

THE GOAL:

**Continue to reduce
our dependence
on oil for energy
production**



Luis Bernal
Puerto Rico Energy Affairs
Administration Executive Director

ADMINISTRACIÓN DE ASUNTOS ENERGÉTICOS



By John Marino pages 16-21

TOP STORY

**Cayey's
Mennonite
Hospital gets
\$130 million
HUD loan**

page 2

INSIDE

**U.S. health reform expected by summer
and to be beneficial to island**

page 4

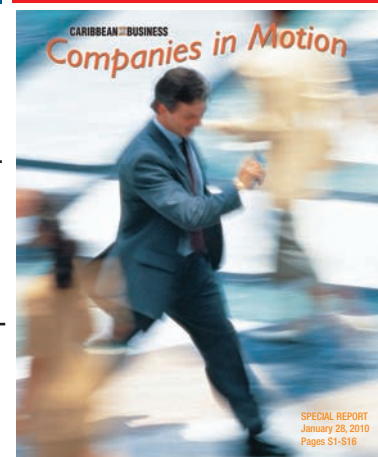
**Sajo García in line for major
Plaza Carolina ad account**

page 6

Puerto Ricans giving light to Haiti

page 6

SPECIAL REPORT



SPECIAL REPORT
January 28, 2010
Pages S1-S16



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2010 pivotal year for energy transformation

Developers pitch projects as government works on framework for new power production, private competition regulations



Puerto Rico Energy Affairs Administration Executive Director Luis Bernal visits a solar power laboratory built in Bayamón that will be used to train workers how to install renewable energy systems in residences and small businesses. From left, are: Albith Colón, president of the Renewable Energy Contractors Association; Bernal; Engineers and Surveyors Association President Miguel Torres and Erwin Keiss, the former head of the Infrastructure Financing Authority.

BY JOHN MARINO
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A new era in island energy is supposed to dawn in 2010, with expectations that the Puerto Rico Electric Power Authority (Prepa) will open its electric grid to private producers and energy-generating production will begin to diversify in earnest away

from imported foreign fuel to our own renewable sources such as wind and solar, as well as waste-to-energy conversion plants.

For the first time in its history, the Puerto Rico Energy Affairs Administration has a significant budget, thanks to a substantial infusion of some \$124.2 million in federal funds, which will allow the agency not only to develop, but also implement, a

state energy plan plus provide millions in funding for energy projects, conservation efforts and job training. Besides diversifying sources of energy production, the plan aims to establish a serious energy-conservation program, which will include a proposed overhaul of island building and construction regulations, as well as a massive effort of retrofitting residences, government offices

and businesses to incorporate new alternative technologies and be more energy efficient.

The Fortuño administration aims to leverage federal funding available over the next two years for green-job training and renewable-energy investment to produce a new “green

Continued on next page

Continued from previous page

jobs" industry. It would mean of new class of trained, well-paid professionals to work on and repair both large- and small-scale renewable-energy projects, provide energy-conservation services and work at local plants that make components for the new island alternative-energy projects. Millions in funding for smaller projects is being channeled through the local energy office to benefit residents, businesses, government agencies and nonprofits.

Reducing energy costs through diversifying production and other means is a priority for the Fortuño administration, which has called high-energy costs one of the biggest problems facing local businesses and investors, and one of the biggest concerns of the island's struggling middle class. It's also one of the biggest drains on the island's competitiveness. The high and volatile price of oil makes Puerto Rico power costs too expensive and unreliable, creating one of the island's biggest vulnerabilities on the economic development front, officials say. Last year, the cost of power in Puerto Rico averaged about 21.5 cents per kilowatt hour, versus the average 10-cent U.S. rate.

"We want to transform the way we see energy in Puerto Rico. That's what is in the pipeline for 2010," Puerto Rico Energy Affairs Administration Executive Director Luis Bernal told CARIBBEAN BUSINESS. "We need to diversify our power production, but there is also a lot we can do on the demand side. We are also clearing the path for the creation of green jobs."

The Fortuño administration's game plan on energy is aimed at cutting the island's dependence on oil through diversification while driving down the cost of energy to an average 12 cents per kWh over the current four-year term. Right now, island power production is 68.7% dependent on imported oil, with natural gas and coal splitting most of the difference at about 15% each, while renewable sources, largely hydropower, currently account for about 1% of production. The administration's goal is to cut oil-generated power, the most costly and volatile, by more than half to about 26% over the next 10-to-15 years. It will do this by bringing new renewable-energy projects on



Puerto Rico Energy Affairs Administration Executive Director Luis Bernal promoting public awareness of current energy conservation and efficiency efforts. The outreach includes seminars and workshops, school presentations as well as advertising in newspapers and other media.

line so that another 6% of island power production stems from renewable sources by 2013, a figure slated to increase to 25% by 2025. While these new plants are coming on line, the administration will begin retrofitting some oil-fired plants to natural gas or coal. The plan is to double energy production from both natural gas and coal.

Many observers, however, say the administration is already behind in its plans on the all-important energy front, especially regarding renewable and waste-to-energy technologies. There have been delays in both the introduction of renewable-energy legislation, which would set goals and establish incentives to foster development of new projects, as well as the ground rules for a "wheeling system," which would allow private power producers to connect to the Prepa power grid and sell energy to third parties. The government also must create an independent regulator to oversee a competitive energy market. All these initiatives were expected to be in place at the beginning of this year, but are still being worked on.

Meanwhile, substantial incentives, which cover 30% of a green-energy project's development costs, are available under the Obama

administration's American Recovery & Reinvestment Act (ARRA) for large projects that are completed by the end of 2013, with extra incentives available for projects that get under construction this year. Bernal estimates that three projects could benefit from the ARRA program, one of which is the 45-megawatt Windmar Renewable Energy project in Guayanilla, which developer, local businessman Víctor González, has been battling to build for the past decade.

"If you want renewable energy in Puerto Rico, the government has to do more than just say it wants renewable energy. They have to take steps to bring it here," González said.

"Puerto Rico needs to take advantage of what the federal government is doing to foster renewable-energy projects in 2009 and 2010. Because we need to get the economy going, the federal government is granting all this money for people to do projects in 2009 and 2010," he added. "Very little happened in 2009, and the way things are going very little will happen in 2010. Puerto Rico will lose all the advantages of this initiative, and we will continue to be dependent on fossil fuels."

Puerto Rico Manufacturing Association President Josen Rossi said



Víctor González has been struggling for a decade to build a 45 megawatt wind project in Guayanilla.

there is still time for projects to benefit from the federal incentives, but the government needs to push forward with legislation and wheeling regulations.

"There has not been a sense of urgency from the executive or legislative branches of government yet," Rossi said, adding that industry groups have been lobbying the government through the Puerto Rico Energy Cluster, a coalition of private-sector groups, about the importance of transforming the energy sector. "Since the beginning, we have been clear about the urgency of clear public policy and ground rules."

NEW PROJECTS ON THE HORIZON

Despite the delays, island government officials insist 2010 will see a new dawn in island energy. Two of the eight priority projects chosen for "immediate action" last month by the Public-Private Partnership Authority Board will retrofit the existing Costa Sur and other power plants to natural gas, PPPA Executive Director David Álvarez said. Requests for proposals on the eight projects, which are aimed at addressing challenges that hurt the economy and its ability to create jobs, are slated to be posted by March 31, he added.

Continued on page 18

Continued from page 17

Two other energy projects considered high priority—the development of a coal plant in Guayama and the island's first waste-to-energy plant along the north coast—are pending further analysis. Álvarez said this would include taking into account changing federal environmental regulations, which could slap penalties on fossil-fuel plants such as coal, making the technology more expensive than it currently is.

"In 2010, we have to achieve progress and advance these projects because Puerto Rico cannot lose another day in its economic development," Álvarez said.

The administration's Energy Public Policy Committee, comprised of Bernal, Prepa Executive Director Miguel Cordero, Economic Development & Commerce Secretary José R. Pérez-Riera, Government Development Bank President Carlos García and La Fortaleza officials, has also made the natural-gas conversion one of its top-four short-term priorities for this year, with the Costa Sur conversion accounting for 270 megawatts, Bernal said. The panel's other recommendations are to develop 300 megawatts of wind power, about 20 megawatts of solar power and a 100-megawatt waste-to-energy plant, which would consume some 3,000 tons of trash per day, Bernal said. The government has been quietly producing about 100 megawatts of hydropower via several small projects throughout the island, and officials are analyzing how to double or triple this output through the deployment of new technology. Substantial progress on all these fronts is expected this year, he added.

"There are producers, mainly in the area of wind, who want to come to Puerto Rico. I can't reveal their names but there are some companies that are close to starting projects," Bernal said. He said that these firms were still analyzing whether to structure their deals via a power purchase agreement with Prepa, where they would sell power directly to the government utility, or use the Prepa grid to sell power to a third party via wheeling.

Bernal estimated that up to three large projects could benefit from ARRA funding, which would cover 30% of development costs that is available for projects completed by



*Puerto Rico Electric Power Authority
Executive Director Miguel Cordero*

the end of 2013. Projects underway by year's end get the additional benefit of being able to turn that credit into cash from the U.S. Treasury.

While solar-power projects are quicker to establish and easier to permit, wind requires a larger initial investment, a more lengthy permitting process and lengthier studies to determine a project's viability, including a complete analysis of the area's wind characteristics.

"With photovoltaic you can do it tomorrow. With wind, you need a year or two of good data, measured onsite with the right equipment and verified by independent auditors," González said. "There's no way to substitute that."

At least publicly, the 45-megawatt wind project in Guayanilla, which is one step from final Planning Board approval, is the most advanced, with legal challenges to its environmental approvals by the island and federal governments having already been dismissed once by the Puerto Rico Supreme Court. At press time, it still had a request for reconsideration by project opponents before it, and opponents can request a reconsideration of the island's top court twice, Planning Board officials said.

González said that if he clears the final requests for consideration lodged before the Supreme Court,



and the Planning Board then certifies the project, he could begin construction within three to six months, with the project operational by mid-2011. He said the wind turbines can take as long as a year to 18 months to deliver, and with demand for turbines on the rise, the wait time is just getting longer. That's one reason the developer, who owns property in Culebra, wants to produce about 10 megawatts of wind power there as well, which is about twice the island town's current demand, through four wind turbines. He said the town officials have expressed support for the idea, and he is aiming to get both projects underway at the same time. The Guayanilla operation will cost an estimated \$80 million, said González, who has already spent \$7 million on the project. He has partnered with Vestas Wind Systems, the market-leading Danish manufacturer of wind-turbine systems, and long-term financing is being provided by JP Morgan Chase & Co.

Another wind project is being developed in the southeast coast town of Naguabo under the Go Green banner. Developers have also entered into a power purchase agreement with Prepa under similar terms as the Guayanilla operation, according to industry sources. While a third wind project was signed with Vientos de PR, the original Arecibo site was discarded because of wind quality and concerns about the project's impact on a regional airport.

Meanwhile, an offshoot of the defunct Babcock & Brown investment firm is monitoring wind in several different areas on the island via a contract with the Land Authority to study the viability of locating projects in different areas, Bernal said. Wind projects are also under consideration for Carolina and Vieques.

NEW GROUND RULES, INCENTIVES NEEDED

Some, however, say the development of alternative-energy projects won't fully take off until legislation establishing incentives and ground rules is enacted and Prepa establishes a transparent wheeling system that provides confidence to investors who can finance the new generation of private green-energy plants. Creating a regulatory body to oversee a competitive energy market is also essential.

"We need private capital to cover 70% of the costs for the new alternative-energy plants, and investors need certainty," Rossi said.

The Fortuño administration was set to file the Renewable Energy Policy Act legislation in November, but pulled back to iron out concerns about its impact on Prepa's finances and its current energy system. The bill would have set administration renewable-energy goals into law through the establishment of a renewable portfolio standard (RPS) for

Continued on next page

Continued from previous page

Puerto Rico, a clear signal to investors the government is serious about developing renewable energy.

More importantly, it would establish a Green Energy Fund, first announced by Gov. Luis Fortuño last summer, which is aimed at bridging the gap between the costs of renewable power production and the price the independent producer would have to sell to Prepa in order for the utility to reach its 12-cent per kilowatt hour pricing target during the next four years.

Instead of granting a traditional tax exemption, credit or construction grant, the draft legislation proposes creating a production-based incentive through which the government will purchase a renewable-energy credit (REC) for each unit of green energy a plant produces. The production incentive would be in the form of a long-term contract between the government and producer, with one REC purchased for each megawatt hour (mWh) of "green" energy produced. The program would provide an essential stream of revenue once the plant is operational, but more importantly the initial government commitment, together with a Prepa power purchase agreement, would allow developers to secure project financing.

González said establishing the green credits is vital to his project.

"We need the green credits to become a reality. The government says this will become a reality, but it is not a reality yet," he said.

Under González's purchase agreement with Prepa, he will sell power to the government utility at a flat 12 cents per kilowatt hour for the first five years, a rate that drops one cent per kilowatt hour every five years until it is locked in at a nine-cent rate. The green credit would then be extended to Windmar for each kilowatt of energy it produced, allowing it to recoup costs and make a profit for producing the clean energy. A draft of the legislation envisioned having a government committee fix a value each year for the green credits, on both a project-by-project and technology-by-technology basis. González said, however, that it would probably be better simply to use existing values established in the U.S. and Europe, which grant a flat

rate to green-energy producers.

It's not clear how the government would raise the funds for the green credits, and the program could cost between \$300 million and \$400 million to fund some \$2 billion in projects the government envisions coming on line over the next 15 years to meet its energy diversification goals. Because the credits would be paid out over time, the government would have to come up with between \$30 million and \$40 million annually. The RECs would be a fully securitized, tradable commodity which has an economic value based on the environmental attributes of the power production. They could help companies offset power produced either on the island or elsewhere through carbon sources. Because carbon-footprint reductions have become an increasingly important aspect of corporate social-responsibility programs, a "voluntary" market for RECs has already developed in the U.S. This market is expected to become more developed as evolving federal carbon standards are enacted into law or new regulations are drafted.

The government could use the RECs it buys from the project developers to substantially lower the cost of its initial investment. It is expected to be able to resell the RECs to companies needing to offset their carbon production on the island or elsewhere, and could use the proceeds to refund the incentive program. Another possibility would be for the government to use the RECs to show compliance with future federal energy requirements.

The legislation is also expected to provide "installation credits" for smaller energy systems for consumers, residences and small businesses.

Just as important as the green credits are clear ground rules for wheeling, which will allow private firms to produce green energy and sell it to third parties over the Prepa network. The Economic Incentives Law of 2008 mandates the introduction of wheeling, which is the retail sale of electric power. It means Prepa has to open up its network so private power generators can sell electricity they produce over the island's electric grid.

The law allows large firms to build their own power plants and to sell any



*Public Private Partnership Authority
Executive Director David Álvarez*



*Puerto Rico Manufacturers Association
President Josen Rossi*

excess power they generate over the Prepa grid to third parties or back to Prepa. It also allows private operators to build and construct power plants and sell the power directly to Prepa or third parties. While Prepa will get paid for "leasing" its grid to private power producers, it also means the public utility will face competition for the first time. Prepa chief Cordero said the utility will have to drive the cost of energy it produces down or it will be driven from the market by increased competition.

Under federal law, power utilities are expected to buy energy from independent and green power producers at their "avoided cost," or the amount it costs utilities to produce the power. But because Prepa is a government monopoly, with the ability to pass



*Martex Farms in southern
Puerto Rico uses a solar-powered
irrigation machine.*



*This solar house was constructed
by island university students for a
competition held in Washington, D.C.*

many costs on to consumers but at the same time shouldered with special subsidy requirements, the work of "unbundling" costs is difficult yet essential in crafting third-party power purchase agreements as well as leasing arrangements with private power generators who want to wheel off the Prepa grid to sell to third parties.

Besides working out these sticky financial details, government officials are also concerned about the financial impact the legislation could have on Prepa's bottom line and its ability to comply with its bondholder obligations. Finally, officials have said a technical analysis of the electric grid was still underway, to see where and under what conditions alternative sources of power could be injected into the grid, while maintaining current levels of reliability and safety.

The preparation for wheeling has brought benefits. Cordero has increased efficiency inside Prepa as management prepares to compete

Continued on page 20

Continued from page 19

against private industry. Allowing private competition to produce power is also allowing for needed private capital investment for the new renewable-energy plants as well as the fossil-fuel conversions and the cost efficiencies of the privately produced power will also work to lower overall power costs.

Bernal said the process will be completed as soon as possible.

“For the first quarter of the year we want to have at least a framework of how wheeling will work. We are now discussing this with our consultants. The objective was for the first of the year but that is not going to happen,” he said.

Bernal said the administration Wheeling Committee, comprised by Bernal, Pérez-Riera and Cordero, worked with Christensen Associates Energy Consulting throughout 2009 to design a wheeling system with input from a wide range of stakeholders. Last month, the committee submitted to Prepa five documents that would form the backbone for the wheeling system. The documents are similar to those that provide the legal foundation for the open-access wheeling systems that cover most of the U.S. and follow the Federal Energy Regulatory Commission regulations. They cover transmission and distribution tariffs, interconnection procedures and agreements and an operation agreement. Bernal said, however, that consultants are still working on determining the actual costs of the unbundled services that wheeling customers will obtain under the new system.

Prepa officials say they received the “extensive” documents Dec. 30 and are still reviewing them, with the utility’s Governing Board designating a subcommittee to both analyze the documents and make recommendations. Approval is expected “very soon,” as early as this week’s Governing Board meeting. The government utility has not received any formal requests for wheeling from private firms, officials added.

Creating a regulator of the energy market, either by creating a new government agency or empowering an existing one to do the task, is just as important, Rossi said. While the House passed legislation to create such a regulator, the Senate has yet



*Economic Development & Commerce
Secretary José R. Pérez-Riera*

to act on the issue, he said.

In tandem with wheeling has been the introduction of net metering, which allows for the interconnection of home-based or small-business energy systems to the Prepa grid. Cordero said a few dozen clients currently use net metering. Under the concept, homeowners and small businesses can sell the excess power they produce to Prepa, which will credit the customers and deduct it from the cost of any power the homeowners buy from the utility.

González, however, complains that his Windmar offices in the Isla Grande area in Miramar have yet to be interconnected to the Prepa grid so that it can send the excess energy it produces to Prepa, even though a solar-energy system was installed last March. Rossi, however, said that Prepa is improving its net-metering service over time, pledging recently to implement a more transparent billing process. González worries that the same foot dragging would likely meet wheeling requests, which would dampen investor appetite for investing in new energy systems. He said the government needs to strongly embrace private energy projects, rather than putting up roadblocks to them.

“We have everything set to go. We are waiting for the Puerto Rico government, just like we have been waiting for the past 10 years. We have had to wait for the Rosselló administration, the Calderón administration, the Acevedo Vilá administration and



*As electric bills continue to rise,
more and more companies are
creating their own solutions through
the deployment of solar and other
renewable technologies to lower their
costs of doing business.*

now we are waiting for the Fortuño administration,” González said. “In the meantime, during all four administrations, one thing has held true: every year the cost of energy is higher, and the amount of pollution and environmental and health problems as a consequence of that dirty energy are higher.”

A HOME-GROWN, GREEN INDUSTRY

Although acknowledging the importance of production diversification, Bernal said the benefits of small-scale renewable production and conservation efforts were being overlooked as well as the job-creating possibilities of a new “green” industry surrounding the adoption of renewable energy.

“There is a lot of opportunity here to promote green jobs through the installation of solar equipment, energy-conservation retrofits and even manufacturing of parts and components,” he said. “We have to consider the demand-side issue. There is a lot we can do with energy codes and building codes.”

Right now, his office is working on revamping Puerto Rico’s energy and building codes, which was first adopted in 1978. Part of this effort is to



deal with the most energy-efficient construction designs and materials as well as the use of renewable-energy production onsite. Bernal’s office is currently embarked on an effort to establish energy and construction codes for new and remodeled buildings to make them more energy efficient. These may require new structures to have solar water heaters. He said that jurisdictions benefiting from ARRA funding are required to bring local codes up to American Society of Heating, Refrigeration & Air-Conditioning Engineers (ASHRAE) and International Energy Conservation Code (IECC) standards.

“When you combine conservation, together with the diversification of the production through alternative energy you are creating more efficient use of energy,” he said. “This is the strategy, which will also work to create jobs.”

In drawing up the new regulations, his office is analyzing the benchmark ranking for different materials and methods for use by both developers and homeowners to “minimize

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Continued from previous page

Prepa costs,” and determine the cost effectiveness and payback terms of different conservation investments and strategies.

Both these efforts and the expansion of smaller scale alternative energy production will also take off during 2010 through the infusion of federal funding under ARRA. In 2009, there were 191 small solar projects for a \$14 million investment, Bernal said. Meanwhile, the local solar water-heater market exploded last year with 15,055 units sold, compared with 4,132 in 2006.

Some \$124.2 million in federal stimulus energy funding is being released through a series of programs this year, offering employment opportunities for a range of professionals and contractors and financing grants and low-cost loans for businesses to undertake renewable energy or other projects aimed at reducing energy consumption. Other beneficiaries of the program are government agencies and non-profit organizations, which can also qualify for federal grants for projects that lower energy consumption and costs. The ARRA energy program should create some 1,800 jobs, according to government estimates.

Some 100 new energy auditors and inspectors to help implement a “weatherization” program have already been certified, Bernal said. Auditors will recommend what measures to take in each unit to achieve the highest energy savings while inspectors will ensure weatherization measures were performed according to auditor specifications. Further job-training programs dealing with solar- and wind-power systems are also planned, including an initiative with the Florida Solar Energy Center, which will train professionals on the island to become solar-power technician trainers.

The bulk of funding is broken down into the \$48.8 million weatherization assistance program, the \$33.97 million Energy Efficiency & Conservation Block Grant program and the \$37 million State Energy Program. There is also money for development of energy outage and security strategies and consumer rebates on the purchase of energy-saving appliances—from water heaters to washers to refrigerators.



*Government Development Bank
President Carlos García*

The weatherization assistance program is aimed at helping low-income families save money on power bills by making their homes more energy efficient. The program will impact 5,500 residences with energy-efficient units and create a lot of work for local construction professionals.

The \$33.9 million Energy Efficiency & Conservation Block grant is funding municipal renewable energy projects such as solar-powered street lighting or systems to power municipal structures as well as building renovations to boost energy efficiency in central government agencies and nonprofit entities.

The \$37 million State Energy Program will funnel money through nine different sub-programs all aimed at boosting energy efficiency:

- **Revolving Loan Program**, \$4.8 million: Low-interest loans for private entities to undertake energy projects. The program will be funded half by ARRA funds and half by the island's Economic Development Bank. Applicants will need to make a 10% investment in the project, and must pay the loan back in eight years.
- **Building Energy Efficiency Retrofit Program**, \$7.7 million: Rebates of up to \$200,000 for businesses and government to undertake retrofit



Currently, about 100 megawatts of electricity is produced through several small hydropower projects on the island. Officials are exploring ways to double or triple that amount of generation.

energy-efficiency projects. Businesses will be allowed to receive up to half of a project's cost through this program, while government entities can finance the totality of the project.

- **Sun Energy Program**, \$6.5 million: Rebates for the purchase and installation of solar-energy systems in businesses, homes and government facilities. The program provides rebates of up to \$4 per each watt of energy produced up to half the project's total costs, with a limit of \$100,000 for businesses and \$15,000 for homes. Government facilities are granted \$8 per watt, up to \$100,000.
- **Wind Energy Program**, \$6.5 million: Rebates for the purchase and installation of wind-energy projects for businesses and government facilities. Again, the rebates are capped at 50% of a project's cost for businesses, with a maximum of \$500,000. Government facilities have the same limit but can finance the entirety of the project through the program.
- **Agricultural Renewable Energy Program**, \$1 million: Rebates for the construction of renewable-energy projects in the agriculture industry. They can be used for 50% of

a project's costs and are capped at \$100,000, but the local Agriculture Department will kick in matching funding and select the projects.

- **Solar Water Heater Rebate Program**, \$1.3 million: Rebates of up to \$500 for homeowners who purchase solar water heaters.
- **Traffic Signal Retrofit Program**, \$1.3 million: Fund replacement of traffic lights with new energy efficient lighting.
- **Codes & Standards Program**, \$1.6 million: Fund a government effort to revamp building codes to incorporate energy efficient criteria.
- **Energy Education and Mass Media Outreach**, \$1.6 million: Fund expansion and promotion of current energy conservation and efficiency public awareness efforts. The outreach should include seminars and workshops, school presentations as well as advertising in newspapers and other media.

Officials initially hoped to launch the program last fall but now say it will get underway the first quarter of this year. An information hotline for consumers and business owners with questions on the various programs is being established. ■