



Nordic Development Fund



FUTURE FINANCE

PRIVATE SECTOR WITH PURPOSE



# GOING GREEN AT THE GRASSROOTS

Future Finance Series No. 5







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## Energy Efficiency

Going Green at the Grassroots

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## CASE STUDY

## Going Green at the Grassroots

Through a private sector initiative gaining steam in Central America, the Inter-American Development Bank is demonstrating, company by company, the feasibility and appeal of renewable energy

For a peanut processor in Nicaragua, the answer to lower energy costs is right there in plain sight—in peanut shells. For a Costa Rican fruit company, it may lie in the pineapple plants that currently get plowed into the ground. A large recycling operation in Honduras, meanwhile, is looking to lower its energy bills with help from the sun.

Costly, unpredictable energy prices are prompting a range of companies in Central America to look at greener alternatives.

For these companies, energy efficiency gains are often a game changer but are still largely untapped. In a region where demand for energy is expected to increase by over 50 percent in the next decade, tens of billions of dollars can be saved only by adopting energy efficiency measures; a unique business opportunity. The Inter-American Development Bank (IDB) is helping to harness this enormous potential by providing extensive technical assistance and financing to show the viability of such investments, one boiler or biodigester or solar panel array at a time.

“Amid increasing demand for energy in the region, we can help reduce consumption by making investments in low-carbon technologies more financially viable,” said Kelle Bevine, chief of the climate sustainability team in the IDB’s Structured and Corporate Finance Department. “This has tremendous scale-up potential in the private sector, as companies seek to become more competitive and at the same time reduce their carbon footprint.”

A US\$50 million Energy Efficiency Finance Facility—established by the IDB, with support from the Nordic Development Fund (NDF)—is offering loans so companies can reduce their energy use or generate some or all of their own energy from renewable sources. A technical assistance fund established under the program provides grants for energy efficiency audits, engineering studies, and cost-benefit analyses to determine what might be the most attractive green solutions for a particular company.

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“If you want to really tackle climate change, you have to do it at a company-by-company level,” said Patrick Doyle, senior energy and climate officer implementing the program. This will have a multiplier effect, he added: As individual firms start to get their energy costs under control, their competitors will sit up and take notice. “We’re hoping to get a significant demonstration impact,” he said.

While the initiative is geared toward the private sector, ultimately it will help countries throughout Latin America and the Caribbean, Doyle said—by helping cut overall carbon emissions and by lowering consumption, thus reducing pressure on the power grid. That complements efforts the public sector is taking to meet the challenges posed by climate change.

The IDB facility can finance up to half the cost of a company’s energy efficiency investment or renewable energy conversion with loans ranging from \$500,000 to \$5 million. While that is a small amount compared to most IDB loans, it can mean a sizeable investment for a small or medium-sized firm. But many such projects save enough money to pay for themselves in just a few years, making them attractive investments for companies looking to cut costs over the long term.

For the Nordic Development Fund, supporting the energy efficiency facility provides an opportunity to help low-income countries adapt to and mitigate the effects of climate change. “Our partnership with the IDB helps us leverage our resources more effectively and uncover highly developmental business opportunities that really make a difference in Latin America and the Caribbean,” said Leena Klossner, Deputy Director of NDF.

So far, the IDB team has conducted more than 30 energy efficiency audits and feasibility studies across a range of sectors, from shrimp farming to clothing manufacturing to dairy operations. This effort began in Central America, but the Energy Efficiency Finance Facility is open to companies in the rest of the region as well.

In many cases, the studies have demonstrated the viability of renewable energy—especially solar or biofuel—to cut costs and bring environmental benefits. Of course, each project must be evaluated on its own merits, based on a wide range of variables such as a company’s size, energy usage, current costs, borrowing capacity, operating priorities, physical plant, and environmental and global climate benefits.

The country’s energy mix has a lot to do with price stability. Many countries use imported oil for a significant amount of their electricity needs, and spikes in oil prices can significantly drive up costs. Many industrial plants also have oil-fueled boilers that generate industrial heat, which can be an expensive and dirty source of energy.

One promising source of cleaner, renewable energy, especially in the agribusiness sector, is biomass—organic material that can be burned or fermented or treated in other ways to release stored carbon and produce energy. Biofuels produced from biomass are a carbon-free alternative to fossil fuels. The costs of generating electricity or heat this way can also be far lower and more predictable, especially when crop waste or agricultural byproducts are available in sufficient quantities to make the project sustainable.

“You need a certain scale to be able to produce your own electricity from biomass,” Doyle said. Whether or not such projects make financial sense, he added, depends to a large extent on a company’s current energy costs: The more expensive these are, the more attractive the investment in renewable energy.

### NOT EXACTLY PEANUTS

Peanut processor Cukra Industrial has a steady supply of potential biofuel, in the form of peanut shells. One of the largest employers in León, Nicaragua, the company employs up to 1,000 workers in its busiest season. It buys peanuts from 35 different growers, large and small, in the western part of the country, sorting and shelling tens of thousands of tons per year for export to Mexico and Europe.


Most of its peanuts are sold with the red skin still on—these are used by makers of candied peanuts and other types of snacks—but in recent years, Cukra has been trying to increase its production of skinless blanched peanuts. This would give the company access to a much bigger and more stable market, including producers of peanut oil and peanut butter. Cukra has also been studying the possibility of producing peanut oil itself.

“From the results of the study, we see that this is a feasible project. It pays for itself.”

“The more we look to add value, the more energy becomes an increasingly important factor,” said the company’s head of finance, Marcel Pallais. Electricity is currently the company’s second biggest operating cost, after raw materials. To keep from paying even higher electricity prices during peak hours, the plant shuts down production for a five-hour window every evening, resulting in inefficiencies.

The IDB feasibility study looked at the possibility that Cukra could generate its own electricity. Currently, Cukra sells its peanut shells for two purposes: as fiber for cattle feed and as feedstock for a cement company’s kilns. But until the study, the company had no way of assessing its potential to produce its own power.

The study found that by burning the shells as fuel to drive a turbo generator—and capturing the waste heat for other purposes—it could produce more than enough energy to cover its own needs. “From the results of the study, we see that this is a feasible project,” Pallais said. “It pays for itself.”



YOU NEED A CERTAIN SCALE TO BE ABLE TO PRODUCE YOUR OWN ELECTRICITY FROM BIOMASS.

Of course, the company would have a sizeable upfront investment, estimated at more than \$8 million. Half would be in the form of an IDB loan and the other half would come from another lender. Having the IDB study in hand gives the project the credibility it needs to obtain a loan from a financial institution, according to Pallais, who said the company hopes to have the financing in place later this year and be generating its own renewable energy two years after that.

"This would give us control over our production costs," he said. "It opens the door for us to keep investing in value added."

### EXTRACTING PROFITS

Biomass is also a potential fuel source for TicoFrut, a Costa Rican fruit company whose largest client is the Coca-Cola subsidiary Minute Maid. TicoFrut's processing plant in San Carlos produces concentrated orange juice, pasteurized pineapple juice, and other products ranging from pellets used in cattle feed to essential oils used in perfumes. The company has extensive orange groves along both sides of Costa Rica's border with Nicaragua; it also buys some of its oranges, and all of its pineapples, from other producers.

The process of producing concentrated fruit juice is highly automated and energy-intensive. Once the juice is extracted from the orange, it goes through a filtering and heating process then is introduced into a series of vacuum tubes where the water content is cut from 90 percent to about 35 percent. By the time the concentrate is pumped into a storage tank, its temperature is below freezing, though the high natural sugar content gives it the consistency of thick syrup.

Between the electricity TicoFrut gets from the grid and the heavy oil or "bunker" fuel it buys to power its industrial boilers and driers, the company spends \$16 million a year in energy, according to CEO Carlos Odio. Rising costs in recent years have made this a "very, very serious" problem for the company, which competes with producers in countries with far lower energy costs, including in the United States.

One untapped possibility for fuel is the pineapple plant, which yields just two production cycles before it is plowed into the ground. Pineapple plants present a particular challenge for combustion because of their high water content, but Odio has been experimenting with them and is convinced they could be an "excellent" biofuel.

Marieta Lizano, who co-owns a Costa Rican environmental consulting company called Siel Siel and has worked with TicoFrut for many years, calls Odio a "visionary" who has been ahead of the curve on environmental issues, including wastewater treatment and forest conservation. She is enthusiastic about his prospects for generating energy from pineapple plants: "He wins, and the environment wins."



An ample local supply of pineapple plants makes this a sustainable long-term fuel source, according to Lizano. And, she said, producers would also benefit. Now, after they plow the pineapple plants under they have to leave the land fallow to let the material biodegrade. If they had another way to get rid of the plants, they wouldn't have to leave so much land out of production at any given time.

TicoFrut recently brought on a strategic investor with biomass experience, and Odio hopes to move forward soon on the biomass project, covering part of the \$15 million cost with a loan through the IDB facility. He believes the project could replace most of the bunker fuel the plant now uses, cutting energy costs nearly in half and reducing emissions. (The new equipment would include modern air pollution control technology.) In the meantime, he plans to have a Brazilian company design a new machine to efficiently harvest pineapple plants.

"To stay competitive, we have to find an alternative," he said of the renewable energy project. "And if we're going to look for an alternative, let's go ahead and make it one that's friendly to the environment."

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## A LOT TO DIGEST

Another company determined to reduce its energy costs is a meat processor called Matadero Central, S.A.—Macesa for short. Located on the outskirts of Juigalpa, in the heart of Nicaragua's ranching country, it is the largest local employer, with a workforce of more than 520.

After the cattle it buys from local ranchers, energy is the company's second-biggest expense, costing around \$320,000 per month, said Silvia Sequeira, who runs the plant. Chill rooms and freezers can never be turned off. The company, which processes 10,500 head of cattle every month, sells fresh and frozen cuts of beef for export around the world, as well as other edible and nonedible byproducts.

While the plant's chilling systems run on electricity from Nicaragua's power grid, more than a third of Macesa's energy costs come from bunker fuel. The oil is used to operate a boiler, which generates high-pressure steam.

The wastewater that comes out of this process currently goes into a series of open-air, gravity-fed oxidation ponds in which any residual organic matter gradually breaks down and releases gases such as methane—not unlike a cow's own digestive system. A better alternative for the environment is an anaerobic biodigester system, in which the wastewater basin is covered with a flexible membrane and bacteria is added to speed up the breakdown of organic matter. Any methane released can be captured and used to produce thermal energy.



**SOLAR POWER  
WILL CUT ITS  
MONTHLY  
ELECTRIC BILL  
BY \$90,000**

In the case of Macesa, the IDB team's feasibility analysis showed that this type of system, which could be put in place for about \$2 million, could replace most of the bunker fuel the plant now uses to run its boiler. In theory, such a system could potentially generate electricity as well, but for now the goal is to capture enough methane to meet the company's needs for steam.

Sequeira hopes to get the project underway before the end of 2014, with construction expected to take about eight months. If all goes as expected, by 2015 Macesa will have the largest biodigester system in the country. Sequeira said the system is expected to pay for itself in five to six years and last for more than twenty.

"We're going to have significant savings," she said. "Those savings will pay for the investment."

### HERE COMES THE SUN

San Pedro Sula, Honduras, has garnered international headlines for having one of the world's highest murder rates, but the city is also a major economic center and export powerhouse. The IDB is helping fuel a clean-tech revolution in and around the city, with several projects in the works.

The area's reliable sunshine makes solar power an option for companies such as Inversiones Materiales, or Invema for short—a recycling company with a large expanse of roof and an appetite for growth. Based on an IDB assessment, the company is planning a \$2.4 million investment in solar technology, in addition to other energy efficiency measures such as putting in LED lighting.

George Gatlin, the company's president, said the measures will cut Invema's \$90,000 monthly electric bill significantly. "This is a great project," he said. "It will pay for the investment in six years."

When Gatlin first started the company 20 years ago, recycling was a fairly new concept in Honduras, and it was a struggle to fill a truck with aluminum cans. Today, Invema takes in around a million plastic bottles per day, as well as aluminum, steel scrap, cardboard, and just about anything that can potentially be turned into something else. The company exports 500 containers a month of compressed or processed recyclables to manufacturers in China, Europe, and elsewhere around the world, for use in a variety of products.

In addition to employing 320 people at its facility in San Pedro Sula, Invema keeps a veritable army of scrap collectors busy. "It's hard to find an aluminum can or bottle on the street," Gatlin said, adding that around 6,000 people are registered with the company to supply recyclables. (Registration and other controls help reduce incentives for theft.)

“One major incentive to bring down its electric bill is that the company hopes to expand and take a step up the value chain.”

In Honduras, which has a low minimum wage, many people find they can make a better living by collecting material for recycling than in some other lines of work, according to Gatlin. Higher-wage countries, by contrast, have a harder time getting people to collect recyclables. As a result, Invema has a ready market in the United States for the material it makes from recycled bottles.

One major incentive to bring down its electric bill is that the company hopes to expand and take a step up the value chain. Most soft drinks come in bottles made out of PET plastic (the acronym stands for polyethylene terephthalate). Currently, Invema washes and grinds the plastic down to a flake, then exports the material to U.S. companies for further processing. Gatlin wants to add value to his recycling operation in Honduras by processing the plastic flake into the kind of food-grade pellets that can be turned into bottles again. That would not only require an infrastructure investment but would also increase the company’s energy use.

While economics are driving the decision to put in solar panels, Gatlin also likes the idea of making his recycling company even greener. Solar energy will cut electricity costs, which will enable the company to make plastic pellets, which in turn will reduce the carbon footprint even further by reducing other companies’ need to import pellets.

## BREAKING RECORDS

Solar energy also promises to be a good investment for a large bottling plant in San Pedro Sula, which implemented a small solar energy pilot project in 2013 and is now getting ready to install what will be the largest rooftop photovoltaic system in Central America.

Embotelladora de Sula, which runs 24/7, bottles the complete line of PepsiCo products as well as its own brands of fruit nectars and purified water. When the company’s solar project is complete, the photovoltaic panels will cover 1,800 square meters of roof and supply about 20 percent of the plant’s electricity needs.

That will not only generate considerable savings, but help the company better manage energy price fluctuations, according to Ramzy Massu, who is in charge of the company’s solar project. “Besides the fact that electricity is expensive, there’s the issue of not being able to budget prices in the medium or long term,” he explained. The \$6 million investment in solar—which will pay for itself in five years—is well worth it, he said.




In recent years, parent company Grupo Corinsa has moved to reduce the plant's negative environmental impact in other ways, such as by replacing bunker fuel with liquefied petroleum gas to power some of its equipment. Based on the IDB team's detailed energy audit, the company plans to take other steps to improve energy efficiency and work toward ISO 50001 certification—an energy management standard established by the International Organization for Standardization. In addition to the solar project, it plans to update its lighting and air conditioning and upgrade some of its industrial processes.

For example, a boiler generates high-pressure steam to clean the machines, but some of the heat produced in the process is now being wasted. By capturing more heat and repurposing it, the company could reduce its fuel consumption, according to Grupo Corinsa energy analyst Jaime Betancourt. Another step will be to optimize the efficiency of boiler combustion by more accurately measuring the oxygen content. "It's similar to combustion in a car," Betancourt said. "An exact amount of oxygen to an exact amount of fuel is needed to reach a proper mix."

Massu believes that the demonstration impact of this plant will be huge as other companies in San Pedro Sula notice what Grupo Corinsa is doing and follow suit. "I think this will have a positive impact," he said. "More companies are going to join up and it will have an economic impact on in terms of investment for the country."

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**\$9.4 MILLION  
OF THE NDF  
CONTRIBUTION  
CAN BE USED TO  
MITIGATE RISKS**

## TECHNICAL KNOW-HOW

While the financing available under the IDB energy facility is critical for many companies to be able to invest in clean energy, the technical assistance grants are another vital component of each project. The Nordic Development Fund—a development finance institution with shareholders from Denmark, Finland, Iceland, Norway, and Sweden—earmarked \$3.2 million of its \$12.4 million total contribution for such grants, building on a joint IDB-NDF initiative already underway in Central America, the Caribbean, Colombia, and Bolivia.

The technical assistance provided has included different types of expertise. The IDB has brought in energy engineering specialists from other countries to carry out the audits and feasibility studies. They have worked closely with local energy service companies and engineering firms, with the aim of sharing know-how in different technologies and project design.

The complexity of the energy picture in each country requires additional expertise on a range of factors, including the regulatory environment, billing structure, and existing tariffs and incentives. In some countries, for example, companies may be able to produce more electricity during peak sunlight hours than they need and receive credit for the surplus that can be used after the sun goes down; in others, these mechanisms are not allowed by the electricity companies, reducing the potential for clean energy production considerably.

“We’re able to add a lot of value for companies trying to navigate those waters,” said a member of the IDB team working on the project, Matthew McClymont.

The IDB has also provided technical expertise in the financial realm, helping local banks and other financial intermediaries learn to evaluate the risks of energy loans more accurately and introducing them to new financial products available to finance such projects. Banking officials unfamiliar with energy audits are often reluctant to offer these types of loans for the first time.

In the case of the Energy Efficiency Finance Facility, \$9.4 million of the NDF contribution can be used to mitigate risks to lenders by providing partial loan guarantees. This can lower collateral requirements and provide more favorable terms to the borrower, such as longer periods in which to pay back the loans. The IDB plans to provide similar credit enhancements for projects throughout Latin America and the Caribbean.

The **Inter-American Development Bank** (IDB) seeks to create opportunities for current and future generations in Latin America and the Caribbean through sustainable private sector investments. Through its Structured and Corporate Finance Department (SCF), the IDB partners with private sector entities to achieve breakthrough financial results with high development impact. The IDB works with large- and medium-sized businesses, including private utilities and infrastructure operators, banks and financial institutions and state-owned enterprises in a broad range of economic sectors.

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## Future Finance Series No. 5

*Going Green at the Grassroots* narrates how the Inter-American Development Bank (IDB), in partnership with Nordic Development Fund (NDF), is working with companies across Latin America and the Caribbean to harness the enormous potential of energy efficiency and small-scale renewable energy.

Costly, unpredictable energy prices are prompting a range of companies to look at greener alternatives. In a region where demand for energy is expected to increase by over 50 percent in the next decade, tens of billions of dollars can be saved only by adopting energy efficiency measures.

The IDB and NDF created the Energy Efficiency Finance Facility to provide the technical expertise and funding needed for the currently underserved energy efficiency and small-scale renewable energy sectors. Because companies often encounter high risk premiums, high collateral requirements and inadequate tenors to adopt greener technology, the IDB energy facility is critical for many companies to be able to invest in clean energy. The Facility focuses on projects with potential for high financial returns, including increasingly economical technologies such as advanced lighting, solar and biomass power.

The IDB has conducted more than 30 energy efficiency audits and feasibility studies across a range of sectors, from shrimp farming to clothing manufacturing to dairy operations. Energy engineering specialists perform energy audits, self-supply renewable energy assessments, financial feasibility studies and develop project design plans in Central America.

This case study illustrates how a private sector initiative is gaining steam in Central America and demonstrating, company by company, the feasibility and appeal of renewable energy.

*Going Green at the Grassroots* is also available online at [www.iadb.org/scf](http://www.iadb.org/scf)