

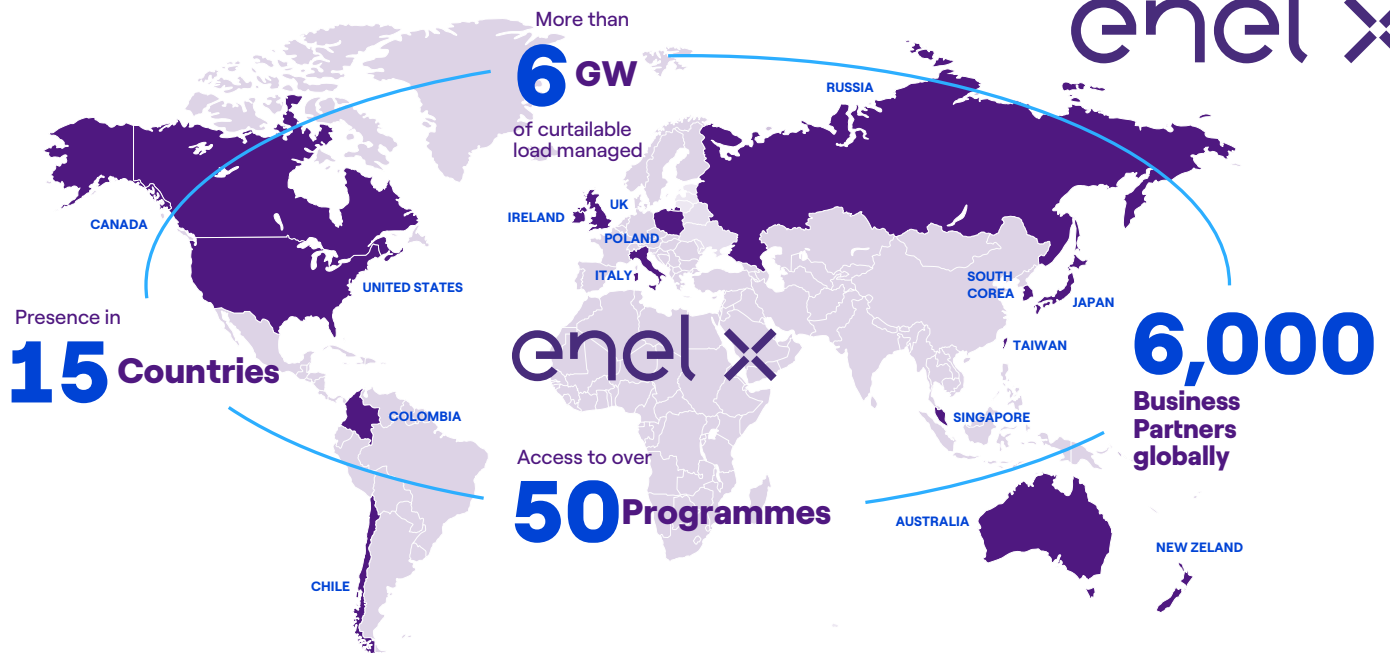


enel x

Demand Response

Customer Success Stories

enelx.co.uk



Part of Enel Group, with over **50 Year Experience** in Energy



Streaming Data from more than **15,000** Enterprise Sites



Network Operations Center with customer support 24/7/365



More than **\$200m** invested in technology to date



2,800+ Employees in Offices across countries

Introduction

Demand Response Success Stories

Every company has its own story, made up of commitment, satisfaction, hard work and sometimes hard times too. In this 2020 characterized by many challenges, Enel X has worked with many different partners across the globe, always with the aim to achieve greater successes together, while decarbonising. This FactBook is a collection of some of our most diverse customers' stories, a testament of our commitment to driving businesses from different sectors of the economy and in different parts of the world, towards a common goal: sustainability.

The business cases included in these pages clearly express the value that comes from participating in Demand Response programs, which has a multiplying value creation effect across the board, for communities, companies, grid operators and the environment.

- Communities** benefit from the reduction of energy capacity costs, the introduction of renewables in the energy mix and a more sustainable environment.
- Grid operators** avoid incurring hefty capital costs to enlarge their power generation fleet and infrastructure, while ensuring grid stability and power quality for all.
- Companies** are remunerated to modulate their energy use while contributing to global decarbonization leading to a more efficient use of the energy infrastructure and resources.
- The Environment**, as Demand Response enables a higher penetration of renewable energy in the grid system.

Enel X's Role

Enel X is the world leading DR aggregator with more than 6 GW of flexible load managed and a unique ability to monetize the energy assets of commercial and industrial businesses across the world.

Seoul Metropolitan Government

Government



Demand Response (DR) Program

The client currently participates in two forms of Demand Response programs.

- **Reliability DR:** a Capacity program that requires the curtailment of energy in response to a DR event.
- **Voluntary DR:** an Economic DR program where the client decides the time period of curtailment and responds accordingly, following Enel X energy experts' directions.



About the Client

As the first governmental entity in Korea to participate in Demand Response, the Seoul Metropolitan Government has been working with Enel X since 2015, with a portfolio of flexible energy assets amounting to a total of **6.3 MW**. Their portfolio includes both facilities, such

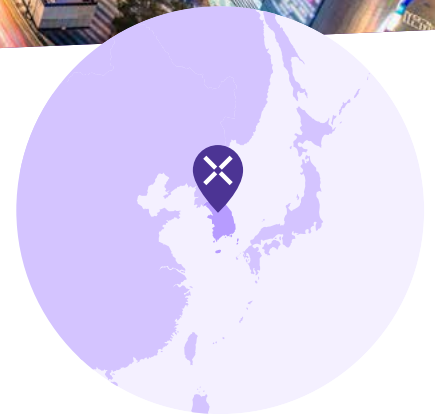
as the underground subway, the water purification center, and the water recycling center, as well as a number of buildings, from the city's museums to the art galleries and the concert halls.



Solution

When there is a demand response event, the **Seoul Metropolitan Government** curtails the power used for water pumps, air conditioners, heating devices and other energy assets.

When affected by unpredictable weather changes, it is especially challenging for the water purification center and the water recycling center, to immediately respond to **a dispatch event**.



Seoul, South Korea

Flexible energy

6.3 MW

To ensure a rewarding and efficient DR participation, **Enel X Korea** analyzed the characteristics of the entire flexible portfolio of the Seoul Metropolitan Government and devised a tailor-made **energy management plan** and DR participation schedule. To enable a convenient real-time monitoring and prompt response to a DR event, the team also equipped each of the client's facilities with a real-time energy monitoring software, which can be consulted by the client both via Mobile App and the web.

By analyzing the country's power supply status, weather conditions, temperature, and timing, Enel X is also able to provide dispatch predictions and personalized consultations that can guide the client towards the most efficient and remunerative management of its energy assets.



Results

Thanks to our tailor-made energy management plan the Seoul Metropolitan Government can achieve both a high performance during a demand response event and **maximize its earnings**, while providing essential services to the public at the same time.

As of June 2020, the Seoul Metropolitan Government was able to achieve a **high performance of over 100%** and **earn a revenue** of approximately **€196,000**.



Benefits

With a **new revenue stream** generated thanks to its participation in the DR program, the Seoul Metropolitan Government was able to improve the insulation of low-income housing; replace low-efficiency home appliances with high-efficiency ones; and distribute electric fans and heated mattresses to senior citizens suffering from extreme weather conditions.

Finally, the Seoul Metropolitan Government is already contributing to the integration of **renewable energy resources** in the energy mix, enabling a further reduction in CO₂ emissions.

By 2025, the Seoul Metropolitan Government aims to further expand its portfolio of flexible assets up to **100 MW of capacity**, by operating a 4-MW load in 25 autonomous districts.

Revenue earned
~**€196k**

"We expect Enel X will play an important role in making Seoul a sustainable, low carbon-green city by using buildings and facilities more efficiently."

Seungjun Kim, Manager,
Seoul Metropolitan
Government

Reduction of
CO₂
emissions



Remondis Group

Waste Management



Poland



Demand Response (DR) Program

DSR programs.

About the Client

Remondis is one of the world's largest recycling, service and water companies. With over **30,000 employees** and around 900 business locations on 4 continents, the group serves more than 30 million people and thousands of companies. The Remondis Group is the **leading municipal services provider in Poland**, operating in the field of waste collection and management, as well as water and sewage management.



Key numbers about the Remondis Group in Poland:

- **Population served:** 4 million in 15 provinces;
- **Turnover:** 1.4 billion PLN (2019);
- **Offices and plants** in 50 cities.

Solution



Remondis is constantly looking for ways to **reduce energy costs**. In 2014, the company started procuring energy at the group level. Currently, Remondis continuously carries out consumption analysis, tariff selection, power supply and fixed charges optimization, as well as reactive power compensation. They are also considering investments in photovoltaic plants.

Reduce energy costs

Reduction of
0.8 MW

The Remondis Group began working with Enel X in the autumn of 2019 by participating in **Demand Side Response (DSR)**.

DSR programs are aimed at stabilizing the **National Power System** in emergency situations. Companies participating in DSR programs declare their readiness to temporarily reduce energy consumption upon the request of the power network system operator in return for remuneration. Recipients may sign contracts to provide DSR services directly with the energy system operator (PSE) or **with the help of a DSR aggregator, such as Enel X**.

In 2019, the possibility of energy consumption reduction at five pilot sites was assessed by our team of expert engineers, who determined the precise level of reduction.

Together with Enel X, the plants were prepared for the reduction tests: a condition for joining the program and receiving remuneration for readiness reduce. All tests were successful.



Results

With the declared possible reduction of **0.8 MW**, Remondis will receive **several thousands of euros in 2020**.



Benefits

These programs are ultimately aimed at stabilizing the National Power System in emergency situations. In DSR programs, participating companies declare their readiness to temporarily reduce energy consumption upon the request of the power network system operator in return for remuneration.

“Following the implementation of group energy purchasing and the optimization of distribution costs, participation in the DSR program is another step that gives us the opportunity to reduce purchase prices and minimize the effects of energy price increases.”

Małgorzata Błaszczkiewicz,
Assistant to Managing
Directors, REMONDIS Group

Taiko Paper MFG. LTD

Pulp and Paper



Demand Response (DR) Program

The "1 dash reserve" program allows the user to **earn revenue** by saving electricity for a few hours in response to a request to **reduce electricity consumption**. The 1 dash reserve program is a power source that can be used to control frequency and adjust the balance between supply and demand in response to rapid changes in power demand caused by extremely hot and cold weather conditions.



About the Client

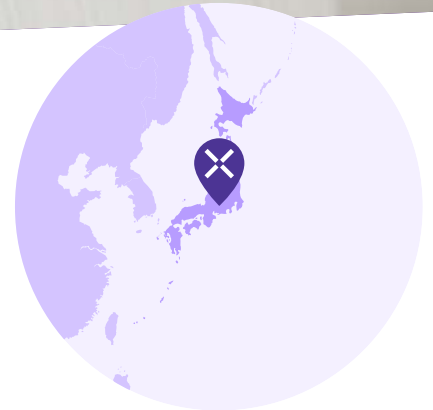
Taiko Paper Mfg. Ltd. manufactures specialty paper for industrial use with a fully-integrated pulp- to-paper production system. Taiko Paper handles everything from the production of pulp made from wood chips to packaging paper and various types of industrial paper.



Solution

The paper industry was once synonymous with energy-intensity. This brought about awareness to saving resources and energy, and sparked efforts to reduce environmental impact.

Taiko Paper consumes approximately **125,900,000 kWh** of electricity annually. However, the amount of electricity purchased from power companies is only 34,600,000 kWh, about a quarter of its energy use. The remainder is covered by chemical recovery boilers that use black liquor (waste liquor) from the manufacturing process as fuel, and private power generation facilities that use heavy oil boilers.



Shizuoka, Japan

**Sustainable
recycling-
based
industry**

Revenue earned
~€185k
per year

Japan's DR project began in 2014 as an experimental business project by the Ministry of Economy, Trade and Industry. Taiko Paper has participated in this project partnering with Enel X Japan since the beginning in order to become a more **sustainable recycling-based industry**. Taiko Paper strongly desired to use the power generated by its own generation facilities to contribute to society.

When DR is called upon, Enel X Japan receives power saving directives issued by general power transmission and distribution companies, and then shares this message with its customers, who are energy users. These partner companies then receive compensation (a DR reward) for saving power by following the directive.

Saving power in this context means reducing the amount of power purchased from power companies, not necessarily reducing the amount of power consumed (power demand). For example, there are some cases where the power demand is reduced by adjusting production line operations in factories, and other cases where the amount of power purchased is reduced by increasing the amount of private power generation without changing power demand. Taiko Paper, with its own in-house power generation equipment, falls under the latter.



Results

Although DR is a socially significant initiative, participating businesses also reap rewards, the greater the contracted power reduction, the greater the reward, with **power saving efforts** directly linked to **compensation**. A key factor Taiko Paper's cost benefit analysis is the cost of heavy oil to power the boilers.



Benefits

Heavy oil boilers play an important role in regulating power to maintain stable production, while responding to power saving directives. In terms of cost benefits, the point is the balance between the price of this heavy oil and the DR reward. If the DR reward and power bill reduction due to power saving is greater than the heavy oil bill associated with an increase in private power generation, there will be **financial benefits**. At Taiko Paper, the ratio of chemical recovery boiler to heavy oil boiler is usually about 7 to 3. To prepare for a DR event, the company is working to use both types of boilers efficiently by improving the load on the chemical recovery boiler when a daytime DR event is likely to be triggered, so as to minimize dependence on heavy oil.

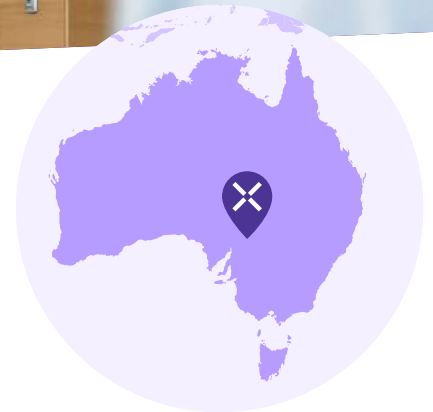
“Enel X was the first company in the world to commercialize the DR business, and already had more than 15 years’ experience across Europe, the US, Australia and New Zealand. That sounded very appealing to our company with our desire to contribute to society through DR.”

Katsumi Suzuki, Engineering Power Division Manager



Echuca Regional Health

Healthcare



Victoria, Australia



Demand Response (DR) Program

Frequency Control Ancillary Services and Price Responsive Program.

About the Client

Echuca Regional Health is a **public hospital** located 208 kilometers north of Melbourne in the beautiful riverside location of Echuca-Moama. With a proven innovation track record, the hospital is widely recognized throughout the region for its holistic and progressive approach to energy management and sustainability.



Solution

In order to enhance site resilience in the face of a weakening grid, since 2017, the hospital has used **backup generators** to participate in **Enel X Virtual Power Plant (VPP)**: a collection of distributed energy assets including backup generators, batteries, and flexible loads that work together to provide additional dispatchable capacity to the grid.



Virtual Power Plants respond quickly to deviations in the grid's frequency when a large power station or transmission network suddenly fails, to **prevent cascading grid failures**. It also responds to spiking electricity prices, which often indicate a supply shortfall.

Virtual Power Plant

VPP



Results

By participating in the program, the hospital receives an **advanced** network instability **alert**, which allows it to better prepare for a network event without suffering a power loss if there is an outage.

Through participating in our VPP the hospital is paid to test its backup power system during hot days when the hospital is running a high load. This provides an excellent tool for testing and ironing out any assumptions made around reliability, giving the hospital the strength of conviction to know that the generators can perform as expected.

The hospital is now looking to further increase its demand response capacity by seeking approval from its network service provider to export the site's excess generation capacity to the grid during DR events.



Benefits

The VPP participation is another way of **keeping patients safe**. When the hospital receives a notification from Enel X signaling network instability, it can fire up the generator and get off the grid in anticipation of a power outage. This allows the hospital to switch to backup power in a controlled manner and reduces the chance of experiencing a power interruption if a real outage occurs. The fact that joining the VPP allows them to also get paid for responding to these events makes it a win-win scenario.

“We view Virtual Power Plant participation as another way of keeping our patients safe. If we know there’s a response request coming, it allows us to fire up our generator and get off the grid, preventing interruption to power.”

Mark Hooper,
Executive Project Manager



The University of Queensland

Education



Demand Response (DR) Program

Frequency Control Ancillary Services.



About the Client

The **University of Queensland** (UQ) is a public research university founded in 1909 by the Queensland Parliament. It is located primarily in Brisbane, the capital city of the Australian state of Queensland. The University of Queensland (UQ) recently installed the state's largest behind-the-meter battery to support its objective of becoming the **world's first university to offset 100%** of its electricity needs with **renewables** in 2020.



Solution

The university has enrolled its battery in various **energy management initiatives**, including the provision of frequency control services through Enel X.

Enel X pays UQ to be on standby to provide instant, dispatchable capacity to the grid when large power stations or transmission lines suddenly fail. This helps to keep the grid's frequency in balance and reduces the risk of cascading power failures.



Queensland, Australia

Revenue earned
~€45k



Results

By joining Enel X's Virtual Power Plant (VPP), UQ's battery joins a collection of **distributed energy resources**, including generators, and equipment that provide critical grid services through demand response and flexibility programs..



Benefits

By enrolling the battery in clever energy management initiatives, the university has secured a range of new **revenue** streams, saving **€45,000 in its first quarter**.

“The high number of Frequency Control Ancillary Service events in Q1 correlated to unprecedented network conditions across the National Electricity Market, with the summer bushfires and other extreme weather events. With Enel X, we were able to provide instant capacity to support the grid’s frequency throughout this challenging period.”

Andrew Wilson, UQ Energy and Sustainability Manager

The first university
to use

100%
green energy



Lineage

Cold Storage



Victoria, Australia



Demand Response (DR) Program

Frequency control and emergency grid support in the **National Electricity Market (NEM)**.



About the Client

Lineage is an organization both deeply rooted in generations of cold storage expertise and on the cutting edge of technology and innovation.

Cold store facility Oxford Cold Storage (recently taken over by Lineage AUS TRS Pty Ltd), employs more than 400 people and operates the **largest temperature controlled third-party logistics warehouse** in Australia.



Solution

The company has undertaken substantial energy efficiency improvements over the past eight years, allowing it to double its cold storage capacity, while keeping its total electricity use at **37 GWh per annum**.

Despite these efforts, in 2018, Oxford Cold Storage's annual cost of electricity **rose 215%** to over €3.9 million. With straightforward energy efficiency opportunities exhausted, the company began exploring how to participate in demand response programs with the support of a partner aggregator.

Reductions in electricity demand by up to

3,250kw

The cold store facility now participates in two demand response programs with Enel X as part of its virtual power plant (VPP). One facilitates reductions in electricity demand by **up to 3,250kW** for short periods – usually no longer than four minutes. Large energy users' electricity loads automatically stopping and starting when required helps the market operator maintain frequency in the National Electricity Market (NEM).

The second demand response program is activated during periods of unusually high demand. For example, during heatwaves when air conditioner loads are very high, the facility can reduce its demand by 3,250kW for up to two hours with no impact on business operations or quality.



Results

Since volunteering to provide these services, Demand Response payments have offset **5%** of the company's rise in electricity costs. enabling a further reduction in CO₂ emissions.

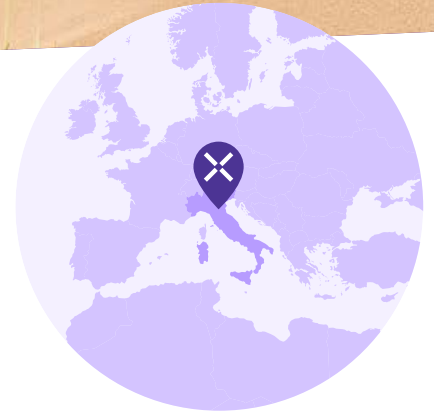


Offset
5%
 of the electricity costs



Laterlite

Manufacturing



Rubbiano, Parma, Italy



Demand Response (DR) Program

- **UVAC (in 2018)**.
- **UVAM (2019–2020)**: real-time balancing adjustment with 15 minutes' notice.



About the Client

Laterlite S.p.A. is an Italian company that manufactures and develops lightweight insulating products for construction, civil engineering, geotechnical engineering, industrial uses, agriculture, and landscaping.

The company's history began in 1964, when it first introduced lightweight expanded clay aggregates in Italy. Today, it has four Italian manufacturing plants, main offices in Milan, and a network that covers all of Italy. In the 1990s, the company expanded internationally and is now present in France, Switzerland and Spain, and exports its goods to more than 20 countries across five continents.

Since the beginning, its research and development have focused on creating innovative products based on the material it specializes in: expanded clay.

With over 50 years' experience, Laterlite is a leader in its field, helping designers and construction professionals choose lightweight insulating products for use in construction, sustainable renovation projects, and complex engineering projects.

1 MW
of flexible energy

**A new source
of revenue**



Solution

Enel X worked with Laterlite to **identify areas of flexibility** at its production site in Rubbiano and devise a **tailor-made energy management plan** to enable its participation in the Demand Response program to maximize the company's profits, while protecting its production cycle requirements.

After developing and testing a load modulation plan, Laterlite was able to participate in the program and adjust consumption at the Rubbiano site for **1MW**.



Results

Participating in the Demand Response program has enabled the company to innovate their energy strategy and given the customer access to a **new source of revenue**. The work carried out with Enel X marks a contribution to Laterlite's energy transition and development of renewable energy, as well as an increase in awareness and control over the flexible energy assets available at its production sites.



Benefits

This partnership has enabled the company to secure a competitive advantage in the energy transition, and increased the awareness over the existing flexibility assets in the production process, that the company can further monetize.

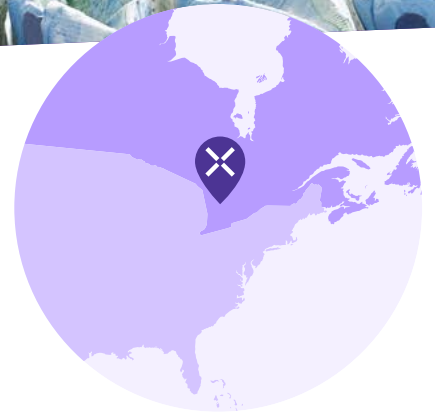
“Our partnership with Enel X in the Demand Response program has proved to be successful, as it has allowed Laterlite to participate in the UVAM mechanism, which provides the grid with greater flexibility, enabling the energy transition to gradually move forward, while receiving a remuneration.”

Luca Bassanini, Energy Management at Laterlite S.p.A.



Kimberly-Clark

Personal and Healthcare Products



Huntsville, Ontario, Canada



Demand Response (DR) Program

IESO DRA.



About the Client

Kimberly-Clark and its global brands are an indispensable part of life for people in more than 175 countries. With brands such as Kleenex, Scott, Huggies, Pull-Ups, Kotex and Depend, Kimberly-Clark holds the top share position in more than 80 countries. The company's Canadian Huntsville mill, in the Muskoka tourism region of Ontario, makes Kleenex Facial Tissue, the Kleenex Pocket Pack, and Scott 1000 Bath Tissue.

The Huntsville, Ontario mill is a **24/7 operation** that manufactures large rolls of tissue and has several conversion operations that fold facial tissue, wind bath tissue, and package the products.

Since 2011, K-C's Huntsville mill has partnered with Enel X to earn payments through Ontario's demand response program. A local expert with global backing, Enel X has substantial on-the-ground knowledge of Ontario's demand response program, and more importantly, the ability to understand the Huntsville plant's operations for a win-win partnership.



Solution

In 2010, the Canadian factory embraced a challenge for energy efficiency and entertained the idea of a 500kW-reduction in energy use at the plant in order to participate in demand response. Enel X visited the site to evaluate its energy use and determined that the **7MW facility** could actually reduce **up to 5MW** during a

Flexible energy

5.3 MW

demand response dispatch to **maximize payments**. Following two successful experimental launches of the Demand Response process, the Huntsville factory found that 5MW was actually a conservative estimate, and that the entire tissue machine could be shut down during a 4-hour dispatch to take a total of **5.3MW off the grid**. Because the Huntsville mill operates with in-process inventory on hand, the packaging operations can continue uninterrupted, even while the tissue machine is down.

Kimberly-Clark has built a culture of flexibility around its ability to respond quickly to a DR dispatch and make the most of its downtime. Huntsville utilizes the **4-hour period of downtime** during a dispatch to perform standard required **maintenance on the tissue machine**.

By performing maintenance during the dispatch periods, Kimberly-Clark not only prolongs the lifespan of its expensive equipment, but also earns capacity payments at the same time with a tailor-made Energy Intelligence program.



Results

Kimberly-Clark has expanded its demand response participation to Australia. Its operations in Ingleburn, New South Wales, are **earning payments** through the Australia Renewable Energy Agency (ARENA) and NSW government-funded demand response trial. Kimberly-Clark executes its energy reduction plan within 10 minutes of receiving dispatch instructions from Enel X, thereby playing a valuable role in a program that helps prevent blackouts in the National Electricity Market (NEM).



Benefits

By receiving regular payments that can be fed back into the mill's infrastructure, organizing the workflow of maintenance activities, and gaining an awareness of the status of Ontario's power grid, demand response helps Huntsville remain competitive in terms of energy efficiency and cost-savings compared to Kimberly-Clark's other global operations.

“Being able to take advantage of downtime has really helped us internally to get our maintenance act together. And we did it with an ‘empty wallet’ approach. We didn’t have to invest capital to make our operations more efficient.”

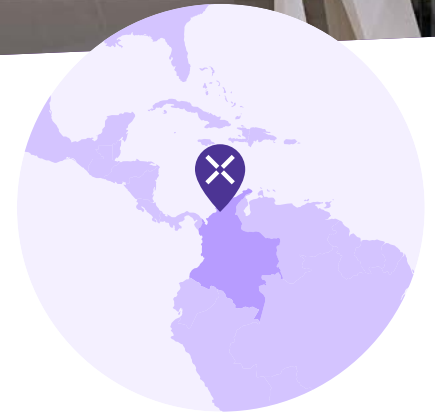
Anthony Magistrale,
Electrical Engineer -
Tissue Manufacturing,
Kimberly-Clark, Hunstville

Revenue earned

€2m+
since 2011

Hotel de Las Americas

Hospitality, Tourism



Cartagena, Caribbean Coast



Demand Response (DR) Program

DDV Program - Colombia



About the Client

The Las Americas hotels is **5-star hotel** located in one of the most touristic cities in Latin America, Cartagena. The hotel has 530 rooms, a business center, 400 meters of private beach, 9 pools, 4 jacuzzis, 5 restaurants, 10 bars, a spa, a gym, and a tennis court and other amenities. The hospitality and tourism sectors have been negatively affected by extensive **lockdowns** that occurred in 2020 and lasted for five consecutive months.



Solution

The Las Americas hotel is part of Enel X's customer portfolio for participation in the Voluntary Disconnectable Demand - DDV program.

This program came as a new alternative for companies to generate a new stream of revenue on top of their core business, either by **reducing their energy consumption** or by **delivering the availability** of the energy produced on-site by their backup plants.

This energy reduction is requested by the Generators, in order to support themselves and guarantee their remuneration of the reliability charge, in turn Enel X remunerates customers based on the availability provided by customers.

Revenue earned

tens
of thousands
of euros



Results

The DDV program was particularly providential during the lockdown, as it provided the opportunity to **generate an extra income** by monetizing the hotel existing backup generation plants, without requiring any capital expenditure. The client has earned **tens of thousands of euros in revenue** by participating in the program.

Additionally, during the impact of the pandemic, the income from this program allowed it to leverage other bills such as energy.

