

How to prevent blackouts in Colombia

Using digital tools to reduce emissions

In the growing region of Sabana Norte near Bogotá, blackouts were becoming a real risk for over 300,000 residents. Rapid urban expansion was pushing the local grid to its limit. But a new pilot project — EnelfleX — is showing how digital flexibility can keep the lights on without costly infrastructure upgrades.

Supported by the UN Environment Programme (UNEP), the International Energy Agency (IEA), and the Italian Ministry of Environment and Energy Security, Enel Grids tested a smart system to help large energy users respond to demand peaks and reduce strain on the grid.

Twenty-one major electricity consumers — including factories and commercial buildings — received automated alerts and compensation to temporarily lower their consumption during high-demand periods. This flexible approach helped balance supply and demand without rolling blackouts.

“We knew we were implementing the first demand response project in Colombia. We installed and integrated new technology into the grid, coordinating across the company with clients at the center. One of the most valuable aspects was the training we received and the exchange with international teams, which broadened our knowledge.”
— Gustavo Parra, Grids Professional, North-East Territorial Unit.

What Enel Grids did

To make flexibility a reality, Enel installed remote-controlled switches across the grid and deployed a centralized Digital Energy Resource Management System (DERMS). This system allowed the grid operator to coordinate consumption reductions in real time.

The team ran a series of controlled stress tests to simulate potential blackouts and evaluate the system’s response.

Participants were financially rewarded for reducing their load — turning energy flexibility into an attractive business decision.



We were implementing the first demand response project in energy distribution in Colombia”



© Enel Grids

3DEN Initiative

Enel Grids, Colombia | 2025

Impact highlights

Enel signed agreements with 21 large customers, giving them tools and financial incentives to reduce energy use during high-demand periods.

"EnelfleX marked a milestone by showing it is possible to actively integrate users into managing the electrical system, enabling fast and reliable responses to contingencies," said Mónica Cataldo, Head of Enel Grids Colombia. "This pilot demonstrates how grid flexibility can be a sustainable alternative to costly infrastructure upgrades."



Grid flexibility can be a sustainable alternative to costly infrastructure upgrades"



Monica Cataldo
Head of Enel Grids Colombia

48.8M

**Euro avoided
in upgrades**

2,322 tCO₂e

**avoided
annually**

9.2 MW

**of peak load
curtailed**



3DEN is not just a cooperation project — it is a living laboratory of shared innovation"



Alessandro Guerri
Director General
Italian Ministry of
Environment and
Energy Security

The bigger picture

EnelfleX is one of four pilot initiatives supported by the **Digital Demand-Driven Electricity Networks (3DEN) initiative** — helps countries harness the power of digital tools to make their energy systems more efficient, accessible, and clean.

Across four countries — India, Brazil, Morocco, and Colombia — Phase I of 3DEN has mobilized over USD 9.2 million, helped avoid over 5,166 tonnes of CO₂ emissions, and reached 340,000+ people.

"Through 3DEN, Italy promotes the use of digital technologies for greener energy systems, to make consumption more efficient, and to reduce costs," said Alessandro Guerri, General Director at the Ministry of Environment and Energy Security. "3DEN is not just a cooperation project — it is a living laboratory of shared innovation."

Supported by



MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA

