Charged up

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Volume: 35 | No: 20
Page : 01, 18-25
Issued : 05/24/2007
Jorge Rodríguez is committed to reducing Prepa's $3.8 billion annual electricity bill to consumers by 14% over the next three years. Here's how he'll do it.

Repowering Prepa
New electric power-generating plants scheduled for east and west coasts; $2.4 billion Prepa bond issue just sold in the U.S. municipal market

Can a crippled Puerto Rico Electric Power Authority (Prepa) sustain Puerto Rico's battered economy through the peak demand of the upcoming summer months and the risks of the hurricane season?

An unequivocal "YES!" was the response from Jorge Rodríguez Ruiz, Prepa's new executive director. Only four months into his new job, he is committed to keeping Puerto Rico's lights on, no matter what.

Rodríguez, an electrical distribution engineer by profession, not only knows what has to be done but he just got right down to doing it. He is back on his turf as head of the island's electric-power monopoly, although not totally out of the water world, as the former executive president of the Puerto Rico Aqueduct & Sewer Authority (Prasa), he remains chairman of the board of that utility.

In his characteristic no-nonsense, businesslike approach, Rodríguez simply jumped into his new job with the attitude of getting things done, breaking down internal political barriers, integrating the agency's staff with a renewed sense of direction and taking Prepa to the next level as a world-class public electric utility.

Prepa ranks No. 1 in terms of clients and revenue and fifth in sales of total electric energy among public electric-power utilities in the U.S. Prepa expects electric-energy sales revenue of more than $3.786 billion this fiscal year, an increase of $1.62 billion from Fiscal 2002 when Prepa's customers paid $2.162 billion for

electric-power service.

To get to this next level, however, the Prepa chief knows he must successfully address the short-term priorities of reducing the cost of producing electric energy, repairing the badly damaged, 602-megawatt (MW) Palo Seco plant—which accounts for 11% of Prepa's total energy production—and readying for the upcoming peak electric-consumption season.

During an exclusive CARIBBEAN BUSINESS interview, Rodríguez shared what these different initiatives—grouped under a comprehensive $2.285 billion capital improvement plan (CIP)—consist of and the economic impact on consumer and businesses they are expected to have over the next five years.

The long road ahead

Top in Prepa's customers' minds is the astronomical increase in the cost of electric power. This year, Prepa's annual electric bill to consumers has reached an unprecedented $3.8 billion, a whopping 72% increase in energy costs to Prepa's customers since 2002. Rodríguez is committed to reducing the energy bill by 14% by 2010 and bringing long-term relief to customers.

"I can't and won't speculate regarding the price of oil but in terms of the electricity bill I can conservatively say we can expect a reduction of 3% by the end of 2008 and we should achieve a 10% to 14% reduction by 2010," said Rodríguez.

During this fiscal year (July 1, 2006 to June 30, 2007) residential clients will pay Prepa $1.306 billion or 34.5% of Prepa's total electric energy revenue, commercial clients $1.713 billion or 45.25%, industrial clients $670 million or 17.7% and other clients will account for another $106 million or the remaining 2.8%.

Residential clients will pay $580 million more than the $726 million they paid five years earlier (Fiscal 2002) or almost 80% more; commercial clients (including most of the government agencies) will pay Prepa $744 million more than the $969 million they paid in 2002 or 77% more and industrial clients $288 million, or 75% more than the $382 million they paid five years earlier. The number of industrial clients has been reduced by more than 25% since 2000.

"My commitment is to reduce dependency on oil as a fuel source for energy production from 73% to 50% in three years with customer savings of approximately 14%. By 2013, oil

dependency should drop to 33% with accumulative savings of at least 30%. We expect that by 2017 carbon should represent 33% of the generating fuel and that oil fuel dependency should have decreased to 32%," said Rodríguez as he tries to remain realistic with regard to how soon Puerto Ricans will see electricity bill reductions as a result of Prepa's fuel diversification efforts. "From the moment I stepped into my new position in mid-January, I had to reshuffle the agency's priority list to make sure we have at the top of that list completing the Palo Seco powerplant repairs and bringing it back online, moving forward at top speed with energy-diversification projects to lower electric-energy costs, integrating Prepa's work group into a team effort so we are all working toward the same objectives and putting an end to the highly political environment I encountered," candidly said Rodríguez, who is quick to admit that if Prepa is to get to the next level of a world-class power utility, productivity and service must be improved and fuel diversification achieved to reduce costs.

The bottom line for Rodríguez is that: "To solve a problem you must first admit that you have one. And electric power in Puerto Rico is expensive, that's a problem. We have to stop going around it and trying to come up with explanations, or even worse, finger-pointing excuses, as to why we have the problem. It is an exercise in futility."

In the mid- to long-term, Prepa must continue to move full-speed ahead with what it was doing more than a decade ago: continue the diversification of its energy-producing .sources—reducing the system's oil dependency from 73% to 32% by 2017—and improving service and rates for all customers.

To fuel this transformation, Prepa has just sold more than $2.4 billion in bonds in the U.S. municipal bond market, the largest Prepa bond issue in history. Prepa has total assets of $7.5 billion and is projected to finish Fiscal 2007 with $3.8 billion in operating revenue. Its credit rating is A3 by Moody's, BBB+ by Standard & Poor's and A- by Fitch Ratings. Of the $2.4 billion, $643 million will go to the capital improvement program and the remaining $1.8 billion will refinance Prepa's existing debt generating savings of $106 million.

Prepa's total projected capital-improvement program for the five fiscal years ending June 30, 2012 is approximately $2.285 billion. Some $390 million, or 17.8% of the projected five-year capital-improvement program (CIP), is expected to be financed with internally generated funds. Therefore, expect Prepa to issue more

than $1 billion in bonds for new money during the next couple of years to cover its CIP.

Reduce energy prices through fuel diversification
Prepa's dependency on oil to fuel its powerplants is still 73% vs. only 3% on the U.S. mainland, 18% in Latin America, 20% in Ireland and 63% in oil-rich Saudi Arabia.

"How we make energy-production costs less expensive is one of the key areas I'm looking into. Projects that are geared to reduce the island's dependency on oil are the priority," said Rodríguez. "Currently, there are four or five projects in the pipeline that will help us achieve our goal. Instead of reinventing the wheel, we're looking at ways to accelerate their implementation but making sure there are no surprises along the way."

Clearly, one of those short-term initiatives slated for completion September 2007 is the construction of two generating units of 232 megawatts (MW) each—for a total of 464 MW of additional capacity at the San Juan Powerplant with an investment of $320 million. This strategic project took Prepa an unheard-of 10 years to complete when it should have taken four. "Five at the most, and it could have cost millions less. This project is a great example of how not to do things," Rodríguez said.

Also, power-generation capacity in the west will increase by 120 MW with the replacement of the current four 20 MW turbines in Mayagüez with four new ones of 50 MW each, gaining 120 MW. "I'm very excited about this because the first two turbines should be online by October of this year, providing an additional net generating capacity of 60 MW," the executive director pointed out. The expected completion date for the second two units is April or May of 2008, providing 60 MW of additional generating capacity. Total investment in these four new turbines is $120 million with a total generating capacity of 200 MW.

"Also on our short-term list is the South Coast Gas Pipeline, a gas pipeline from the gas-powered EcoEléctrica plant in Peñuelas to supply the Aguirre combined-cycle 400 MW combustion turbines with natural gas. This will reduce oil dependency by approximately 10% with an investment of about $70 million," explained Rodríguez.

The conversion of the Aguirre Combined-Cycle Oil Plant, which now uses oil, to a Combined-Cycle Natural Gas Plant is expected by May 2008, with projected annual savings of between $60

million and $100 million. “In other words, a project that combines increased efficiency with cost reductions,” noted Rodríguez.

The Cambalache plant will be converted to a Combined-Cycle Plant by April 2009, increasing its existing capacity by 100 MW without additional fuel-consumption costs. “Prepa is installing a steam turbine to produce 100-120 additional MW with an investment of $140 million,” he added.

These projects, among others, will increase the capacity of the island’s electricity-generating system to 6,257 MW which, based on Prepa’s current projections of peak load, will provide the additional generating capacity needed through Fiscal 2009 while still keeping an adequate reserve. “This is what I refer to when people ask about whether we’ll be ready for the summer and the hurricane season. Of course, we will! And we will continue to do everything in our power to protect our emergency reserves and redundancy systems, but both the summer and the hurricane season can bring unexpected forces of nature. But with all that in mind, we are as ready as we can be,” reaffirmed Prepa’s executive director.

“But no one, anywhere, can be fully prepared to face a category-five storm,” added Luis Avilés, Prepa’s chairman of the board and also recently appointed vice chairman of the board of the Government Development Bank.

Avilés, who acted as Prepa’s interim executive director during a brief period after the Palo Seco fires until Rodríguez’s appointment, also told CARIBBEAN BUSINESS, “the goal is not to stabilize the cost of electric energy but to actually reduce it.”

New subsidiary, Prepa Utility, to provide additional capacity

With electric-energy demand projected to double over the next 25 years, from 3,625 MW to 6,857 MW a year by 2030, Prepa is investing $2.189 billion in capital-improvement projects by 2011, adding new powerplants and seeking fuel diversification to reduce the island’s dependence on fuel oil for electric-energy generation.

Looking ahead, Prepa Utility, a new Prepa subsidiary, will accommodate the need for additional generating capacity beyond Fiscal 2009, starting with a new natural gas plant to be built in Mayagüez with a planned generation capacity of

400 MW.

With an investment estimated at between $375 million and $400 million, Prepa Utility is already in negotiations with Power Technology Corp. (PTC), a local corporation, for the development of the project, which is expected to be online by 2013.

CARIBBEAN BUSINESS learned PTC is headed by local businessman Heli Rivera who, according to sources, is also a nuclear engineer with wide experience in the industry. In 1993, PTC submitted an unsolicited proposal to Prepa under the federal Public Utility Regulatory Policies Act (Purpa), as five other companies did.

Purpa is a law passed in 1978 by the United States Congress as part of the National Energy Act. The law provides mechanisms to encourage electric-power utilities to buy power from other producers at the "avoided cost" rate, which is the cost the electric utility would incur were it to generate or purchase from another source. Generally, this is considered to be the fuel costs incurred in the operation of a traditional powerplant.

Although still under negotiations, the project is expected to be a joint venture between PTC and Prepa with both entities investing capital in the project development.

"Rest assured, we [Prepa] will design the facility and we will be an integral part of how the plant will be operated from day one. But we must remain laser focused on what's needed; I'm not going to use more employees than we need," said Rodríguez, referring to this private-public partnership with PTC.

And, to supply the requirements of the new natural-gas plant, Prepa plans to build a gas pipeline from the EcoEléctrica terminal in Peñuelas to the new plant site in Mayagüez.

"After conducting various feasibility studies, a North Coast Gas Pipeline route plan is almost decided on," pointed out Prepa's Planning Director Juan Alicea. "It is expected to go from Peñuelas through Utuado to the Cambalache Plant in Arecibo. Potential additional phases include going along the north coast from Arecibo to the Puerto Nuevo and San Juan powerplants. The estimated cost of the pipeline is $150 million."

Prepa Utility is also exploring the possibility of a downstream market to supply private-sector clients along the gas pipeline's path. Although Rodríguez didn't disclose the names of specific companies from the private sector that could join Prepa Utility in this venture, he did say, "there has been a lot of interest from potential clients along the gas pipeline route as well as potential partners in this venture.

"Already in place is an agreement, signed last month with Grupo Gas Natural de España, to receive, store and gasify liquid natural gas at its Peñuelas terminal, but we will issue a new Request for Proposal (RFP) for other phases of the business," added Rodríguez, who recently got back from a natural-gas industry convention in Barcelona where he met with 10 to 15 natural-gas companies including Exxon, Chevron, Shell, Embesa and Gas Natural de España.

These additional natural-gas initiatives have been in the works at Prepa for more than 10 years, only this time Rodríguez says they will actually be implemented. "This is not the time to reinvent the wheel, especially when we have the internal intellectual capital not only to understand what we need but how to do it," reflected Rodríguez, adding that no more time will be wasted on bureaucratic pondering.

"Like the use of the latest gas technology, which we have known about for years, there are many things that have been talked about for a long time but never implemented. For example, there is an outstanding Research & Development group in our Planning Division, which has been studying the possibilities of different fuel energy sources and alternative technologies. For years, they made their recommendations but no action was taken, until now. With the right facts, it doesn't take me very long to make decisions," said Rodríguez.

A new powerplant for the east

A new powerplant for the east coast? That's correct. According to Rodríguez, it's long overdue.

"So, we are going to build it. The new plant, expected to be in operation by 2017, will generate between 400 MW and 500 MW with gasified coal as a fuel source. Using the latest technology available, coal is burned at very high temperatures without the presence of oxygen, thus avoiding combustion, which is more environmentally friendly. It will be more expensive to build, but long-term savings in the power-generation process will more than

make up for the additional capital investment," explained Alicea. Potential sites for the new plant include the former Roosevelt Roads Naval Base area or Yabucoa as coal must be brought in by water, meaning onsite or nearby port facilities are essential.

The new east coast plant will complement the production of the AES cogeneration plant, which operates with coal imported from Colombia and produces an estimated 13% of Prepa's total power production. Prepa has also visited Colombia, a major coal exporter, to identify ways to increase Puerto Rico's energy production from coal. With exports totaling 104 million tons annually, Colombia ranks sixth among the world's leading exporters of coal.

Prepa is also moving forward with the implementation of alternative electric-energy-generating technology and initiatives such as wind energy, ocean thermal-energy conversion, integrated gasification combined cycle, biodiesel, compressed natural gas marine transport and waste to energy.

Speaking of wind, CARIBBEAN BUSINESS has learned that Prepa has finalized negotiations with Canada-based TROC International and its local subsidiary, TROC Puerto Rico, for the development of a 50 MW wind farm in Arecibo. TROC is also involved in the development of a wind electricity-generation project in the Dominican Republic.

Negotiations have also been finalized with a local company for a wind farm project in Guayanilla, which will generate 45 MW. According to CARIBBEAN BUSINESS sources, the Guayanilla project is headed by local businessman Víctor González.

"Within the next 60 to 90 days, we will sign a contract with a Canadian company that will generate 50 MW in Arecibo and another wind farm project in Guayanilla will generate 45 MW. We are also working with the waste-to-energy project in Caguas," confirmed Rodríguez. Both projects are expected to be online by 2010.

What about nuclear energy? "Let me tell you exactly how I feel about nuclear energy. The current government public policy and public perception is not in favor of nuclear energy. As Prepa executive director, I have to tell you that," said Rodríguez. "Personally, however, I believe it is a technology that has evolved tremendously in recent years. Many of the safety concerns have been addressed and it is being successfully used in

many countries, particularly in Europe. Perhaps, we should conduct serious studies about the feasibility of the latest nuclear technology for Puerto Rico's long-term energy requirements and then determine if is something we ought to consider beyond that point."

Is Prepa ready to confront Mother Nature?
The fires at the Palo Seco powerplant late last year put 602 MW, or 11% of the island's power-generating capacity, offline, adding yet more challenges to the public corporation's already extensive list.

Prepa's peak-demand period begins at the end of August or the beginning of September when the executive director expects the system to reach a peak demand of approximately 3,600 MW putting additional pressure on Prepa's generating capacity.

"To deal with the demand, we are accelerating our efforts to bring Palo Seco back online. In fact, some of its generating capacity will be online by August, or maybe even before that," said Rodríguez.

"Although we have publicly stated we expect two of Palo Seco's units online before the end of the year and one of them could possibly be online by October, we are still being asked whether we will be ready or not," said Rodríguez. "Intensive line patrolling and tree trimmings are the key to being prepared for the hurricane season. We have already cleaned up the 230 kV and the 115 kV lines and we are in the process of trimming the trees affecting the 38 kV lines and down."

Prepa's total generating capacity, including the cogeneration facilities of EcoEléctrica and AES, is 5,365 MW and has an estimated peak demand of 3,685 MW. Without Palo Seco, generating capacity is reduced 4,763 MW.

"The situation has grown out of proportion," is Rodríguez Ruiz's opinion, adding that even with Palo Seco offline and the loss it can experience in sending additional energy to the north coast, the utility still has enough generating capacity to supply the expected upcoming peak demand.

"With an excess generating capacity of 1,078 MW over peak demand, even with Palo Seco offline, we are covered. Even considering the 14% lost or unaccounted-for generated power,

there are 4,096 MW left to supply a peak demand of 3,685 MW.

“We are constantly monitoring our transmission lines and plants with a thermal vision system to make sure we identify ‘heat spots’ that could potentially present a problem. Having Palo Seco offline forces us to be more vigilant,” explained the Prepa executive.

“We have concentrated our yearlong planned maintenance and conservation programs to major generating units such as Costa Sur Powerplant (Units Nos. 1 and 2) and the Aguirre (Units Nos. 5 and 6) system in the first six months of the calendar year as a preventive measure to avoid taking any of them offline during the peak demand period. EcoEléctrica has also taken similar actions,” explained Rodríguez.

Prepa’s system, according to Rodríguez, is designed with ample redundancy, lots more than equivalent-size electric utilities elsewhere in the U.S. or in other countries whose grids may be interconnected with neighboring utilities. “In case of an emergency, they can borrow or buy from a neighbor. We can’t,” said Rodríguez. Even with the loss of the 11% that Palo Seco’s 602 MW represents, reserve margin is still expected to exceed 27% of this year’s peak demand.

“The danger we face is not in the generating capacity but rather the voltage because of the need to transfer additional energy from the South Coast to the North Coast to cover our needs while the Palo Seco plant is being repaired,” Rodríguez pointed out. Prior to the Palo Seco fires, Prepa’s reserve margin was 46% and Prepa is addressing part of the situation by not scheduling powerplant maintenance that would require them to be offline during the peak demand period.

Seventy percent of Prepa’s generating capacity is on the south coast of Puerto Rico (a decision made in the 1970s when the petrochemical complex was to be developed on the south coast), while 70% of the energy consumption is on the north coast. This situation increases the cost of energy transmission and distribution due to the distance. It also contributes substantially to the loss or unaccountability of 14% of the energy generated; a loss that is more than double the 6% loss on the U.S. mainland.

During the period from Fiscal 2002 to Fiscal 2006, Prepa invested $1.3 billion (or 55.4% of its capital-improvement program) in its transmission and distribution system. The capital-

improvement program for the five fiscal years ending June 30, 2012 includes $982 million, or 43%, for transmission and distribution facilities.

Transmission lines include 364 circuit miles of 230 kV lines, 676 circuit miles of 115 kV lines and 1,348 circuit miles of 38 kV lines. There are also 42 miles of underground 38 kV cable and 55 miles of 38 kV submarine cable. Seventy-four transmission substations at generating sites and at other sites throughout the island have a total transformer capacity of 17.3 million kilovolt amperes (kVA).

After completing construction of the transmission loop in the western part of Puerto Rico in Fiscal 2002, in 2006 Prepa finished a new 230 kV transmission line to complete the transmission loop in the eastern part of the island and is now constructing new 230 kV transmission lines to complete the transmission loop for the central region.

The loop that runs from Yabucoa to Sabana Llana will drastically reduce the cost of transmission and provide better voltage on the island's north coast. This eastern loop connects major switching and load centers in the northern and eastern sectors of Puerto Rico and boosts the electrical system's capacity in these regions," said Rodríguez. The eastern loop was built at a cost of $100 million.

Prepa is also constructing a new 53-mile-long, 230 kV transmission line between its south coast (Costa Sur) steam plant and the transmission center in Aguas Buenas. The completion of this new transmission line at an investment of $69 million is expected by Fiscal 2010.

In addition, another 230 kV transmission line loop is being constructed from Costa Sur Cambalache in Arecibo. This center loop will connect major switching and load centers in the southern and northern parts of the island, and boost electrical-system capacity in Puerto Rico's northern and western regions. Once in operation, in 2010, this major infrastructure project, at an estimated cost of $96 million, will enhance the reliability of the transmission system and allow the increase of power transfers from the south coast to the northern and central regions.

To increase reliance and operational flexibility to its transmission system, Prepa has also been improving its 115 kV line system. For example, at an investment of $19 million, a new 19.3-mile-

long line is connecting the Hatillo Transmission Center with the Mora center in Isabela. The project will be completed by November 2007. By December 2008, a new 16.8-mile, 115 kV line will increase the reliability of the Juncos Transmission Center, improving service to the industrial, commercial and residential customers of Juncos and Las Piedras.

Other ongoing projects to improve transmission include improvements to the Victoria in Aguadilla, Las Cruces in Cayey and Hato Tejas in Bayamón transmission centers.

To improve distribution, the Candelero substation is expected to address the increased residential demand in Palmas del Mar and commercial customers in the area; the Factor substation in Arecibo should cover the demand increase from residential and commercial clients in the region; and an increased capacity of the Canóvanas substation will supply the demand in Canóvanas, Carolina and Río Grande.

A program to improve the 38 kV subtransmission system is in effect, which includes construction of underground 38 kV lines in Mayagüez, Vega Baja, Carolina, Viaducto, Humacao and San Fernando in San Juan. In addition, most of the 38 kV lines in the central part of the island are being replaced. These projects will improve the reliability of the subtransmission system.

“We are doing tree trimming all-week long but, now, have started to work on Saturdays, simultaneously impacting 20 to 22 municipalities with 200 work teams of approximately 600 people. We are taking the opportunity to change burned-out streetlights. In addition, a new educational program will be implemented while we visit the different neighborhoods to educate the customers on which kind of trees are not suitable to plant near the lines in their surroundings and backyards,” Rodríguez explained.

The trimming process and the changing of street lamps is an ongoing project. “When I got here, there were 18,000 burned-out streetlights. Today, less than three months later, there are only 1,200 left to be replaced,” he said.

Puerto Rico’s location in a hurricane path threatens aboveground electrical infrastructure. The tropical storm season, with its characteristic strong winds and heavy rainfall, presents a clear and upcoming danger to Prepa’s 33,000 aboveground circuit miles of electric-power transmission and -distribution lines. The transmission lines extend for 2,379 miles with an additional

30,480 miles of distribution lines. Prepa serves more than 1.455 million clients including 1.319 million residential, 130,392 commercial and 1,584 industrial clients.

The island's water service is also predicated on Prepa's capacity to provide adequate electrical power to its sister public utility. Prasa's ability to provide adequate water service to the population and keep its water-treatment plants operational depends substantially on Prepa. Prasa serves approximately 1.2 million clients providing 97% water service and 55% sewer coverage to more than 3.9 million residents and tourists.

"To reduce the incidence of loss of power in the aftermath of hurricanes and other major storms, we are finishing the construction of an underground 115 kV transmission circuit line around the San Juan metro area. The project, which is 95% completed, is scheduled to be delivered in the next few months at a cost of $135 million," added Prepa's executive director. The Federal Emergency Management Administration is providing 75% of the cost involved.

"Also, in cooperation with several municipalities, Prepa is currently designing and building major underground systems in high-density metropolitan areas. These underground systems will allow the replacement of overhead subtransmission and distribution lines, thereby improving reliability and assisting municipalities undertaking urban renewal projects by removing unsightly poles, lines and transformers," he continued.

The dreaded bill

When can consumers see a reduction in their electricity bills? "I can't and won't speculate regarding the price of oil but, in terms of the electric bill, I can conservatively say we can expect a reduction of 3% by the end of 2008 and 10% to 14% by 2010. Although there are other things that along the way can improve my expectations, I can't publicly commit this agency to them," said Jorge Rodríguez.

Prepa projects revenue of more than $3.786 billion this fiscal year, an increase of $1.62 billion compared with Fiscal 2002 when Prepa's customers paid $2.162 billion for electric-power service. "Out of that, $1.8 billion is the fuel oil we buy," said Rodríguez, the first to admit he was a critic of the formula used by Prepa in its electric billings. "But now I'm convinced these

charges are necessary to cover our present costs."

"I believe we have made too many different representations to our customers in the past and it is time for us to be frank with them. Although we are committed to reducing the cost of energy and making it competitive, we must realize that our geographical circumstances don't always afford us the flexibility to keep costs down. In terms of electric energy, Puerto Rico is an isolated island without the possibility of being connected to other generating facilities, as is the case on the U.S. mainland and in continental Europe. That has an incremental cost," explained Rodríguez. The aggregate of the cumulative increases in electric-energy costs to Prepa's customers over the past five years, add up to $4.8 billion. Put differently, the cost of electricity to Prepa's customers has increased a whopping 72% in just five years.

Although Prepa's basic charges of 5.7¢ per kWh have not been increased since 1989, during Fiscal 2006, the residential charges for a kWh was 17.72¢, 18.97¢ for commercial, and 15.63¢ for industrial clients. The average for all sectors was 17.99¢.

These rates are substantially higher than the averages on the U.S. mainland, which are 8.38¢ per kWh for residential customers, 7.82¢ for commercial and 4.9¢ for industrial.

Prepa's co-generators save millions of dollars; provide natural gas and coal alternatives to Prepa's expensive oil fuel reliance

In an attempt to diversify its fuel sources and reduce the island's historic reliance on oil-fired generating units, during the administration of former Gov. Pedro J. Rosselló, the Puerto Rico Electric Power Authority (Prepa) reached long-term purchase agreements with two privately owned cogeneration facilities.

Prepa has a contract with EcoEléctrica L.P. to purchase 507 MW of dependable generating capacity from a natural gas-fired cogeneration plant the private company built in Peñuelas. In addition, Prepa also entered into a long-term contract with AES Puerto Rico L.P. to purchase 454 MW of dependable generating capacity from a coal-fired facility built by AES in Guayama. Both companies provide a fixed capacity at a higher availability level than Prepa achieves. Their output is fully integrated into Prepa's system and dispatch control is maintained by Prepa.

AES and EcoEléctrica contribute to Prepa's efforts toward fuel

diversification and improved reliability of service. In the past, oil-fired units produced approximately 99% of Prepa's energy. After the incorporation of EcoEléctrica and AES facilities into the system, approximately 27% of Prepa's annual energy requirements are being provided by nonoil-fired generating facilities. This percentage is expected to increase to 33% upon EcoEléctrica and AES reaching full contracted availability.

Prepa's production facilities together with EcoEléctrica and AES Puerto Rico have a dependable generating capacity of 5,365 megawatts (MW). EcoEléctrica's natural-gas-fired plant in Peñuelas provides 507 MW while AES' Guayama coal-fired cogeneration plant provides an additional 454 MW.

Prepa entered into an agreement with EcoEléctrica to purchase all the power produced by the facility for 22 years. The agreement requires EcoEléctrica to provide 507 MW of dependable generating capacity. Prepa may purchase any energy produced by the facility in excess of 507 MW, if made available, by paying an energy charge only. No capacity charge would be imposed on Prepa for this "excess" power.

EcoEléctrica entered into a long-term supply agreement to meet its expected needs for natural gas at the facility. Deliveries of natural gas commenced in July 2000. The power purchase agreement with EcoEléctrica includes monthly capacity and energy charges to be paid by Prepa for the 507 MW of capacity, which EcoEléctrica is committed to provide.

The EcoEléctrica-purchased-power costs incorporate a minimum monthly power or fuel purchase requirement based on an average capacity-utilization factor on the part of Prepa. After paying this minimum requirement, Prepa only pays for energy actually received (including energy in excess of the 507 MW guaranteed by EcoEléctrica).

This element of the agreement, when combined with the possible reduction in the capacity charge, effectively transfers substantially all of the economic risk of operating the facility to EcoEléctrica.

The agreement with AES-P.R. allows Prepa to purchase all the power produced by this facility for a term of 25 years from the date of commencement of commercial operation. The contract with AES-P.R. is substantially similar to the EcoEléctrica contract. Above a certain minimum amount, Prepa is only

obligated to purchase energy actually produced by the facility. AES-P.R., an affiliate of the AES Corp., is a clean-burning coal-technology facility, which consists of two fluidized bed boilers and two steam turbines with 454 MW of dependable generating capacity.

Among other benefits, the integration of the EcoEléctrica and AES-P.R. cogeneration facilities into Prepa's System reduces the impact of changes in energy costs to Prepa's clients resulting from short-term changes in fuel costs due to the manner of calculation of the energy charges under the EcoEléctrica and AES-P.R. agreements.

While the agreements provide that energy charges will change based on different formulas relating to the prior year, each agreement fixes the energy price for each year of the contract at the beginning of the year. Fixing the energy component of the price for the whole year reduces the impact of seasonal or short-duration variations in the market price of electricity. Because the energy price is fixed and known for the entire year, Prepa is able to achieve better economic dispatching and scheduling of maintenance outages of all its generating units.

In addition, the year delay in the effect of energy price changes on Prepa's energy costs reduces variations of the fuel and purchase power components in the price of electricity sold by Prepa by postponing the impact of the price changes and bringing these changes out of step with price changes in other Prepa components.

Prepa exploring alternative energy sources

By FRANCES RYAN

Canadian and local companies are finalizing plans on how to incorporate the wind farms into Prepa's network. Windpower, however, while an important renewable energy source and environmentally friendly, is subject to wind currents. The technology being considered by Prepa could make wind generation feasible even if only operating 33% of the time, which makes it a cost-effective project. Although not enough to run the entire system, it would be ideal to keep in reserve or serve smaller regional areas in case of an emergency.

Final investment for wind farms will be secured through a power-purchase agreement with the selected company whereby Prepa

retains the right to buy the electricity generated by the wind farms. Construction of wind farms could start as early as the end of this year. Industry experts believe the best locations for wind farms could be Culebra, Vieques and generally the east coast of the island where there are stronger winds.

Meanwhile, industry opponents of coal generation will definitely argue a coal plant on the east coast, possibly in Ceiba, would be an ecological disaster for El Yunque and the island's northwestern region given that winds blow from the northeast carrying emissions.

Rocío Vélez, new business manager for Solena, a Washington-based environmental company specializing in the latest waste-to-energy technology, said, "While diversification of energy sources is a very important step in the right direction to move away from fuel oil, more and more countries around the world are moving toward renewable energy sources to provide cleaner energy in both a profitable and environmentally sound manner."

Currently, there are no renewable energy market sources on the island. "If we could partner with Prepa to develop waste-to-energy plants we could alleviate the handling of 10,000 tons per day of solid waste and could be producing 400 megawatts of renewable clean energy," continued Vélez. "This could translate into generating 20% of the island's power while significantly reducing the environmental impact."

Regarding waste-to-energy technology to convert solid waste to electricity, Prepa is finally coming around to considering the plasma technology, such as the one used by Solena, which tends to be effective but expensive. Another exciting technology under Prepa's consideration is ocean thermal-energy conversion, or OTEC, a way to generate electricity using the temperature differences of seawater from the surface to different depths.

The method involves building a floating platform to pump cold water from the ocean depths to the surface and extracting energy from the flow of heat between the cold water and warm surface water. OTEC utilizes the temperature difference that exists between deep and shallow waters to run an ammonia turbo generator. Experts may argue Yabucoa is not the best place to install an OTEC facility, as has been considered in the past, but rather Punta Tuna in Maunabo, which has the necessary sea depth for this type of installation. The second-best place in Puerto Rico would be the southwestern part of Vieques, according to studies

from the Energy & Environmental Center of the University of Puerto Rico.

Several years ago, the University of Puerto Rico validated studies that confirmed the area of Yabucoa as ideal to develop OTEC technology. Twenty-five years ago, Puerto Rico lost its federal bid for an OTEC pilot project, which landed in Hawaii. Recently, Prepa has been in talks to resume efforts to incorporate OTEC technology into the agency's energy-diversification efforts. Project presentations are expected shortly.

Regarding nuclear energy, Prepa's executive director is personally in favor of studying the feasibility of such technology for Puerto Rico. However, he is fully aware that current public policy and the public's perception are not in favor of it.

San Juan Combined-Cycle Plant

- Additional capacity: 464 MW;
- Investment: $320 million;
- Delivery date: September 2007.

Aguirre Combined-Cycle Plant

- Transfer of natural gas from Peñuelas to Aguirre;
- Reduce oil dependency by 10%;
- Investment: $70 million;
- Delivery date: May 2008.

Palo Seco Powerplant

- Loss of $106 million fully covered by insurance;
- Starts coming back online: August 2007;
- Full capacity: 602 MW in 12 to 18 months.

Cambalache Combined-Cycle Plant

- Additional capacity: 100 MW;
- Investment: $140 million;
- Lower production costs;
- Delivery date: April 2009.