light units will be located in close proximity to other units already in operation at Turkey Point.

At the federal level both utilities are navigating the difficult process of getting plant licenses approved and their reactor designs

certified. Even though the NRC licensing process has been streamlined, approval can take between two and four years from the time the application is submitted. The streamlined process was only initiated in 1998 and is therefore untested, as applications have yet to go through the entire licensing procedure. Unproven designs and new technologies in so-called Generation III and III+ nuclear plants may cause delays in the process and may ultimately lead to higher construction costs. Also if the NRC requires changes in proposed design specifications in mid-process, the utilities will need to resubmit licensing applications. All these potential pitfalls could mean higher costs and more uncertainty, which will trickle down to ratepayers in higher rates. A case in point is the NRC's recent announcement that its review of the Toshiba-Westinghouse AP1000 reactor design, which was selected by Progress Energy Florida, Florida Power & Light, and four other U.S. power companies, is expected to run 15 months behind schedule.

Finally, if projected electricity demand does not materialize, there could be a public backlash as Floridians are left saddled with the construction costs of the unneeded new plants. One option to prevent such a situation is to arrange for electricity sales between utilities themselves. The Orlando Utilities Commission (OUC), a municipal electric utility, is currently considering paying \$800 million to buy into Progress Energy Florida's proposed nuclear plant and has increased its rates accordingly, in small part to pay for that investment. The rate increase coupled with the prospect of the investment in nuclear power has already triggered some protests from OUC customers. Despite these objections, OUC considers this investment necessary because other fuel options are less attractive to meet projected demand. According to OUC, with coal plants there is the cost of compliance with anticipated federal regulations on carbon emissions and nuclear power is more reliable under all weather conditions than wind or solar.¹⁴ Therefore, from both Progress Energy Florida's and OUC's perspectives, such an arrangement would be mutually beneficial. How consumers fare from these and other nuclear plant proposals in Florida and elsewhere remains an open question whose resolution may be years in coming. ■

Lynne Holt is a policy analyst at the Public Utility Research Center of the University of Florida and is also affiliated with the Bureau of Economic and Business Research and the Askew Institute on Politics and Society at the University of Florida. Her career spans 29 years researching and writing about public policy issues, with a focus on energy and telecommunications. Theodore J. Kury is director of Energy Studies at the Public Utility Research Center at the University

of Florida, where he promotes research and outreach activities in energy regulation and policy. He has 12 years of experience in the energy sector. The authors would like to thank Mark A. Jamison, Sanford V. Berg, Nathan A. Skop, Bill McNulty, and Mary K. Galligan for their comments on an earlier version of this article.

NOTES

1. For the percentage of retail customers, see Florida Public Service Commission (PSC), “Review of 2008 Ten-Year Site Plans for Florida’s Electric Utilities,” Table 2, December 2008, <http://www.psc.state.fl.us/publications/pdf/electricgas/tysp2008.pdf>. For the percentage of retail sales by sector in Florida, see U.S. Energy Information Administration, “Retail Sales, Revenue, and Average Retail Price by Sector, 1990 Through 2007,” Florida, Table 8, April 2009, http://www.eia.doe.gov/cneaf/electricity/st_profiles/florida.html.

2. U.S. Energy Information Administration, “Retail Sales of Electricity to Ultimate Customers: Total by End-Use Sector,” Table 5.1, April 22, 2009, http://www.eia.doe.gov/cneaf/electricity/epm/table5_1.html.

3. Florida Power & Light is planning to build Turkey Point units 6 and 7 and Progress Energy, Levy units 1 and 2. This paper refers to the two units proposed by each as a nuclear plant or nuclear project.

4. Florida’s electricity generation also included 9 percent from oil, 2 percent from renewables, and 1 percent from other gases, see U.S. Energy Information Administration, “Electric Power Industry Generation by Primary Energy Source, 1990 through 2007,” Florida, Table 5, April 2009, http://www.eia.doe.gov/cneaf/electricity/st_profiles/florida.html.

5. This is not true for variable costs, see U.S. Energy Information Administration, “Electricity Market Module,” Table 8.2, March 2009, <http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/electricity.pdf>. Variable costs were \$2 (2007 dollars) for advanced gas/oil combination cycle plants compared to \$0.49 for advanced nuclear plants.

6. Ibid.

7. Eric Silagy, Florida Power & Light, “Meeting Future Energy Needs in Florida and the United States,” (presentation, February 4, 2009), http://www.cba.ufl.edu/purc/docs/presentation_2009Silagy.pdf.

8. “Progress Energy Florida Signs Contract for New, Advanced-Design Nuclear Plant,” Progress Energy Florida, January 5, 2009, http://phx.corporate-ir.net/phoenix.zhtml?c=106559&p=irol-newsArticle_print&ID=1240252.

9. On April 11, 2008, the PSC approved the need for Turkey Point Nuclear units 6 and 7 proposed by Florida Power & Light and on April 12, 2008 for Levy units 1 and 2 proposed by Progress Energy Florida.

10. Plant cancellations were prevalent after the 1970s when it became clear that demand would not be realized. One hundred thirty U.S. plants were ultimately canceled.

11. On February 6, 2009, the Green Party of Florida, the Nuclear Information and Resource Service, and the Ecology Party of Florida filed a petition to intervene in the Nuclear Regulatory Commission’s licensing of Progress Energy Florida’s proposed nuclear plant. One of the issues of contention was that Progress Energy Florida had not adequately considered aquatic and radioactive waste impacts.

12. Nuclear Energy Institute, "Nuclear Industry's Comprehensive Approach Develops Skilled Work Force for the Future," January 2009, http://www.nei.org/filefolder/Nuclear_Industrys_Comprehensive_Approach_Develops_Skilled_Work_Force0109.pdf.
13. Brian Schimmoller, "Politics Aside, Challenges Remain," *Power Engineering*, March 12, 2009, http://pepei.pennnet.com/display_article/355439/6/ARTCL/none/none/1/Politics-Aside,-Challenges-Remain.
14. Amanda Welch, "Proposed Nuclear Plant, Funds Spark Protest," *Central Florida Future.com*, March 19, 2009, <http://www.centralfloridafuture.com/proposed-nuclear-plant-funds-spark-protest-1.1621222>.

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