

Green Building Case Studies

Nicaragua



The IDB Group Office in Nicaragua substantially reduced its electricity bills through a combination of efficiency measures and on-site solar power generation. The installed capacity is enough to power between 25% and 63% percent of the office's needs, and excess can be sold back to the local grid. Water-saving projects carried out between 2018 and 2020 have reduced drinking water consumption by 50% and water used for landscaping by 40%. These projects demonstrate the Bank's commitment to the UN Sustainable Development Goals.

PROJECT HIGHLIGHTS

- A combination of energy efficiency and on-site renewable energy generation reduced electricity costs by approximately 30%, US\$ 30,000 annually.
- Electricity consumption dropped by 41%, 178,000kWh, equivalent to 53 tons of CO₂ equivalent annually.
- A grid-tied solar system can meet up to 63 percent of building's electricity needs during low demand period, and around 25% during high demand period, and excess generation can eventually be sold back to the grid through net metering.
- A Social and Environmental Management Plan launched in 2020 supports further environmental impact reductions through water conservation and waste management.



Context

Nicaragua is highly vulnerable to climate change. The country already faces severe droughts in the dry season, with shortages affecting subsistence farmers and agricultural producers alike. Meanwhile, with increased frequency and intensity of rainfall during the wet season, stormwater drainage has become a particular challenge in the capital, Managua¹. With urban growth, the city's system is not sufficient to cope with heavy downpours, leading to flooding and road blockages.

Yet despite these challenges, Nicaragua has made significant headway in transforming its energy mix away from fossil fuels. Over the past twenty years, the share of electricity production from carbon intensive fuels has steadily decreased, falling below 50 percent for the first time in 2013², and reaching around 40 percent of the mix in 2019. This has been achieved by increasing the share of energy produced by renewables – a combination of sugarcane biomass, geothermal, wind, solar, and hydropower – which now represents around 60 percent of electricity production. However, even though Nicaragua has a vast solar capacity, only around 1 percent of electricity production came from solar in 2019.

High electricity costs, abundant solar-generating capacity, stormwater challenges, and an engaged staff gave the Nicaragua IDB Group office an opportunity to demonstrate its commitment to sustainability to employees, partners in the government, civil society, and other building owners who want to follow its example.

Tackling High Electricity Consumption

In 2016, the Nicaragua office spent USD \$94,419 on electricity – more than any other IDB country office. That same year, the office embarked on a comprehensive plan to improve energy efficiency, reducing energy demand and associated utility costs.

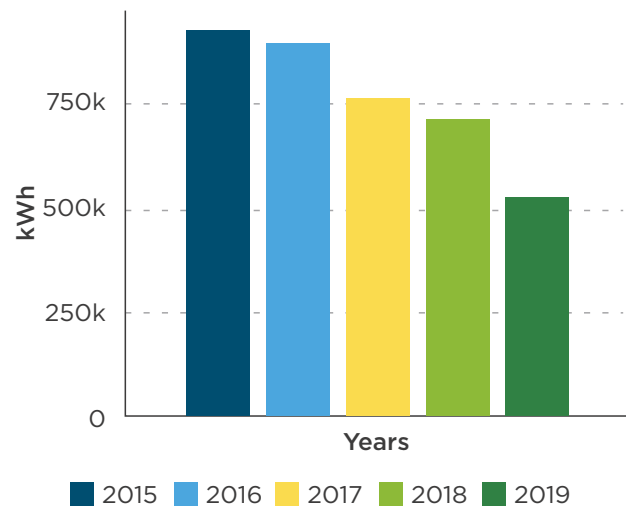
They switched all interior and exterior lights to LED bulbs, saving energy, and providing better light for staff. From 2015 to 2017, electricity consumption dropped by 17 percent, a reduction of over 160,000 kWh. An energy audit conducted in 2017 showed that, after this lighting project, 75 percent of electricity consumed in the building was for air conditioning, with only 12.5 percent used for lighting.

To reduce cooling costs, the office installed approximately 1000 m² of solar film on east and west-facing windows and the central skylight to prevent heat gain from the intense tropical sun. They set air conditioning startup and shutdown times of 7:30am and 5:00pm, coinciding with building occupancy. These measures reduced electricity consumption and created savings by controlling electricity use during times of peak demand (and peak cost). From 2017 to 2018, electricity consumption dropped again, by a further 6 percent.



Carport Photovoltaic Panels.

Municipal Electricity Use



Add in Clean Power

With electricity consumption reduced by 20 percent from efficiency alone, in 2019 the Nicaragua office took the next step of installing its own on-site solar PV system, reducing its electricity costs even further, lowering its carbon footprint, and adding to the country's solar power production.

The 360-panel, 120-kw photovoltaic system, installed above a new carport, also shades the parking area, a dual benefit that keeps cars cool and reduces sun damage. The US\$ 220,000 investment provides approximately 178,000 kWh of carbon-free, renewable, grid-tied energy every year. Since installation, monthly consumption of electricity from the national grid has fallen by 41% and purchased electricity costs have dropped by approximately 30% (US\$ 30,000 annually). By generating 420 MWh of clean, renewable solar power, the office has reduced its carbon footprint by nearly 125 tons of CO₂ equivalent.

Net metering in Nicaragua means small grid-tied generators like the IDB Group office can sell their excess power back to the local grid. Power produced on weekends, or after working hours but before sundown, won't go to waste. It will supply the local grid with clean energy while providing an additional source of income to the office. The IDB Group would be one of the first to take advantage of net metering, helping showcase and promote the benefits of on-site solar generation.



Beyond energy issues

Inspired by the Bank's alignment with the Sustainability Development Goals, the Nicaragua office adopted a Social and Environmental Management Plan to further reduce the environmental footprint of the building and raise environmental awareness amongst staff. They launched a campaign in 2020 to raise awareness of the impact of personal behavior on the environment. This included managing drinking water and preventing destruction of habitat, building on earlier campaigns about waste reduction.

To support these behavior-change campaigns, several facilities upgraded and improved the sustainability of the office. To tackle water use, the office installed waterless urinals and used informative posters and signage to educate staff on good water-conservation practices, saving an estimated \$655 and 123 m³ of water annually. In 2020, work continued with the installation of two 5,000-liter rainwater collection tanks on the grounds of the country office property. These tanks collect stormwater overflow not only to help ease pressure on the city's drainage system but to capture water that will eventually irrigate a green roof. Moreover, the landscaping surrounding the building was redesigned to prioritize local, drought-resistant vegetation, eliminating the need for additional watering. Inside the building, automated faucets, and toilet flush valves both reduce contact with surfaces and reduce water consumption. These changes are

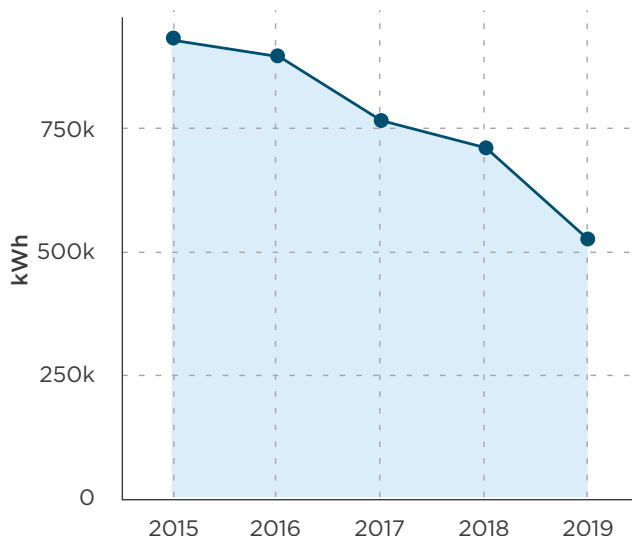


Rainwater Collection Tanks.

expected to reduce drinking water consumption by 50% and landscaping water use by 40%.

To further reduce waste, the Bank implemented practices to decrease single-use plastics in catering and created its own waste-management plan. In 2020, they installed drinking water stations to eliminate bottled water use and promote reusable options. Finally, the office held educational events about environmental and climate-change issues and encouraged sustainable personal behavior, such as using reusable bags, mugs, and bottles in place of plastic, disposable versions.

Grid Electricity Consumption



Educational event held with Country Office staff on Plastic Waste and the Ocean in Nicaragua.



Benefits Beyond the Office Walls

Pro-environmental behavior results in clear benefits to the office, like savings on utility bills. However, the benefits extend far beyond just the financial bottom line. Getting more solar power – almost 300 MWh and counting—into the Nicaraguan grid means improved air quality and reduced carbon emissions for everyone. Since power outages are a common feature in Central America; on-site power through renewable generation helps protect the office against any business interruption. In addition, water conservation and recapture measures help to protect aquifers against drought and mismanagement and lowers the risk of flooding.

Finally, these visible actions bolster the institution's reputation and influence. Staff can bring their new habits home and act as change agents in their community, while feeling a sense of pride about what the office has accomplished. Guests, including recent visitors from the European Union, and the Swiss Agency for Development and Cooperation can see the good practices of the office and spread the word to others, as Vos TV did when it profiled the office's sustainability successes in 2019. This way, the Bank's stakeholders, whether clients, civil society, or other institutions, can see that the IDB Group is truly their partner in sustainable development – the evidence is showcased throughout the office.



Aerial View IDB Building Nicaragua.



References

1. Page 29: <https://publications.iadb.org/publications/english/document/Climate-Change-Adaptation-and-Integrated-Water-Resource-Management-in-Managua-Nicaragua.pdf>. 2. Hannah Ritchie (2014) - "Energy". Published online at OurWorldInData.org. Retrieved from: '<https://our-worldindata.org/energy>' [Online Resource].

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