

What will Puerto Rico have in common with



the White House, the Pentagon & the Capitol ?

By Carlos Márquez & Gina M. Hernández Pages 20-29

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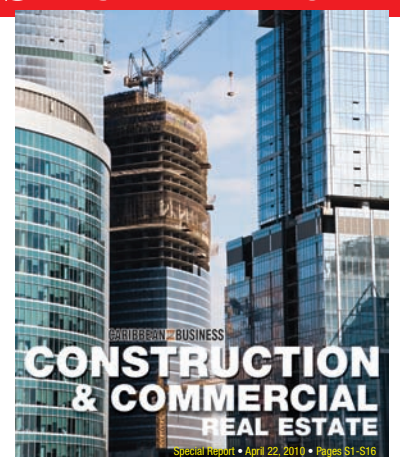
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SPECIAL REPORT



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Everybody is on board

Increased use of natural gas essential to reduce energy costs in the short term



From left: Department of Natural & Environmental Resources Secretary Daniel J. Galán Kercadó, Environmental Quality Board President Pedro J. Nieves Miranda, Planning Board President Héctor Morales, Solid Waste Management Authority Executive Director Elí Díaz, Energy Affairs Administration Executive Director Luis M. Bernal, and Economic Development & Commerce Secretary José R. Pérez Riera

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The administration of Gov. Luis Fortuño and the Puerto Rico Electric Power Authority (Prepa) are making a commitment and taking concrete actions to bring down the cost of electricity in the short term.

Curbing the use of oil by turning

more to natural gas to produce electricity is the only way to dramatically reduce energy costs and greenhouse gas emissions in the short term. With oil prices constantly rising, renewable energy such as solar and wind are being looked at as the power generation sources of the future. However, Puerto Rico can't wait for the future any longer.

At last, and with a single voice, the administration and Prepa are taking

the necessary actions to address a decades-old problem that has hindered economic development, hurt the environment and emptied consumers' pockets.

After spending an average of nearly \$4 billion a year during the past five years for electric energy, consumers will get a big break in their electric bills starting in December, and electricity costs will be cut by 30% during the next two years.

Prepa confirmed to CARIBBEAN BUSINESS that the cost of electricity, currently at approximately 21 cents per kilowatt hour (kWh), will be slashed to about 15 cents per kWh by 2012 and 12 cents per kWh by 2015. The average cost of electric power on the U.S. mainland is about 10 cents per kWh.

The reduction is possible due to the

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conversion of a substantial part of Prepa's generating plants to natural gas instead of fuel oil. By 2012 Puerto Rico's use of natural gas to generate electricity will double from 15% to 30% with a proportional reduction in oil dependency currently at 70%.

The increased use of less expensive, cleaner-burning natural gas is part of the Fortuño administration's public policy to diversify Puerto Rico's energy sources to reduce the island's dependence on oil. The aim is to cut energy costs to make the island more competitive and protect the environment.

Oil prices are expected to remain well above U.S. natural gas prices over the next 25 years, according to the U.S. Department of Energy's Energy Information Agency. Natural gas has been an average of 38% cheaper than oil for the past five years and 28% cheaper over the past decade.

Prepa's fuel costs are automatically passed on to customers via a monthly fuel adjustment mechanism.

The expanded use of natural gas in Puerto Rico will parallel the expanded use of natural gas on the U.S. mainland. Vigorous construction of natural gas infrastructure on the mainland has included some 84 new pipeline projects in 48 states over the past few years, adding close to 4,000 additional miles of natural gas pipelines and expansion of existing pipelines since 2008.

Approximately 180 new projects are already being planned in the States, representing a potential 10,200 miles of new pipelines in a grid throughout the U.S.

Most of the natural gas consumed in the U.S. is produced in the U.S. (84%). Canada provides another 13% of the natural gas used in the U.S. while only 3% is imported from other sources. This is helping the states cap energy-generation costs as they reduce their dependence on oil from Venezuela and the Middle East.

The continued growth in the use of natural gas in the States is due to the much lower cost compared to oil and the proven safety record of natural gas. Environmentally, natural gas produces fewer emissions, and it dissolves into the atmosphere in the case of leaks.

Natural gas is considered so safe



that the White House, Pentagon and the U.S. Capitol are now heated with natural gas. So are 63 million residential homes (25%) and five million commercial clients throughout the U.S.

ECONOMIC DEVELOPMENT AND THE ENVIRONMENT

"Many people have the generalized assumption that economic development and environmental concerns are mutually exclusive and can never occupy the same space. Nothing is further from the truth. We have designed and have been implementing a plan based on the simple idea that the environment and economic development can go hand in hand," Fortuño said.

"The key word here is integration. Our aim is to develop greener alternatives for our energy needs that go hand in hand with our goals for achieving a higher competitive standing in the global market," the governor said. "We would position Puerto Rico as a leader in the development of strategies for reducing greenhouse gas emissions. Our team is working very hard to make that happen."

Green initiatives, cost-effective and environmentally friendly energy sources and reducing the island's dependence on fossil fuels all fit with the economic development issues of job creation and "true progress for every individual. That is essentially what this integrated plan is all about," Fortuño said.

"Prepa's plans to diversify its fuel sources with the conversion of some of its generating plants to natural gas will reduce the island's dependence on oil for electric energy generation which should, in turn, eventually result in a lower electric bill for all consumers."

Gov. Luis G. Fortuño

"Prepa's plans to further diversify its fuel sources with the conversion of some of its generating plants to natural gas will reduce the island's dependence on oil for electric energy generation which should, in turn, eventually result in a lower electric bill for all consumers," the governor said.

Currently, the public utility's power generation is 68.7% dependent on imported oil, with 16.1% stemming from natural gas and 15% from coal. Prepa itself is almost entirely reliant on oil as the power generated at natural gas and coal plants are privately owned. The remainder of the utility's power generation comes from several small hydropower production facilities.

BRINGING MORE NATURAL GAS ONLINE

"Natural gas-based electricity production is safe, reliable, economical and environmentally friendly. This is what we have to look for if we want to reduce our electric bills. To reach this goal we must rid ourselves of the oil and convert our power units to natural gas—a clean, economic, abundant fuel with a much more stable price than oil. That will help us quickly lower our clients' electric bills by up to 30%," said Prepa Executive Director Miguel A. Cordero.

"The public policy is geared toward reducing energy costs within the next two years. Prepa's clients could see a significant reduction in their electric bill," said Planning Board President Héctor Morales.

Cordero expects to start generating electricity from natural gas at the massive 1,090 megawatt (MW) Costa Sur plant in Guayanilla before the end

of the year. Then Prepa will proceed with the conversions to natural gas of the San Juan Combined Cycle plant units 1 and 2 (440 MW), San Juan units 3, 4, 5 and 6 (400 MW), Palo Seco units 3 and 4 (432 MW), and Cambalache units 1, 2 and 3 in Arecibo before the end of 2011.

The substitution of natural gas for oil is the only way to dramatically reduce energy costs and emissions in the short term. Although both fuel sources are imported, natural gas will siphon off much less money from the island economy. (See side bar on page 28.)

Cordero also plans to convert Aguirre plant units 1 and 2 (900 MW) in Salinas from oil to "clean coal" before the end of 2011.

By early 2012, natural gas will represent 30% of Prepa's fuel sources, coal 30%, and oil less than 40%.

"You have to look at oil not at its current cost, but where it might go. That's why we have to strike a balance. We are including renewable resources, but we want to bring energy costs to the lowest level possible," Cordero said. "Coal is definitely better for Puerto Rico than oil. The cost is lower, and its price and supply is very stable."

The reserves of coal on the U.S. mainland are enormous, representing approximately 25% of the world reserves.

In the long term (2020), renewable sources of energy (wind, sun and hydro, among others) are expected to represent 15%, further reducing oil share to approximately 25%. While renewable energy sources and technologies are key to achieving fuel diversity, their implementation is time-consuming and does not

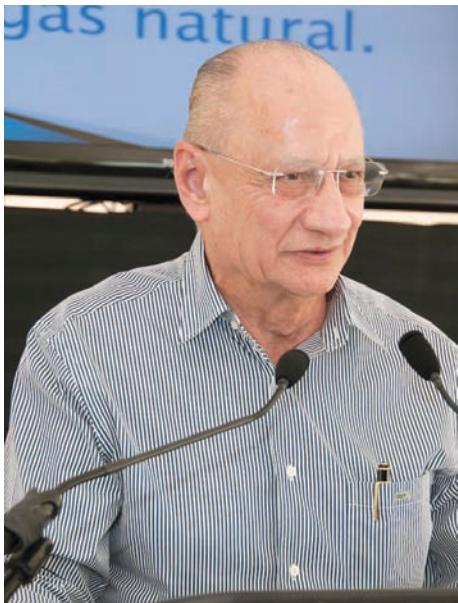
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translate into marked reductions in electricity prices in the short term.

Currently, natural gas is used by private sector cogenerator EcoEléctrica (507 MW) in Peñuelas to provide approximately 15% of Prepa’s needs. Applied Energy Systems (AES) provides another 15% through its 454 MW coal-fired plant in Guayama.

“EcoEléctrica and AES emerged as a solution for the electricity demand crisis we faced during the 1990s. At that time, we looked toward the private sector to reach natural gas and coal cogenerating agreements,” Cordero said.

According to Cordero, EcoEléctrica and AES were instrumental at a time when the government was looking for choices to reduce Puerto Rico’s 99% fuel oil dependency during the Pedro Rosselló administration.



EcoEléctrica came online in 2000, followed by AES in 2002.

Aside from generating electricity at a lower cost than Prepa’s oil-fired plants, the safety and environmental records of both cogenerators is outstanding.

“Natural gas-based electricity production is safe, reliable, economical and environmentally-friendly... if we want to reduce our electricity bill...we must rid ourselves of the oil and convert our power units to natural gas ... that will help us quickly lower our clients’ electric bill by up to 30%.”

Prepa Executive Director Miguel A. Cordero

The selection of Costa Sur to start with the conversion process was not taken by chance as it is located near the EcoEléctrica facility, which includes a vital liquid natural gas (LNG) terminal, facilitating transportation of natural gas to Costa Sur. The Aguirre conversion







to coal also takes into consideration its proximity to AES.

**NATURAL GAS DELIVERY:
PIPELINE OR BARGES?**
The supply of natural gas to other

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Prepa’s fuel diversification plan implementation schedule

	Plant	Capacity	Current Fuel	Schedule	Strategy
	Costa Sur Units 5 and 6	1,090 MW	#6	1st	Convert units 5 and 6 to LNG by 2010.
	Costa Sur Units 1,2,3 & 4			2nd	Replace units 1, 2, 3 & 4 to LNG Combined Cycle by 2012
	San Juan Combined Cycle Units 5 and 6	440 MW	#2	3rd	Liquefied Natural Gas (LNG) Ready by 2012
	San Juan Units 7,8,9 and 10	400 MW	#6	4th	Convert to LNG by 2012
	Palo Seco Units 3 and 4	432 MW	#6	4th	Convert to LNG by 2012
	Cambalache Units 1,2 and 3	247 MW	#2	5th	Convert to LNG by 2012
	Aguirre Units 1 and 2	900 MW	#6	6th	Convert to Coal

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Prepa generation plants is a different story. The solution will be either the construction of a pipeline from the EcoEléctrica terminal to Arecibo and San Juan, or direct supply to the different plants by barges and buoy systems.

Morales said a feasibility study, expected to be finalized during the next few months, is analyzing the alternatives to supply Prepa's generating plants with natural gas.

"We met with EQB and Prepa officials last week to discuss the alterna-



"...we will be reducing and stabilizing the price of electricity, improving global competitiveness, protecting the environment, improving public health and creating a new strong renewable energy industry that will create thousands of green jobs and a sustainable economic development."

José R. Pérez Riera,
Secretary Economic Development and Commerce

tives and technologies, and we will be conducting site inspections during the next few weeks," Morales said.

Prepa and the new Public-Private Partnership Authority are taking the lead in the process as other pertinent agencies are providing technical and all other necessary information to

make an informed selection of the best alternative.

Prepa has already analyzed potential routes for a potential north coast natural gas pipeline.

CARIBBEAN BUSINESS reported in May 2007 that after conducting various feasibility studies, a north



"Not acting will mean not being able to respond to the call for lower prices from our residential, commercial and industrial clients, who are overwhelmed by the high cost of oil," said Cordero.

Considering the opposition sparked by the scuttled south coast pipeline from Peñuelas to Aguirre, and the time involved in the construction of a pipeline from Peñuelas to San Juan, barges and buoys may be the system selected to deliver natural gas to Prepa's generation plants. Oil tankers currently supply these plants with fuel oil directly.

"The public policy is geared to reduce the energy cost within the next two years. Prepa's clients could see a significant reduction in their electric energy bill."

Héctor Morales,
president of the Planning Board

coast gas pipeline route plan was almost set to stretch from Peñuelas through Utuado, to the Cambalache plant in Arecibo. Potential additional phases included spurs along the north coast from Arecibo east to the Puerto Nuevo and San Juan power plants. The estimated cost of the pipeline was \$150 million. Another alternative was to go north along the west coast to provide service to Mayagüez and then along the north coast to Arecibo and San Juan. (CB May 24, 2007).

At the time, Prepa Utility, a Prepa subsidiary, was exploring the possibility of a downstream market to supply private-sector clients along the gas pipeline's path.

Either way, it is expected that the delivery of natural gas will be completed through a public-private partnership.

Morales said that the study and permits should be ready by December, or earlier, so the development of the chosen alternative can be initiated.

"We have to succeed. Not doing anything or failing are not alternatives. Puerto Rico needs it both economically and environmentally," said Environmental Quality Board (EQB) President Pedro Nieves.

Community and environmental protests that halted construction on the south coast pipeline had little to do with the actual dangers of a natural gas pipeline. Natural gas is a very safe gas; it isn't propane gas, which was what caused the explosion in Río Piedras in November 1996. (See side bar on page 27.)

Natural gas supplies approximately 24% of all of the energy used in the United States. In 2008, the U.S. consumed 23.2 trillion cubic feet of natural gas, and consumption is expected to increase 20% by 2030, according to the U.S. Department of Energy.

ADMINISTRATION TOP OFFICIALS SPEAK WITH ONE VOICE

This time around, Prepa's plans have the support of top officials within the administration, and no bureaucratic snags are expected.

"The cost of energy impacts our quality of life and global competitiveness. Puerto Rico's energy cost is approximately two times higher than the average in the U.S. We spend more than \$5 billion a year importing fuel. For each \$100



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we make, we have to spend \$12 in energy. For each dollar increase in the price of oil, \$70 million leaves the local economy. The last two administrations did very little to address this problem, and today we are suffering the consequences,” said Economic Development & Commerce Secretary José R. Pérez Riera.

“With the energy reform we will be reducing and stabilizing the price of electricity, improving global competitiveness, protecting and conserving the environment, improving public health and creating a new strong renewable energy industry that will create thousands of green jobs and a sustainable economic development,” added Pérez Riera.

“The first step is the reduction of energy costs,” said Morales. “To achieve it we must implement the public policy clearly established by



Fortuño to minimize oil dependency and diversify energy sources. Lower costs will improve our competitiveness in the short term.”

“The administration’s public policy is that economic development is not in conflict with environmental protection. In that sense the government is promoting and creating mechanisms to diversify the energy sources to reduce energy costs that will allow

“We have to succeed. Not doing anything or failing are not alternatives. Puerto Rico needs it both economically and environmentally.”

Pedro J. Nieves Miranda,
Environmental Quality Board president

a greater economic development and improve our global competitiveness, attracting investment to the island while protecting the environment,” added Nieves.

“At EQB we want to make sure that the new technologies comply with the regulatory parameters and the established public policy. We are working to establish the necessary mechanisms to be fair with the

communities but also with the markets and bondholders,” Nieves said.

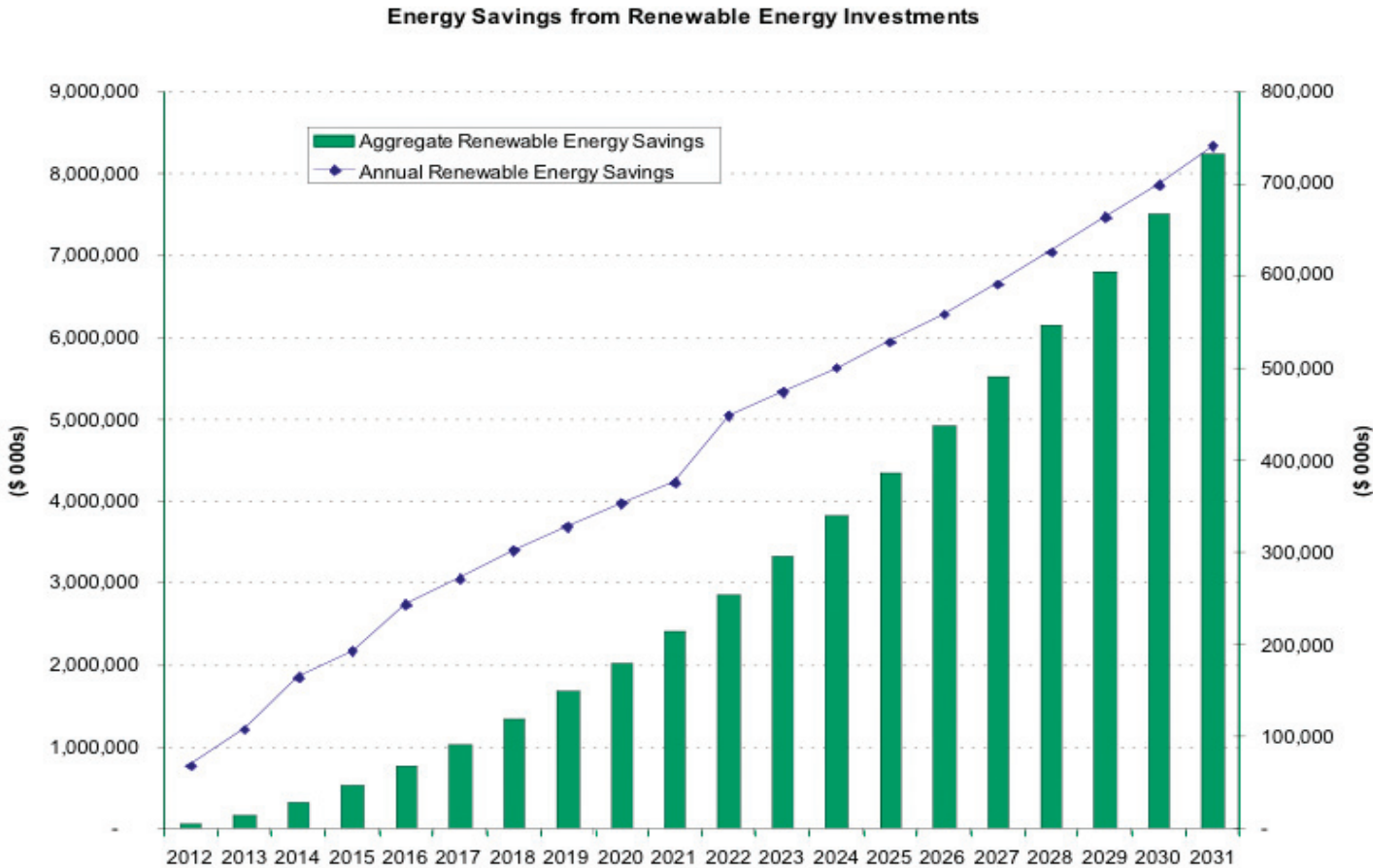
“Energy is an area where development and environmental protection converge, but by no means do these elements have to clash. Development projects have changed, and there is more awareness now of its environmental impact. In fact,

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Renewable Energy Projects will Lower Dependence on Petroleum, Resulting in Energy Savings



Large-Scale Projects Alone Could Provide 20-yr Savings in excess of \$8B



SOURCE: P.R. DEPARTMENT OF ECONOMIC DEVELOPMENT & COMMERCE

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conservation promotes economic development,” said Department of Natural & Environmental Resources Secretary Daniel Galán.

“By reducing energy costs we will increase Puerto Rico’s competitiveness. We must consider other factors such as using fuel sources that are cleaner than burning oil fuel and that selected technologies will reduce carbon dioxide emissions. It is important to take into consideration not only the short-term conservation efforts and the adoption of renewable energy sources but also the environmental impact and cost factors,” said Energy Affairs Administration (EAA) Executive Director Luis Bernal.

“The strategy is geared not only to address energy generation but also the energy consumption behavior patterns of all sectors. By establishing efficiency and conservation measures we can reduce energy consumption and reduce the amount of fuel Prepa has to buy,” added Bernal.

“In that sense we have to establish clear and efficient rules that take into consideration the feasibility of the different type of operations in Puerto Rico. We are seeing how corporate citizens globally and locally are increasing their environmental conscience. They want to reduce their environmental impact, and we have to help them be more competitive creating a better business place where they can invest and operate,” Nieves said.

ENERGY PLAN EXPECTED TO SAVE \$8 BILLION

The renewable energy reform will create more than 10,000 jobs in the next five years with an estimated investment of \$4 billion during the next 10 years, of which \$2 billion are expected to come from the private sector, according to administration estimates.

Savings of an additional \$8 billion for the economy are projected over the next 20 years.

“Rather than being exported as a result of oil purchases in foreign markets, this money would stay in Puerto Rico,” said Pérez Riera. “This means that more money will stay circulating in the local economy, and consumers will have more money in their pockets.” (See chart.)



“We are undertaking efforts in all areas. There is a parallel implementation, but the impact of renewable projects will be in a longer term than the conversion from oil to natural gas. That doesn’t mean its implementation is being left for later. If we keep delaying those options, we’ll never get to the goal.”

Luis M. Bernal, executive director of the Energy Affairs Administration

Prepa spent an annual average of \$1.9 billion buying foreign oil during each of the past five years, representing a total of \$9.5 billion that left the local economy.

Pérez Riera told CARIBBEAN BUSINESS that the Fortuño administration was ready to present two energy-related legislative bills on April 20 to promote renewable energy.

“The first bill will establish a minimum of 15% energy production from renewable sources by 2020. The second bill will create a \$20 million Green Energy Fund (GEF) to provide incentives for small and midsize projects and create renewable energy credits (RECs) for larger projects that could be instrumental in achieving the 15% renewable energy production goal,” said Pérez Riera.

“Our administration, in conjunction with the federal government, will work on this initiative to promote the creation of a new industry of renewable energy in Puerto Rico,” he added.

NATURAL GAS AND RENEWABLE ENERGY PROJECTS WILL REDUCE EMISSIONS

Prepa, a large generator of carbon dioxide (CO₂) has realized that one of the fastest ways to cut greenhouse gas emissions is substituting oil for natural gas.

“We expect significant emission reductions through the conversion of a substantial number of Prepa’s plants from oil to natural gas,” said Cordero.

Producing electric energy with natural gas generates substantially

less emission than with oil. A recent study by Prepa found that natural gas could reduce sulfur dioxide emissions by 98%, carbon dioxide by 30%, and other regulated emissions by 65%. (See side bar.)

Nieves, the EQB president, explained that some companies are already measuring their CO₂ emissions in anticipation of federal regulatory action.

“The EQB is starting to do it, although in a limited manner,” he said.

“Although currently we are just monitoring to verify the amount that is being generated, the Environmental Protection Agency (EPA) has been very clear that they want to regulate CO₂ emissions possibly through the issuance of credits. I recently met with the officials in charge of the program, and they are being very aggressive. We will see specific regulation by the end of this term, and Congress is already working on an energy bill,” said Nieves.

RENEWABLE ENERGY STRATEGY

Island government agencies are simultaneously working on additional projects with the same cost-reduction and environmental compliance goals. Those benefits, however, will come in the mid- to long term.

The energy diversification strategy includes integrating renewable energy sources, like solar, wind (eolic) and waste-to-energy (WtE) projects into the equation.

“The renewable energy reform is but one component within a more comprehensive and wide-reaching plan which includes the conversion of generating plants to use natural gas instead of oil and WtE plants in conjunction with renewable energy projects among others,” said Pérez Riera.

“Basically, what we’re looking for is using renewable technologies to supply the peak demand [the period of stronger consumer demand]. We’re looking to supply Prepa’s base load demand [the minimum amount of power the utility must make available to its customers] with natural gas. This reduces the floor, or base capacity, providing them space to invest in renewable energy sources that will eventually stabilize prices,” added Bernal.

Officials noted that the sun doesn’t shine all day and the wind doesn’t blow all the time.

FEDERAL SUPPORT FOR ENERGY PROGRAMS

Through the American Recovery & Reinvestment Act’s (ARRA) State Energy Program (SEP), the federal government has already assigned and distributed funds for the installation of photovoltaic panels, both on residential and commercial levels, among other energy-related programs.

Puerto Rico is receiving \$99 million to fund the local SEP and weatherization programs, both administered by Bernal’s EAA.

“An advantage of these small-scale implementations is that they expose citizens to renewable energy technologies, so they can see it first hand and learn how they work, with a minimal impact on Prepa’s system,” said Bernal.

“In fact,” he added, “the incentives aim to stimulate the switch from fossil fuel dependence to renewable energy.

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Since ARRA calls for environmental compliance and establishes a term to use these incentives, it's limited to the two renewable energy sources that meet those requirements, solar and wind. Under that premise, we have to comply with the National Environmental Policy Act (NEPA), which provides for categorical exclusions that make way for faster implementation."

"That's a neat and clear example of implementing efficient environmental protection policies that are not counter to economic development. ARRA has been a great guide in that sense, and Puerto Rico has set an example in the way we've implemented it. We want to do the same for the remaining energy projects by working as a cohesive government unit in the evaluation process and implementation, rather than making separate efforts. Each agency has a complementary role to play in order to make these things happen quickly," added Nieves.



"Energy is an area where development and environmental protection converge, but by no means do these elements have to clash."

Daniel J. Galán Kercadó,
Department of Natural & Environmental Resources secretary

INCREASED SPEED FOR WIND PROJECTS DEVELOPMENT

In March, the Planning Board certified the 45-megawatt Windmar renewable-energy project in Guayanilla, which will represent the first commercial-scale renewable energy

project in Puerto Rico. The \$80 million project consists of 25 wind turbines that will provide enough electricity to power more than 20,000 homes.

inhabitants," said Bernal.

Bernal said that the particular characteristics and applicable technology of eolic technologies make regulation indispensable.

Prepa has signed a renewable energy source contract for a wind project in Arecibo (50 MW) and another in Naguabo (75 MW). There are other windmill projects proposed for an additional 50 MW.

In the meantime, the Planning Board is drafting regulation of wind-energy generation with the process open for public comment until April 26.

"This regulation entails everything involved in wind turbine installation on different scales, like capacity and performance, and what these represent for nearby structures and

A LONG OVERDUE STRATEGY IS NOW A PRIORITY

The federal Environmental Protection Agency (EPA) recommends a hierarchy of actions for the efficient management of solid waste that include reducing waste generation from the source first, recycling and composting second. Waste combustion comes third, followed by landfill disposal.

Elí Díaz, executive director of the Solid Waste Management Authority (SWMA), echoed the EPA recommendations, considering that WtE facilities (where waste is burned to generate electricity) represent a viable alternative to manage the island's solid waste crisis, reducing its volume by almost 90%, while contributing to the generation of cleaner energy than other fuel sources.

"WtE is an essential part of our strategy, given that it provides diversification options, both for solid waste management and energy generation," said Díaz.

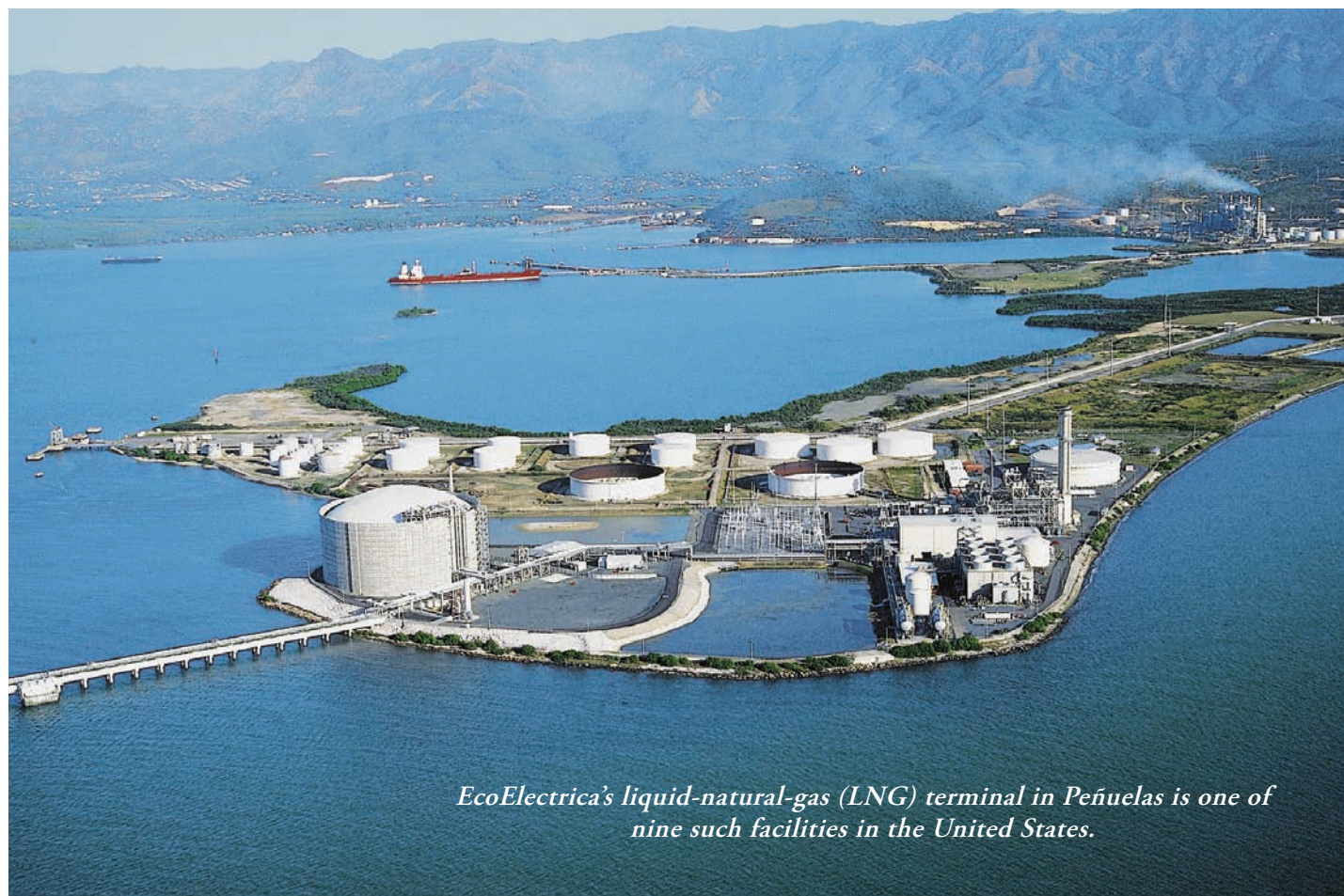
Unlike renewable energy sources like sun and wind, WtE facilities have reliability on their side.

"The resource to generate electricity in WtE facilities is solid waste. While this is not a renewable source, Puerto Ricans produce enough of it for us to incorporate in the base load energy generation strategy. It's not an intermittent resource like the sun or the wind. It's constant, therefore we can design and establish a constant flow of the source material," said Bernal.

After two decades of talk about WtE facilities there is not a single one operating despite several initiatives reported in this timeframe. Then, why is it different this time around?

According to Morales, this is the first time that a local government has established as public policy the use of solid waste as a source to generate energy.

"I think it makes a world of difference. There are internal efforts and people working hard for it to happen. Maybe there have been before, but now we have a cohesive effort, clearly defined in a government platform and its public policy. I'm sure this administration will set the foundation needed to develop one or more projects of this kind," said



EcoElectrica's liquid-natural-gas (LNG) terminal in Peñuelas is one of nine such facilities in the United States.

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Morales, while acknowledging that it's a long and complex process.

In fact, the process could take at least six years from the moment a WtE operation is authorized until it becomes functional.

Nieves said that while there are independent studies on WtE facilities and their potential environmental effects, his agency has not received a formal presentation for a specific WtE project.

"There are many elements involved in determining the right location for a WtE plant, such as technology, generating capacity and its impact. All these variables, which directly impact the timeframe for opening a WtE facility, will be considered in our decision," said Nieves.



But according to Nieves, Puerto Rico will have all the necessary elements in place before the end of this four-year term conducive to the establishment of WtE operations.

"Waste to energy is an essential part of our strategy, given that it provides diversification options, both for solid waste management and energy generation."

Elí Díaz, executive director of the Solid Waste Management Authority

Prepa has signed two power purchase agreements for WtE projects in Caguas (50 MW) and Arecibo (55 MW).

EFFORTS IN ALL AREAS
Recognizing the imperative need

to address economic development, diversification of energy generation sources and environmental considerations, Fortuño administration officials say they are all working together to achieve the public policy objectives.

"We are undertaking efforts in all areas. There is a parallel implementation, but the impact of renewable projects will be in a longer term than the conversion from oil to natural gas. But that doesn't mean its implementation is being left for later. If we keep delaying those options, we'll never get to the goal," said Bernal.

"Everything is being done now. If we don't do it now, we will never achieve the objectives. We will first see conversion from oil to natural gas, then renewable energy projects and then WtE," concluded Morales. ■



Natural gas: the cleanest fossil fuel catches on

BY CARLOS MÁRQUEZ &
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Natural gas has emerged as a popular fuel for the generation of electricity because it burns cleaner than oil and its price is lower and more stable than petroleum. It is considered the cleanest fossil fuel.

Of the 23,475 megawatts (MW) of new generation capacity planned in the U.S. in 2009, more than 50%, or 12,334 MW, called for natural gas. According to the Energy Information Administration (EIA), natural gas-fired electricity generation is expected to increase dramatically

over the next 20 years as the new capacity that is being constructed comes online.

The use of natural gas in some of Puerto Rico Electric Power Authority (Prepa) generation plants as a substitute for the oil currently burned would allow for a reduction of 65% of the contaminants regulated by local agencies and the U.S. Environmental Protection Agency (EPA) and at least 30% of carbon-dioxide emissions.

The latter, while not presently regulated, could be in the near future given growing concerns over global warming. Because carbon dioxide makes up such a high proportion



of U.S. greenhouse gas emissions, reducing carbon-dioxide emissions can play a huge role in combating the greenhouse effect and global warming, according to scientists and environmentalists.

In the 1970s and 1980s, most

electric utility generators opted for large oil-, coal- or nuclear-powered plants. Due to economic, environmental and technological changes, natural gas has emerged as the fuel of choice for new power plants.

New technology has allowed natural gas to play an increasingly important role in the clean generation of electricity. Regulations surrounding the emissions of power plants have forced these electric generators to come up with new methods of generating power, while lessening environmental impact. That has spurred a dramatic surge in the use of natural gas. ■

Natural gas: A hot commodity that is cheaper than oil

BY CARLOS MÁRQUEZ &
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The government’s inability to articulate a cohesive public energy policy coupled with the Puerto Rico Electric Power Authority’s (Prepa) failure to implement the necessary fuel-diversification strategy for electric energy generation has literally cost consumers billions of dollars over the past decade.

Between fiscal 2001 and fiscal 2009, Prepa spent \$12.9 billion burning oil to generate electricity. That averages more than \$1.4 billion a year, much of which was passed on to the public utility’s clients.

The situation deteriorated as the price of a barrel of oil (net of handling costs) to Prepa surged from an average of \$39.22 in fiscal 2005 to a high of \$84.18 in fiscal

Prepa’s Oil Cost

FISCAL YEAR	\$ IN BILLIONS
2001	\$ 0.758
2002	\$ 0.776
2003	\$ 0.890
2004	\$ 0.954
2005	\$ 1.631
2006	\$ 1.523
2007	\$ 2.068
2008	\$ 2.398
2009	\$ 1.919
Total:	\$12.917

Source: Prepa

2008 and \$76.23 in FY ’09. For the first six months of fiscal 2010 the

average price was \$72.08. The total cost of oil between FY ’05 and FY ’09 was \$9.54 billion, representing an average of \$1.91 billion a year.

Substituting 50% of the oil bought during the past 10 years with natural gas would have cut fuel costs by about \$4.2 billion, savings that would have stayed in Puerto Rico to help move the dormant economy.

Prepa would have gone a long way in diversifying its sources of electric energy generation, reducing the island’s dependence on oil and cutting the electric bills that have hobbled Prepa’s clients principally due to the high cost of petroleum.

The private sector insists the high cost of energy in Puerto Rico is the single biggest impediment to industrial promotion on the island.

ENERGY IS ENERGY

Historically, natural gas has carried a lower cost than diesel oil.

“On April 15, natural gas traded at \$4.15 (\$/MMBtu) and a barrel of oil (West Texas Intermediate, WTI) at \$85.51 because of the big reserves in the U.S. and Canada.”

The two prices tended to move together in the early part of the decade, but have diverged significantly over the past few years, with natural gas selling at approximately one-third lower than the price of oil in terms of British thermal units (BTU) content. (See chart.)

U.S. Department of Energy projections indicate the cost of natural gas will stay 30%-40% lower than the cost of oil for the next 25 years.

On April 15, natural gas traded at \$4.15 (\$/MMBtu) and a barrel of oil (West Texas Intermediate, WTI) at \$85.51 because of the big reserves in the U.S. and Canada. The energy equivalency of natural gas to oil was \$24.90, or 71%, less expensive.

In 2008, Puerto Rico’s cost of energy was just over 22 cents per kWh, the second highest in the U.S. after Hawaii. In 2009, it was more than 21 cents.

The island’s private sector is firmly behind the increased use of natural gas as one of the steps that must be taken to bring energy costs down. Business leaders and trade organizations argue that Puerto Rico needs to cut electricity costs by as much as half to be competitive with other investment jurisdictions and significantly reduce the cost of doing business for existing operations. ■

Historical price difference between natural gas and oil

	U.S. natural gas electric power price (\$ per thousand cubic feet)	West Texas Intermediate (WTI) spot price (\$ per barrel)	Conversion of natural gas prices to oil equivalent	Price differential	Percent differential
YEAR					
2000	\$4.38	\$30.38	\$26.28	\$ 4.10	13.50%
2001	\$4.61	\$25.98	\$27.66	-\$ 1.68	-6.47%
2002	\$3.68	\$26.18	\$22.08	\$ 4.10	15.66%
2003	\$5.57	\$31.08	\$33.42	-\$ 2.34	-7.53%
2004	\$6.11	\$41.51	\$36.66	\$ 4.85	11.68%
2005	\$8.47	\$56.64	\$50.82	\$ 5.82	10.28%
2006	\$7.11	\$66.05	\$42.66	\$23.39	35.41%
2007	\$7.31	\$72.34	\$43.86	\$28.48	39.37%
2008	\$9.26	\$99.67	\$55.56	\$44.11	44.26%
2009	\$4.89	\$61.95	\$29.34	\$32.61	52.64%
Five-year average:	\$7.41	\$71.33	\$44.45	\$26.88	37.68%
Ten-year average:	\$6.14	\$51.18	\$36.83	\$14.34	28.02%

Source: Energy Information Administration, U.S. Department of Energy

P.R. energy deals should spark Japan's interest

Japanese firms interested in deploying energy-efficiency technology here

BY JOHN MARINO
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Japanese companies are potential partners for Puerto Rico as the island government looks to lure offshore investment to diversify its energy production and increase energy efficiency.

That's the word from Ambassador Shinichi Nishimiya, the consul general of Japan in New York, who said that the "Green New Deal" being pushed by President Barack Obama and Puerto Rico's need to diversify its power production are creating the type of environment that could lure investment from the Asian economic powerhouse. And the new public-private partnership law could provide the vehicle to make such an investment a reality, he added.

Nishimiya, who visited Puerto Rico last week to scout for possibilities to increase cultural and commercial ties between the Island and his country, said Japan sees "great potential" to both profit from and contribute to world development in the current landscape of great economic and energy challenges and Obama's new energy policies.

"Japanese companies, and the government actually, are trying to see how Japanese technology, which is first-rate in these areas, might be deployed throughout the world," Nishimiya said. "This would not

only be business but also a chance to help bring improvements in terms of less carbon emission and more efficient use of energy.

"Puerto Rico appears to be one of the many places inclined toward new renewable energy, and you really can't wait 20 years for solar," the consul general added.

Japan, like Puerto Rico, for years relied too heavily on imported and costly oil for its power production, and in 1989 had among the highest energy rates in the world. That was one of the factors that drove Japanese industry into becoming world leaders in the efficient use of energy, which is evident in everything from consumer electronics to automobiles to high-speed trains.

Since the oil crisis in the 1970s, the country has been diversifying its power production base, moving away from oil toward increased natural gas and nuclear sources. Today, Japan still uses oil for 45% of its power generation, but the remainder is balanced between coal (21%), nuclear (15%), natural gas (14%) and hydropower.

Besides diversifying production methods, Japan has also aggressively sought to diversify its fuel sources, buying from a number of different regions and countries, a strategy that also works to ensure supply and hold prices down.

"Of course, the quest for alternatives is endless. Japan, like



*Ambassador Shinichi Nishimiya,
the consul general of Japan
in New York*

Puerto Rico, still imports most of its fuel," Nishimiya said, pointing to the current Japanese administration plan to cut carbon emissions by 25% by 2020.

That aggressive goal is also sparking "renewed interest in natural gas as a clean-burning fuel and to make the most out of nuclear power," he added.

Japanese firms routinely participate as subcontractors and main consortium partners on pipeline and power-plant projects throughout the world, Nishimiya said. And they also supply important equipment that is put to use in such projects.

"These long-term energy projects have the potential to interest Japanese companies. They work as subcontractors or main consortiums.

Japan, like Puerto Rico, for years relied too heavily on imported and costly oil for its power production, and in 1989 had among the highest energy rates in the world.

There are many formats. The point really is to make sure to let these people know about what is going on in Puerto Rico," he said. ■

