

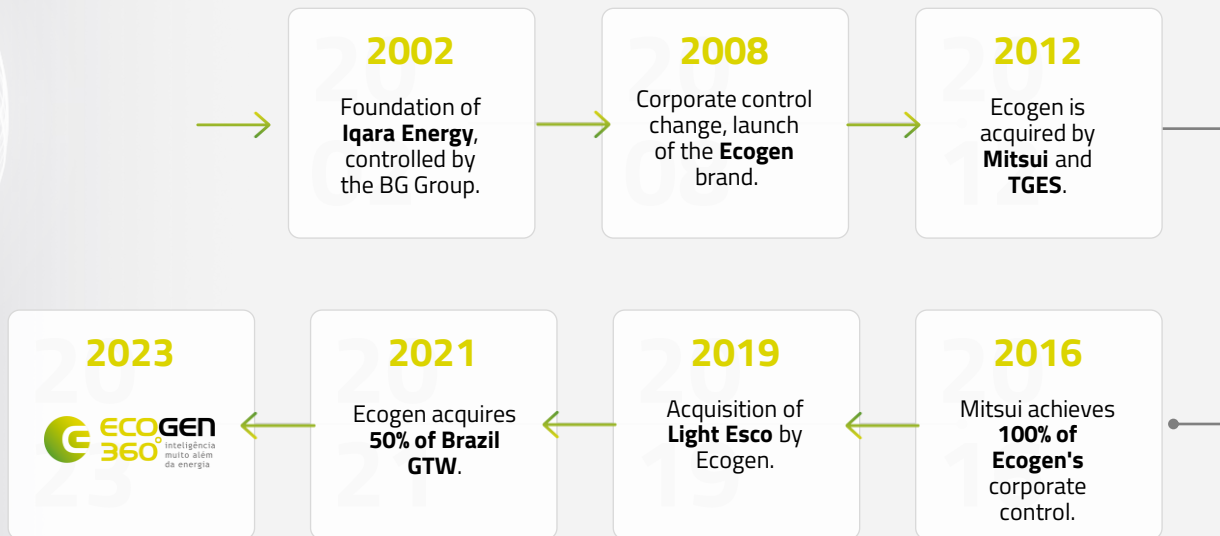


**ECOGEN**  
**360°** inteligência  
muito além  
da energia

# MOR THAN 20 YEARS



Promoting **excellence, reliability** and **tirelessly** seeking new ways to **delight** our clients.





# WITH THE STRENGTH OF A GIANT CORPORATION

A 100% Mitsui & Co. Ltd. Group company.  
**Even more security and credibility for our clients.**



Present in  
**63 countries**



**44.5 thousand**  
employees



**US\$ 112.8 billion**  
in assets



**US\$ 72.2 billion**  
revenue



**130 offices**  
around the world



**514 affiliated**  
companies



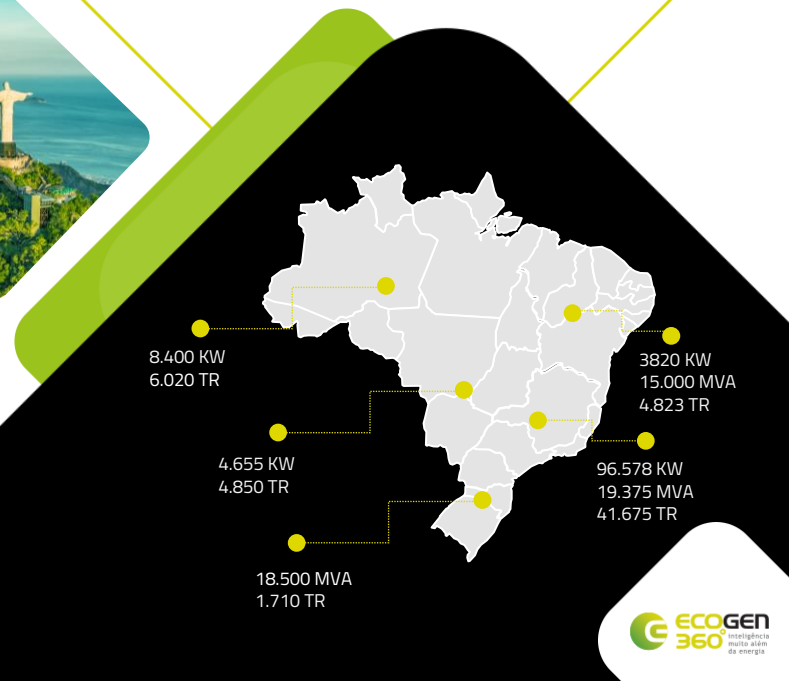
**US\$41.2 billion**  
net worth



# NATIONAL BENCHMARK

We delight customers **all over Brazil**.

Wherever you are,  
we will bring **our intelligence** to you.







## Environmental

**We act today with a look into the future.**  
We constantly aim at developing environmentally responsible solutions.



## Social

We dream of **transforming the society's relationship with energy.** Therefore, we develop actions that stimulate human relations, through empathic collaboration.




# ESG



## Governance

Respect and Ethics shape Ecogen's daily life. We promote a work environment open to diversity. **Our energy is built by everyone and for everyone.**





Whatever needs  
you have, **Ecogen**  
has the Solution.

Wide solutions portfolio  
that meet multiple  
demands.



Cold Water  
Plant



Substation



Natural Gas Power  
Generation



Batteries




Operation and  
Maintenance  
Services



Compresses Air



Distributed Generation



Whatever needs  
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demands.



**Biomass**



**Biogas**



**Solar**



**GTW**



**Waste-to-energy**



**Reuse Water**



**Energy Efficiency**



# A new era has come!

A **transformation** that takes us beyond energy, and that generates even more value for your business through our **intelligence**.

Powered by  METRON



# 3D's

of the energy transition  
The Essence of  
our Business.



## Decarbonization:

We contribute to measuring and reducing the carbon footprint of your business, promoting efficient and environmentally responsible solutions.



## Digitalization:

We leverage the digitalization of your business using high technology and connectivity with a focus on energy efficiency.



## Decentralization:

We use decentralization as a transformation vector that leads us to a new, more efficient and sustainable energy model.

# WHAT YOUR TEAM GAINS WITH ECOGEN 360°

## Energy & Operation Optimization



### OPERATORS

Real-time **monitoring** of machine operation and baselines.



### ENERGY MANAGERS

Define goals, detect and monitor **implemented efficiency projects**.



### CORPORATE LEADERSHIP

Standardization and implementation of efficiency projects in an agile way.

### OPERATIONAL BOARD

Monitoring sustainability and productivity KPIs.



### PURCHASE AND MANAGEMENT ENERGY

Better predictability and taking advantage of market opportunities.



# 360° OPTIMIZATION

We meet the demand of our customers at all stages.

Digital Maturity Baseline



## TRADITIONAL ENERGY MANAGEMENT

- Invoice tracking.
- General energy meters.

### OVERVIEW



## ADVANCED MANAGEMENT OF ENERGY

- Measuring plan.
- **ISO 50001 certification**
- Calculation of performance and sustainability KPIs.

### DATA VISUALIZATION



## INDUSTRY 4.0 INTELLIGENT ENERGY MANAGEMENT

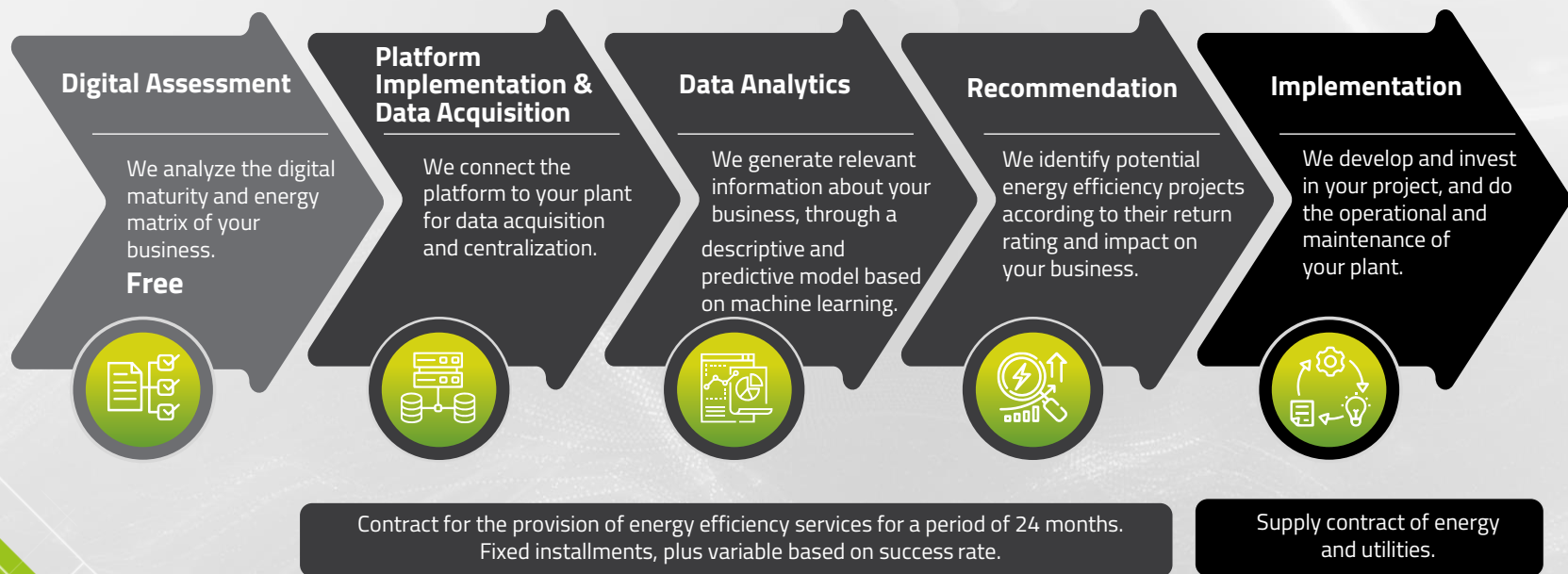
- **DEFINITION OF BASELINES**
- **Descriptive** data analysis.
- Identification of parameters with greater impact.
- Detection of real-time deviations according to baselines.
- **ARTIFICIAL INTELLIGENCE**
- **Predictive** Data Analytics.
- Real-time simulations of high-performance (optimal) operating mode.

## MARKET INTELLIGENCE

- Intelligent management of energy flexibility.
- Demand response according to cost and revenue.
- Identification of energy efficiency projects (with or without CAPEX).

# HOW WE WORK

and generate efficiency for your business.



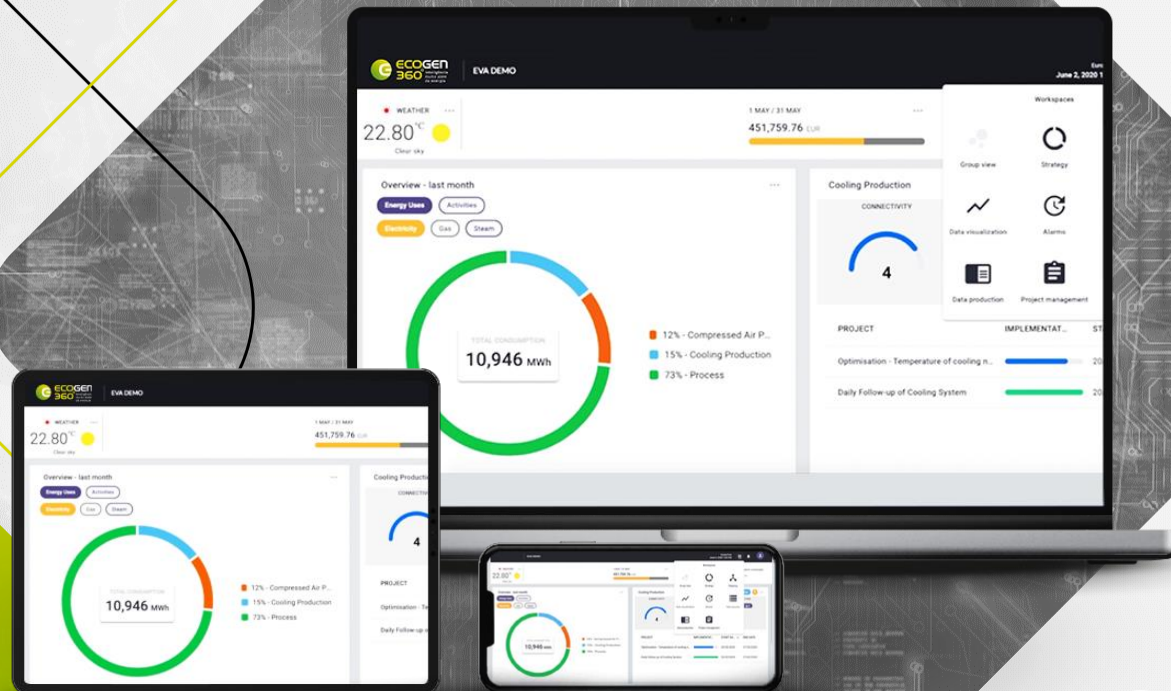


# Our Platform

Easy implementation.  
Constant benefits.

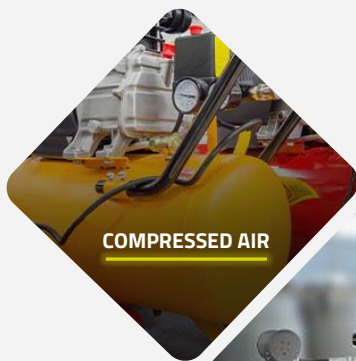
- Connectivity
- Scanning
- Data structuring
- Management
- Prediction

Link for the Demo



# PROVEN TECHNOLOGY

Solution used in more than 35 customers and 230 plants, with 250 types of analyzes used to investigate utilities and processes.



COMPRESSED AIR



OVEN



GRINDR



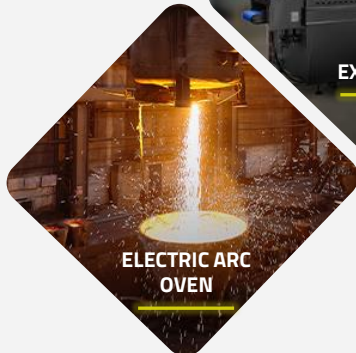
EXTRUDER



SPRAY DRYER



BOILER



ELECTRIC ARC OVEN



COGERATION



CHILLER



# CONNECTIVITY

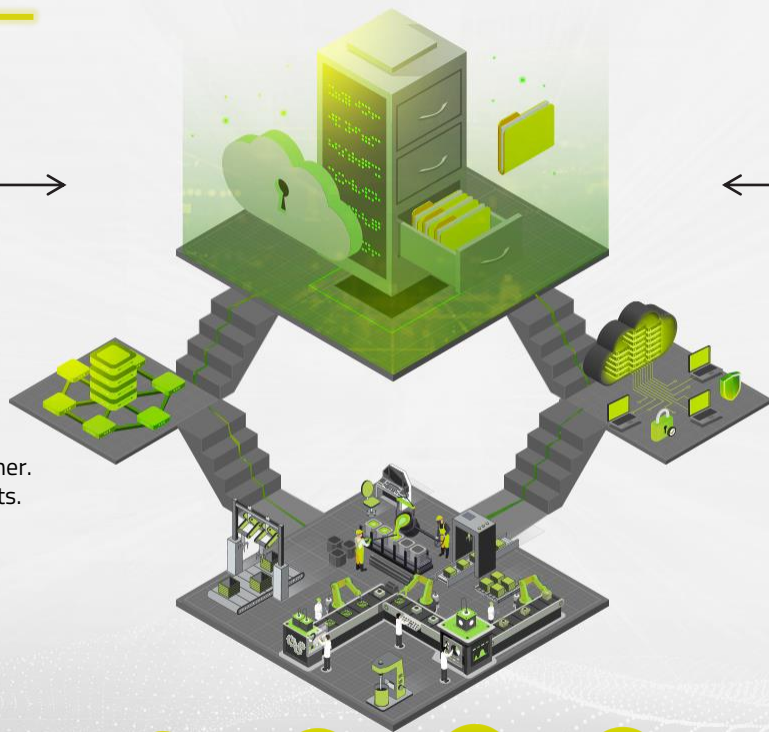
A smart and safe way to use data generated by your business.

## CLOUD SERVICES

- Unlimited data storage.
- Platform maintenance and updates.
- Artificial intelligence.

## DATA ACQUISITION

- Agnostic data collector.
- Availability of the data lake to the customer.
- Unlimited number of data collection points.



## OPTIMIZATION & RISK MODULES

- Data valuation.
- Consumption and processes optimization.
- Data Science.

## DATA ARCHITECTURE

- Dedicated database.
- VPN secure data transfer and management.
- Mutual authentication / AES encryption.



Energy Meters



IoT Sensors



PLCs



SCADA System



ERP & MES



Energy Market



Energy Invoices



Meteorological Data



## Your Data Protected

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- Dedicated server instance in regionalized cluster (data is not shared with other customers);
- 256-bit AES Encryption + Mutual Authentication;
- Network encryption (sFTP, HTTPs, mTLS) and storage (EBS, S3));



## Restricted & Authenticated Access

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- Limited access for authenticated and customer-validated users;
- Auditing connections and active users, with history and access details;
- HTTPS authentication (encrypted TLS) managed by OpenID, with individual login and password;
- Compliance with ISO/SOC security standards (SOC 2 Type2 certification).

# Data Security

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**which brings safety  
to your business.**



# BENEFITS

that **Ecogen 360°** generates for your business.



**Digitization** of plants.



**Decarbonization** of your business.



**Cost reduction** based on **efficiency**.



**Optimization** in **energy consumption** and utilities.



Greater **competitiveness**.



Energy **security** and **reliability**.



**Information** through data.



Data **security**.

**Investment of up to 100% in the solution implementation.**



# SUCCESS CASE

## FOOD AND BEVERAGE COGENERATION



### SUCCESS CASE

#### LOCALIZATION

South Korea

#### ENERGY BILLING

\$10.9 million/year

#### SCANNING LEVEL

Average

#### MAIN EQUIPMENT

1 coal boiler, 1 backpressure turbine and 1 condensing turbine.

#### SOURCES OF ELECTRICITY

Grid purchase: 55 GWh  
Self-generation: 25 GWh

**COAL:** 50 000 t / year

### BEFORE METRON

- Monthly monitoring of some KPIs of consumption and generation with Excel;
- Constant steam production;
- Excess production of "recovered" steam in the turbines.

### GOALS

Optimize in real time the mix of electricity generation / grid supply.



## OUR ANSWER

Decision-making tool to optimize the cost of the energy mix in **real time** through the digitization of energy management.

**1 - Modeling of the supply contract** (peak/off-peak) and modeling of the steam and electricity production process.

**2 - Real-time optimization** of grid supply/electricity generation mix considering real-time context and requirements to reduce energy costs.

### Optimized real-time settings:

- Condensate flow rate (t/h) of the condensing turbine
- Sequential regulation of steam production

## Results

- Savings: **\$90K/year** (=1% of energy bills)
- **4 man-days** of monthly savings
- Development of an **energy efficiency culture**

# SUCCESS CASE

## STEAM LINE



### SUCCESS CASE

#### LOCALIZATION

France

#### ELECTRICITY BILL DEDICATED TO STEAM CONSUMPTION

€1 million per year

#### SCANNING LEVEL

Low

### BEFORE METRON

- Manual monitoring of steam meters by Excel
- Random maintenance based on operator feedback
- Time-consuming steam network audits (involving complete overhaul of 500 traps) leading to steam leaks

### GOALS

Fast and accurate detection of deviations to keep the steam line efficient.

#### MAIN EQUIPMENT

Steam network including traps  
(Flow from 0.5 to 50 tvap/h).

#### PRODUCTION

Baby milk: 47,000 tons/year



## OUR ANSWER

**1 - Digitize energy performance management** of the entire plant on a single platform: real-time KPIs, visualization of steam network data, action plans, reports and follow-up.

**2 - Detect consumption deviation to identify steam leakage.**

Steam leaks from a faulty trap detected in real time through alarms.

**3 - Modeling of steam consumption and valuation of savings**

- Calculation of a model to obtain the ideal consumption profile (applying a relearning process)
- Optimized audit of steam traps through data collection and visualization and definition of the action plan:
  1. Definition of the perimeter to be audited
  2. Detection of faulty trap(s)
  3. Replacement of equipment(s)

## Results

**Savings: €90k/year (-9%)** on annual steam consumption

**Reducing carbon emissions: -1200 tons** of CO<sub>2</sub>/year

**Savings of 2 man days per month**

Promotion of **Energy Efficiency** culture in operational teams

Agreement negotiated for the **100+ factories of the group in the world**

# SUCCESS CASE

## PRODUCTION ANALYSIS



### SUCCESS CASE

#### LOCALIZATION

France

#### SCANNING LEVEL

Average

#### ENERGY BILLE

550K/year

#### PRODUCTION

Chocolate: 8K t / year

#### MAIN EQUIPMENT

Extrusion, molding, coating, tempering machines.

#### COUNTRY SPECIFICATIONS

Electricity tariff: €70/MWh

### BEFORE METRON

- Macro Monthly Management in Excel
- Lack of monitoring and visibility of production line consumption
- There was no action plan to reduce the plant's energy consumption.

### GOALS

Digitize energy performance management to identify potential process energy savings.



## OUR ANSWER

**1 - Scanning** plant flows to track global process performance: energy consumption data collected for mapping and KPIs.

### 2 - Production consumption analysis

- Consumption should be close to 0 when the plant is not producing
- Various on-site customer tests: testing shutdown of certain production lines and adjusting shutdown duration to find potential savings opportunities

## Results

**Savings: 43 kW** which represents a saving of €4.2K/year

50% off-production energy reduction

Improved visibility through **data visualization**

Development of an **Energy Efficiency Culture**



# SUCCESS CASE

## COMPRESSED AIR SYSTEM



### SUCCESS CASE

#### LOCALIZATION

Asia

#### SCANNING LEVEL

Low – Medium

#### ENERGY BILL

\$12 million a year

#### PRODUCTION

Beer: >4M hl/year

#### MAIN EQUIPMENT

Compressed air system (10% of energy bill): 4 compressors, heat exchangers...

#### ELECTRICITY COST

\$91/MWh

### BEFORE METRON

- Daily monitoring of the most relevant KPI (Nm<sup>3</sup>/Wh) through Excel
- Sequencing based on required type of operation (instant / continuous) and shift (day / night)
- 60% of the dryer cycle uses about 300 Nm<sup>3</sup> / h of compressed air (wasted)

### GOALS

Consumption optimization based on real-time indication of compressor sequencing



## OUR ANSWER

**1 - Digitizing plant energy performance management** on a single platform: real-time KPIs, action plans, reporting and tracking, significant energy usages, etc.

**2 -Real-time** definition of optimal sequencing based on requested flow rate.

**For the same flow rate, different sequencings were tested:** Non-optimized sequencing → increased specific consumption

**3 - Suggestion for optimizing and quantifying the savings obtained**

- **Real-time monitoring and recommendations** for compressed air production and deviation detection alarms
- Each compressor has its own energy consumption per m<sup>3</sup> of air produced
- Optimized real-time sequencing of air compressors for a given demand to ensure the **lowest total energy consumption**.

## Results

**Savings:** 245 MWh /year which represents **-6.1% of electricity consumption in the perimeter**

Reduction of carbon emissions: **-136 tons of CO<sub>2</sub>/year**

**2 man days** saved / month

# SUCCESS CASE

## DIGITALIZATION OF ENERGY USES



### SUCCESS CASE

#### LOCALIZATION

France

#### SCANNING LEVEL

High

#### ENERGY BILL

€ 1.15M / year

#### PRODUCTION

Chocolate: 15K t / year

#### MAIN EQUIPMENT

Roasting, grinding, conching and tempering machines

#### COUNTRY SPECIFICATIONS

Electricity tariff: €70/MWh

### BEFORE METRON

- Monthly data analysis via Excel: energy usage, manual performance indicators
- ISO 50001 procedure manual

### GOALS

Scan ISO 50001 procedure to monitor real-time data



## OUR ANSWER

### 1 - Digitize the ISO 50001 approach

Collect and compare plant consumption data in real time with models: global view, by energy use, by KPIs, etc.

### 2 - Case COVID-19

A global excessive consumption of the plant was detected over a long period (from September 2020 to January 2021)

Global consumption of the plant showing a **>5% gap** with the model, representing an excess consumption of **59,754 kWh**

A deeper analysis of the energy indicators on the Platform allowed finding the exact area where abnormal consumption was detected (deviation model >12)

Then, the plant operators correlated this increase in consumption with one of the plant doors left open for health reasons linked to the COVID-19 crisis.

## Results

**Increased visibility** of all plant energy uses

**Global plant deviation** detected quickly and easily

**Increased plant autonomy** and **visibility** with data visualization

# SUCCESS CASE

## CONSUMPTION REDUCTION

### SUCCESS CASE

#### LOCALIZATION

Colombia

#### ENERGY BILL

Gas: \$5M/year

Electricity: \$7M/year

Biomass: \$45k/year

#### MAIN EQUIPMENTNH

3 cooling system, boilers,  
roasting, extraction,  
concentration, freeze-drying

### BEFORE METRON

- Daily management of KPIs by Excel.
- Manual on-site monitoring for some meters.
- In-house Industry 4.0 project for a global cloud solution for managing multiple plant data

### GOALS

Digitize energy KPIs to improve energy performance, quantify and drive plant improvements



#### SCANNING LEVEL

High

#### ENERGY CONSUMPTION

Gas: 268 GWh/year

Electricity: 78.5 GWh/year

Biomass: 144 GWh/year

#### PRODUCTION

freeze-dried coffee: 10,000 t/year



## OUR ANSWER

### 1 - Digitization of energy KPIs.

**Digitization of key energy indicators:** kWh of fuels/tons of steam, COP for compressed NH3, thermal efficiency of boilers in real time to detect deviations and quantify improvements.

### 2 - Optimization of the freeze-drying process

1. Digitization of  
**advanced process  
monitoring**

2. **Development of energy  
consumption models** based on  
production parameters

3. **Optimization of production  
parameters** related to  
vacuum and condensers

### 3 - Cooling system optimization – Improved NH3 suction pressure.

First step, decreasing the suction pressure to the maximum **to improve the energy efficiency rates** of isolated equipment. Then verification of the refrigeration system to identify **optimal sequencing for compressors and absorption flow** to meet the NH3 demand in the process.

Savings: **\$14,000/year**

### 4 - New Maintenance plan

**Machine schedule monitoring** via dashboard and real-time alarms to decrease the number of maintenances per year without losing reliability and maintainability, leading to annual cost savings of approximately 30% or **US\$20,500 / year**

## Results

**Savings: \$76.5K/year** with platform usage, cooling system maintenance and optimization  
**176,000 kWh/year-(electric)**

**Process monitored in real time**

**Carbon emission reduction: -121 t CO2/year**

# THE TRANSFORMATION

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we want for the future starts with the choices we make in the present.





# CONTACT



## Ana Keller Lekitsch

Marketing, Innovation, Business Intelligence & ESG Superintendent

📞 11 2199-3750    📱 11 99664-3150

✉️ [anapaula.keller@ecogenbrasil.com.br](mailto:anapaula.keller@ecogenbrasil.com.br)



## Michel Navega

Innovation Manager

📞 11 2199-9422    📱 11 95323-5009

✉️ [michel.navega@ecogenbrasil.com.br](mailto:michel.navega@ecogenbrasil.com.br)



## Ana Silva

Innovation Consultant

📞 11 2199-3753    📱 11 97357-9560

✉️ [ana.silva@ecogenbrasil.com.br](mailto:ana.silva@ecogenbrasil.com.br)



## Jayme Navarro

Energy Specialist

📞 11 2199-3720    📱 11 996632-1751

✉️ [jayme.navarro@ecogenbrasil.com.br](mailto:jayme.navarro@ecogenbrasil.com.br)



## Hajime Murofushi

Innovation Trainee

📞 11 2199-3700    📱 11 97292-0895

✉️ [hajime.murofushi@ecogenbrasil.com.br](mailto:hajime.murofushi@ecogenbrasil.com.br)



Know more :

