enerbrain®

Enerbrain for the industry

20240901

We simplify energy management and digitization of buildings

by making them efficient and sustainable

We are certified

ISO 27001 BUREAU VERITAS Certification

ISO 9001 BUREAU VERITAS Certification

A team of experts taking care of your buildings

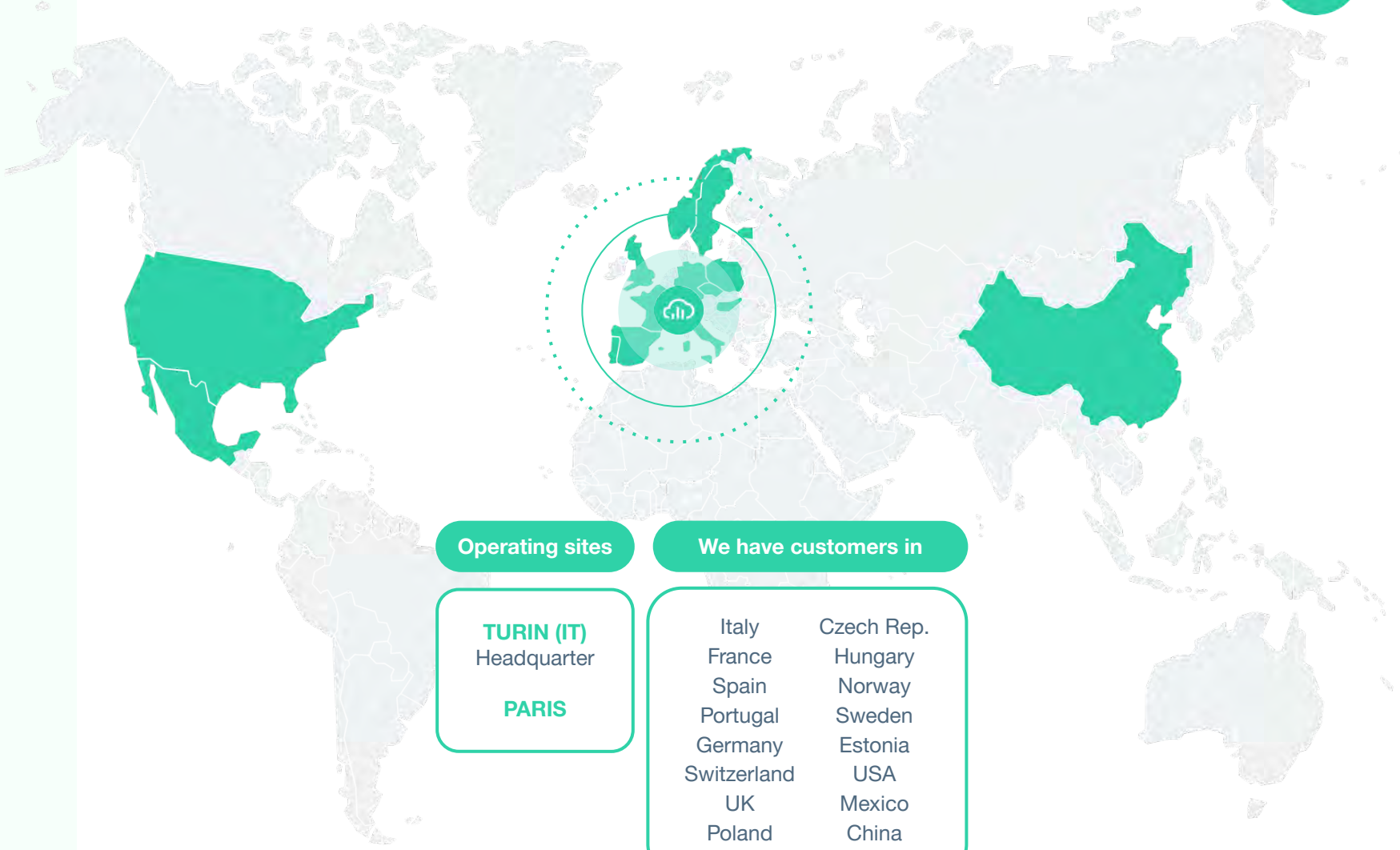
700+
Buildings

16
Markets

12
Patents*

Our expertise

Energy management & analysis
Project management
Hardware development
IoT and Cloud computing
HVAC energy efficiency



Operating sites

TURIN (IT)
Headquarter

PARIS

We have customers in

Italy	Czech Rep.
France	Hungary
Spain	Norway
Portugal	Sweden
Germany	Estonia
Switzerland	USA
UK	Mexico
Poland	China

5 patents approved, 9 in the process of approval

Optimize your building with our services

HVAC Optimization

Make **plants efficient, save energy** and **reduce** CO_2 emissions with **our Algorithm**

Energy monitoring

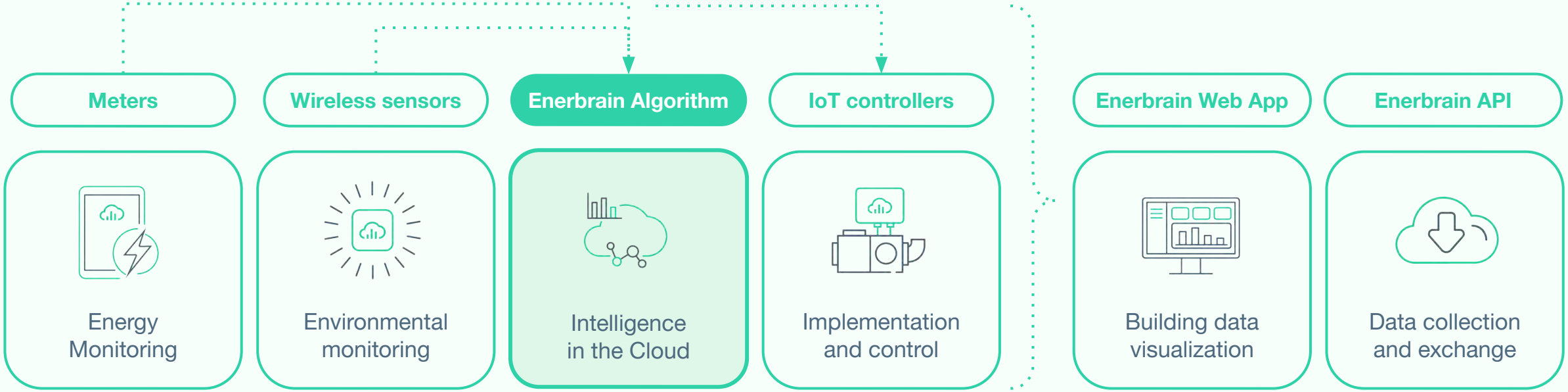
Identify the most **energy-consuming** machines and processes and consciously **reduce waste**

Environmental monitoring

View the **comfort conditions** of your buildings in real time with **our sensors**

\+ Turn to us for an Energy Intelligence Consultation

IoT and cloud-based elements
of our intelligent system



Features

Accurate and secure data acquisition from the building or electrical panels, machinery, processes, and indoor environment

ex: electrical consumption, gas, water, temperature, etc.

Consumption **optimization** and setpoint maintenance

Remote control over the BMS, plant, or individual elements

Displaying and receiving data also and setting desired comfort setpoints for each area of the building

Why choose
the Enerbrain team?

A single stakeholder for stress-free optimization

Complete turnkey service

We take care of every stage

SAVING

Save energy and reduce CO_2 emissions

5-7%
with
energy monitoring service

15-30%
with
HVAC optimization service

DIGITIZATION

We simplify energy management

Collect data and make strategic decisions to

Cut consumption
Decarbonize
Obtain certifications
ESG reporting

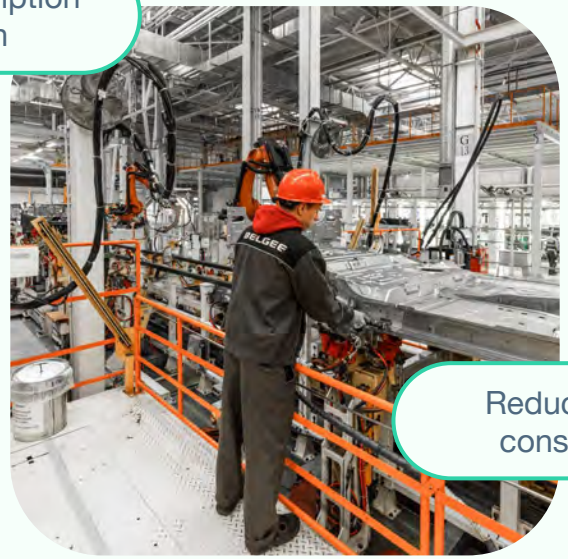
INNOVATION

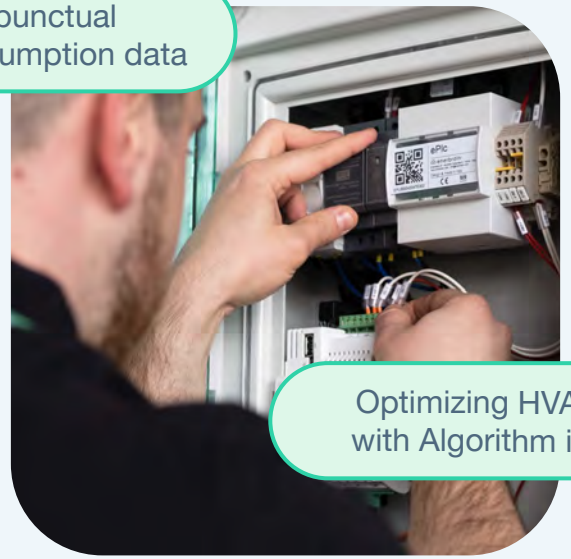
We increase the intelligence of your buildings

Thanks to the optimization logic developed by our **Cloud Algorithm**

Custom solution

If you have these needs	Here's how we can support you
Advanced energy monitoring	Disaggregation of loads with granularity and accuracy of data (even in complex buildings)
Reporting consumption of production	Collection of punctual and accurate consumption data
Reduce energy consumption	Optimizing HVAC Systems with Algorithm in the Cloud
Digitization of company data	Data management, visualization and control platform
Control and improve environmental comfort	Environmental monitoring of indoor comfort parameters





Why choose
Enerbrain for Industry?

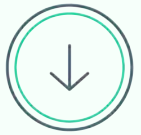
IoT DEVICES

For monitoring environment
we use our wireless sensors

Granularity of data that can be integrated into the regulation of the HVAC system

ENABLERS

Our tools are functional
for obtaining
ISO 50001 certification



SECURITY

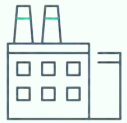
We are **ISO 27001 certified**
and pay utmost attention
to the security of your data

SUPPORT

Our **team of experts**
will be available
in case of post-installation
needs

INTEGRATION

We are **compatible**
with any type, brand,
or model of plant present



RELIABILITY

We have a proven
track record on more than
50 industrial sites
in 13 countries

REPORTING

Open API and
data downloading
will allow you to do ESG
and internal reporting

Our services

Give intelligence and simplify energy management

with Enerbrain solutions

HVAC optimization

With the intelligence of our Algorithm

Make your buildings' HVAC systems efficient

Our comprehensive service to
monitor, reduce energy consumption and improve occupants' indoor comfort

COMPATIBLE

With any HVAC system
regardless of make or model

Energy saving up to 30%

Remote control

Improved indoor comfort

Intelligence to the building

Real-time monitoring
of internal comfort parameters

Internal temperature

CO_2 level concentration

Relative humidity

Wireless installation
in a few hours

Automatic calibration

Rechargeable or non-rechargeable
according to customer needs

eSense

LoRa

Full service,
customized
to the plant
characteristics
in the field,
to improve
the activity
and achieve:

Energy savings

Improved indoor comfort

Reduced CO_2 emissions

Easy to scale to a portfolio
of large buildings

Application of intelligence logic
to the HVAC plant

HVAC system optimization
intelligent logics

Control of elements present in plant

Retrofit installation without modification

Cloud connection and data collection

HVAC system optimization

actuator control

Versatile application
on buildings belonging to different sectors

example:
Industry, airports, retail, public buildings and others...

Quick configuration
via Enerbrain Web App

ENERGY CONSUMPTION REDUCTION
up to 30%
on the HVAC quota

Our Algorithm adjusts the HVAC system according to the **comfort conditions to be maintained and the times of actual room use**

Algorithm in the Cloud
intelligence and optimization

How do we achieve savings?
The logic of optimization

Adaptive Regulation

The algorithm adjusts the system response to the building behavior.
The regulation tries not to exceed the set room setpoint, and through **integration with environmental monitoring with eSense** it will be possible to achieve:

- more **appropriate regulation** based on the customer's needs (choosing where to adjust);
- **tighter monitoring of internal parameters** and consequently compliance with the setpoint assigned to each room;
- **flexibility of future configuration** of sensors

Optimized management of generation and/or distribution systems

The algorithm manages hot/cold generation according to indoor and outdoor thermo hygrometer conditions and the heating and cooling requirements of the building.

Dynamic pre-ignition and pre-power-off calculation

The algorithm determines the correct instant of turn-on or turn-off to ensure that comfort is achieved at the desired occupancy times, taking into account building inertia and indoor and outdoor conditions and set setpoint, zeroing out the waste associated with excessively early or late turn-on or turn-off.

Benefits

Decreased
OVERHEATING
OVERCOOLING

Improvement and maintenance of
COMFORT conditions

Optimization of
TIME for plant management

=

SAVINGS on HVAC quota of up to 30%

A single interface to:

visualize the data collected from IoT devices

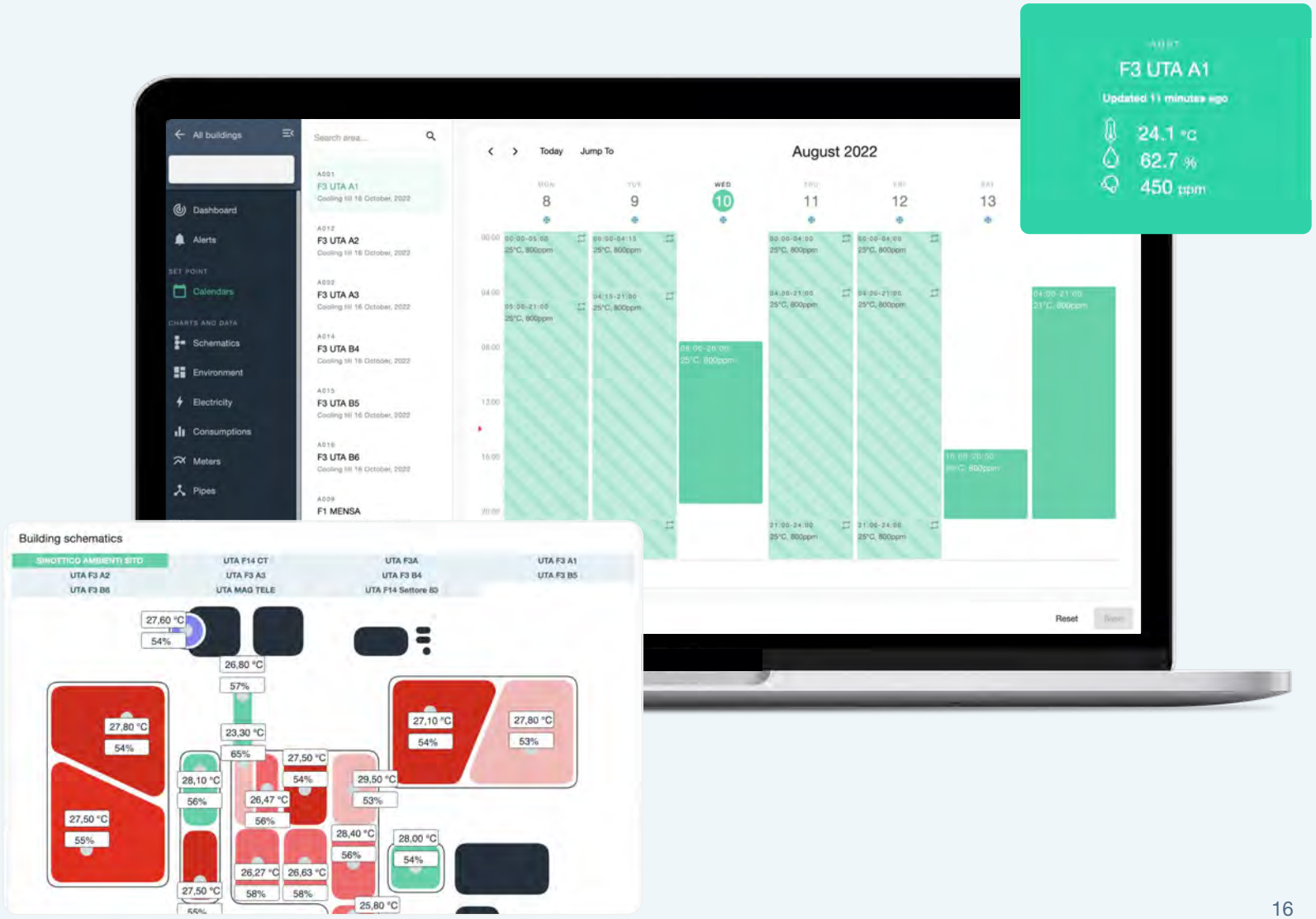
control HVAC plants via calendars

report **critical issues**

view **building synoptics**

Setting of setpoints (T, RH, CO_2) for each area

Data integration **via API**



Data visualization and control

Energy Monitoring

Actual data to support you in energy management

Identify and reduce waste where needed with the Enerbrain platform

Simplify **energy data collection and monitoring:**
a single tool, with advanced alarming,
to take targeted actions and simplify data management

MONITORED DATA

- electrical loads
- gas consumption
- water consumption
- Thermal energy

Energy savings of 5 to 7%

Cloud-based data collection

Targeted intervention

Disaggregation of loads

Quick installation
a few days

Cloud data collection

Energy monitoring
of electrical loads

Gas consumption

Thermal energy

Water consumption

Energy monitoring

pulse counter monitoring

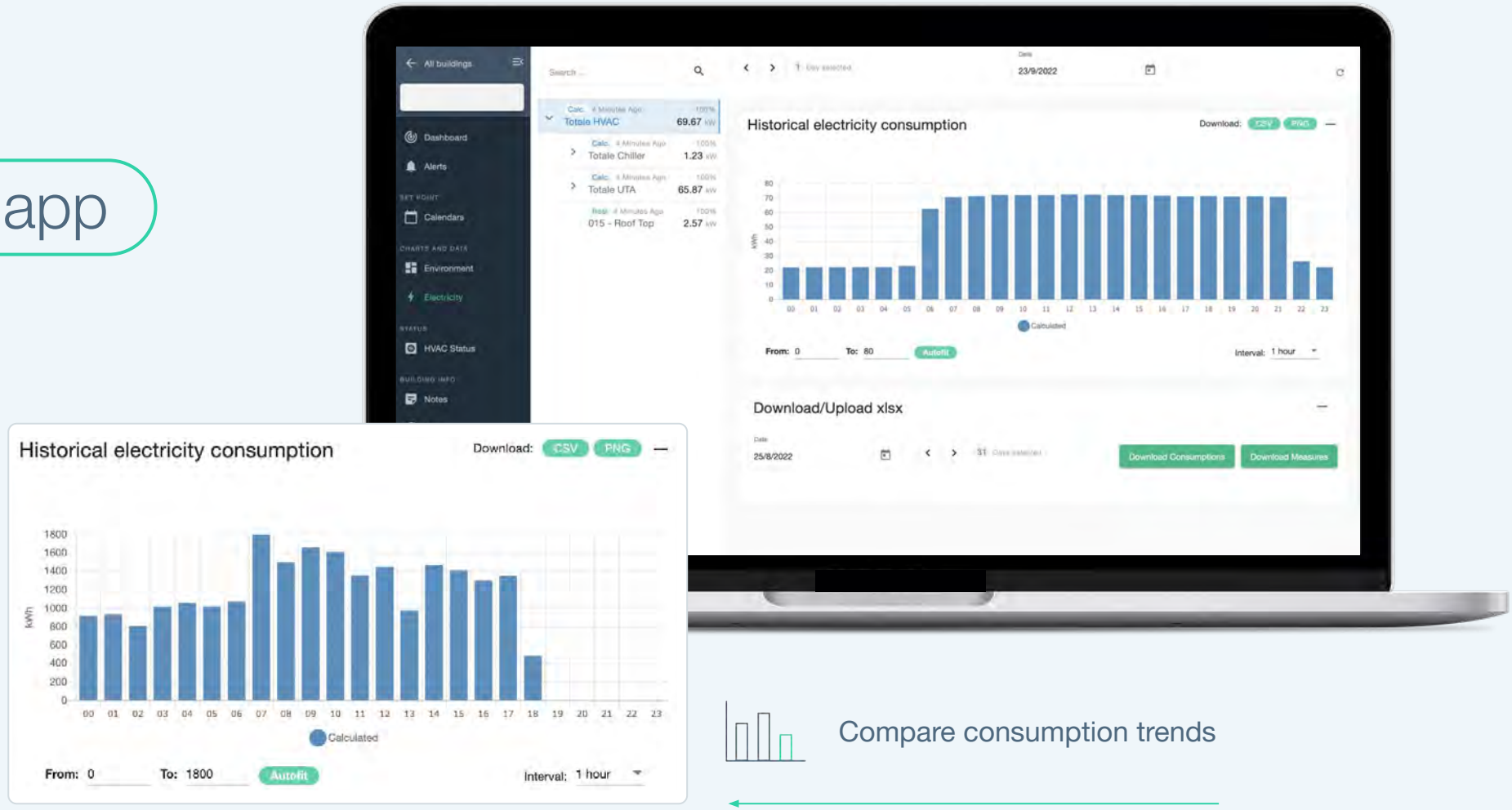
sigfox

LoRa

Enerbrain Web app

for visualization
and monitoring]
of collected data

Disaggregation of loads
to understand areas of focus



Compare consumption trends

Environmental monitoring

Never too cold or too hot again

View real-time comfort conditions

Monitoring indoor spaces using **Enerbrain sensors** allows you to **view environmental comfort parameters in real-time**

MONITORED DATA

- temperature
- CO_2
- relative humidity

- Decreased complaints
- Cloud-based data collection
- One platform for many buildings

Real-time monitoring
of internal comfort parameters

Internal temperature

CO_2 level concentration

Relative humidity

Wireless installation
in a few hours

Automatic calibration

Rechargeable or non-rechargeable
according to customer needs

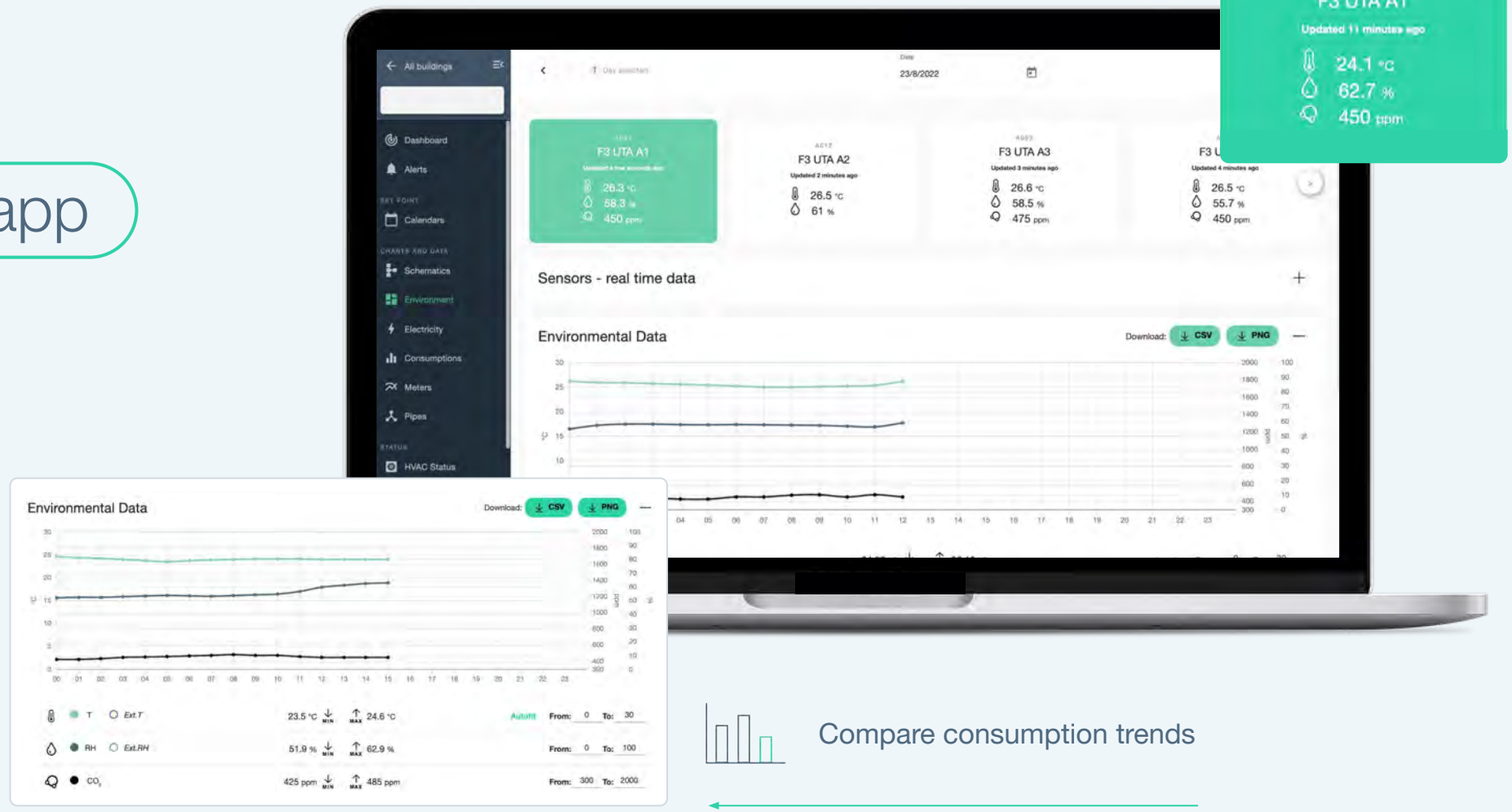
eSense

LoRa

Enerbrain Web app

for visualization
and monitoring]
of collected data

Real-time photography
of the monitored parameters



Compare consumption trends

Energy Intelligence
by Enerbrain

The creation of
customizable dashboards
based on your needs:

- **Energy and financial KPIs**
- **data available for reporting**
- **control and strategic choices**

+ Add it to your services!

Example values

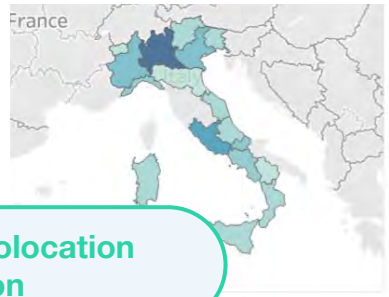
Consumption of electricity (kWh) and natural gas (Smc)

Explorable graph for multilevel analysis

Savings achieved

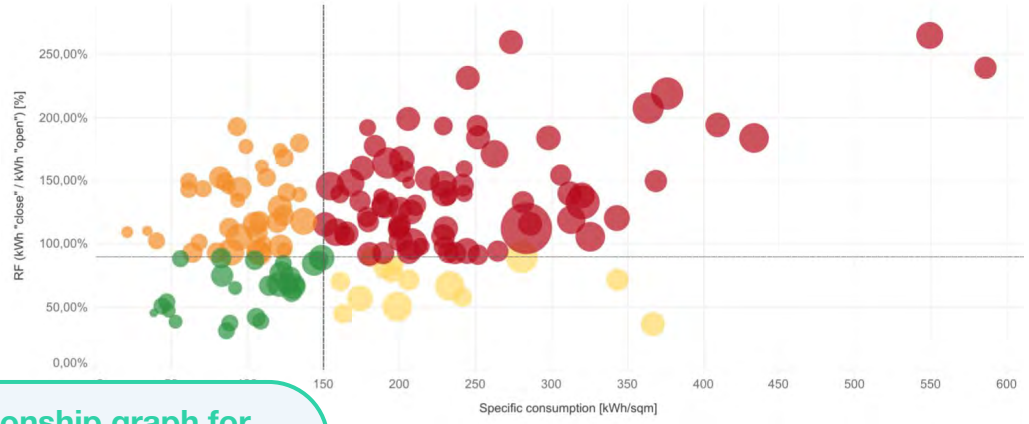
Customizable charts

Scenario analysis based on customer goals and monitored data



	# sites	Possible efficiency [kWh]	Possible efficiency [€]
High priority	38	177.796	35.559
Low priority	26	0	0
Medium priority	14	11	6
Very high priority	72	929.003	185.801

Integrated geolocation function



Navigable relationship graph for identifying critical issues

Example values

Focus on energy consumption

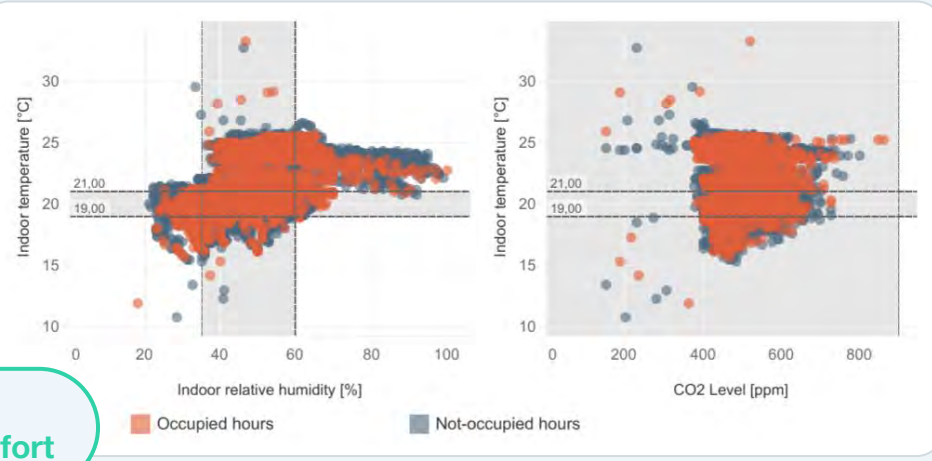
Electricity consumption

Close: 50,40%

Open: 49,60%

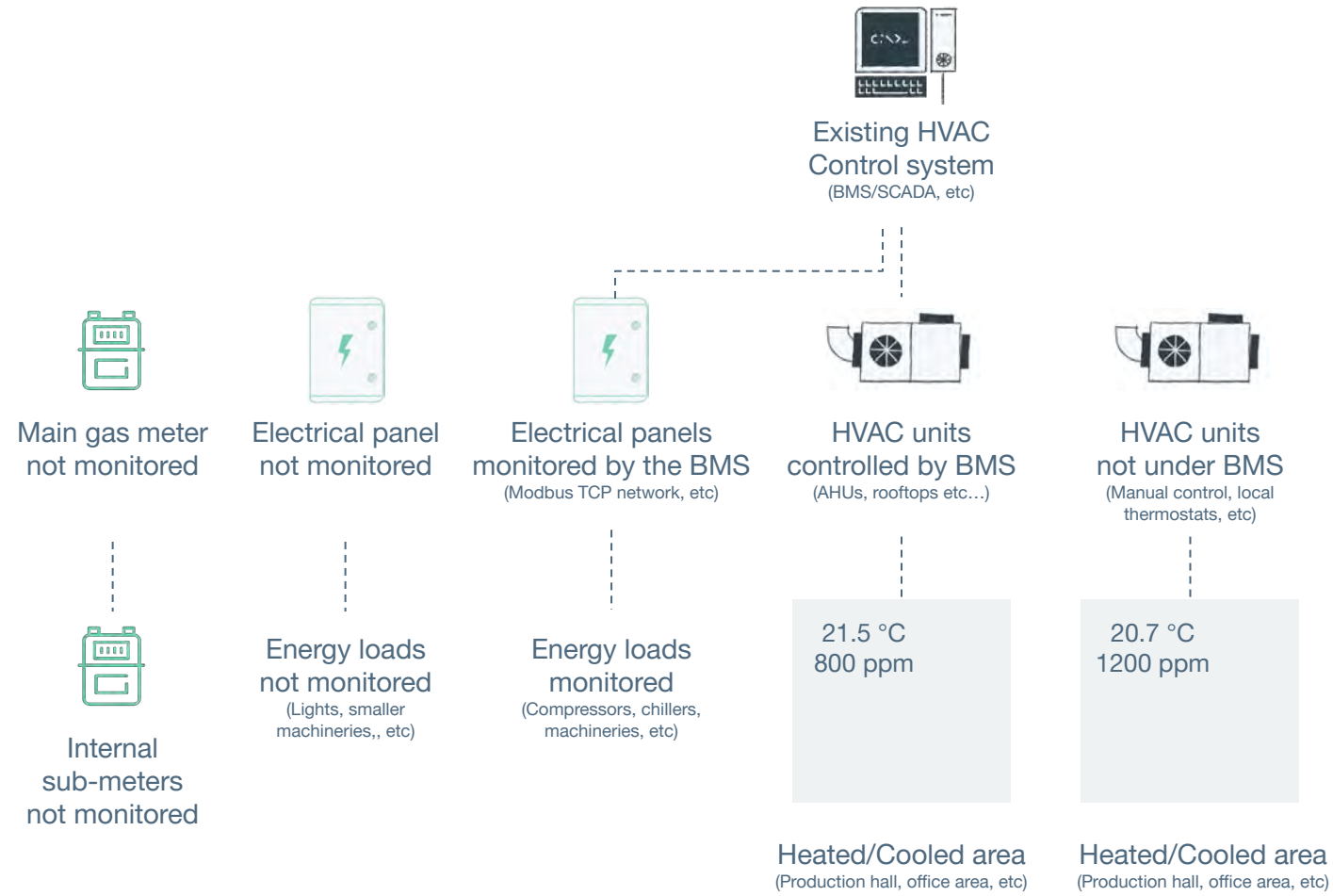
Opening time 9

Closing time 18



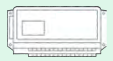
Graphs on indoor temperature and comfort

Schematic diagram of a typical HVAC assets



This diagram summarizes the typical structure **of an industrial plant**

Schematic diagram of a typical EB implementation

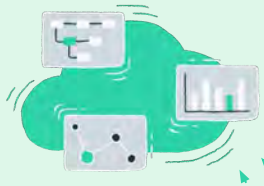


Pulse metering
Local pulse metering system to read gas consumption

eMeter
Local energy monitoring with CT-Clamps or Rogowski coils

Existing HVAC Control system
(BMS/SCADA, etc)

eGateway
Integration of control system directly in the existing BMS to exchange data to the Cloud



Enerbrain Cloud
Cloud database with cloud computing and algorithms to control and optimize the HVAC system

Enerbrain Web App
Web based control system to visualize data and the desired set set-points

Main gas meter not monitored

Electrical panel not monitored

Electrical panels monitored by the BMS
(Modbus TCP network, etc)

HVAC units controlled by BMS
(AHUs, rooftops etc…)

HVAC units not under BMS
(Manual control, local thermostats, etc)

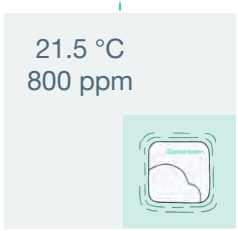
eNodes/ePLC
Integration of control system directly to HVAC components to exchange data to the Cloud

APIs
Data is available via REST APIs

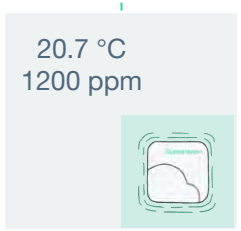
Internal sub-meters not monitored

Energy loads not monitored
(Lights, smaller machineries,, etc)

Energy loads monitored
(Compressors, chillers, machineries, etc)



Heated/Cooled area
(Production hall, office area, etc)



Heated/Cooled area
(Production hall, office area, etc)

eSenses
Additional sensors to detect temperature, relative humidity, CO_2

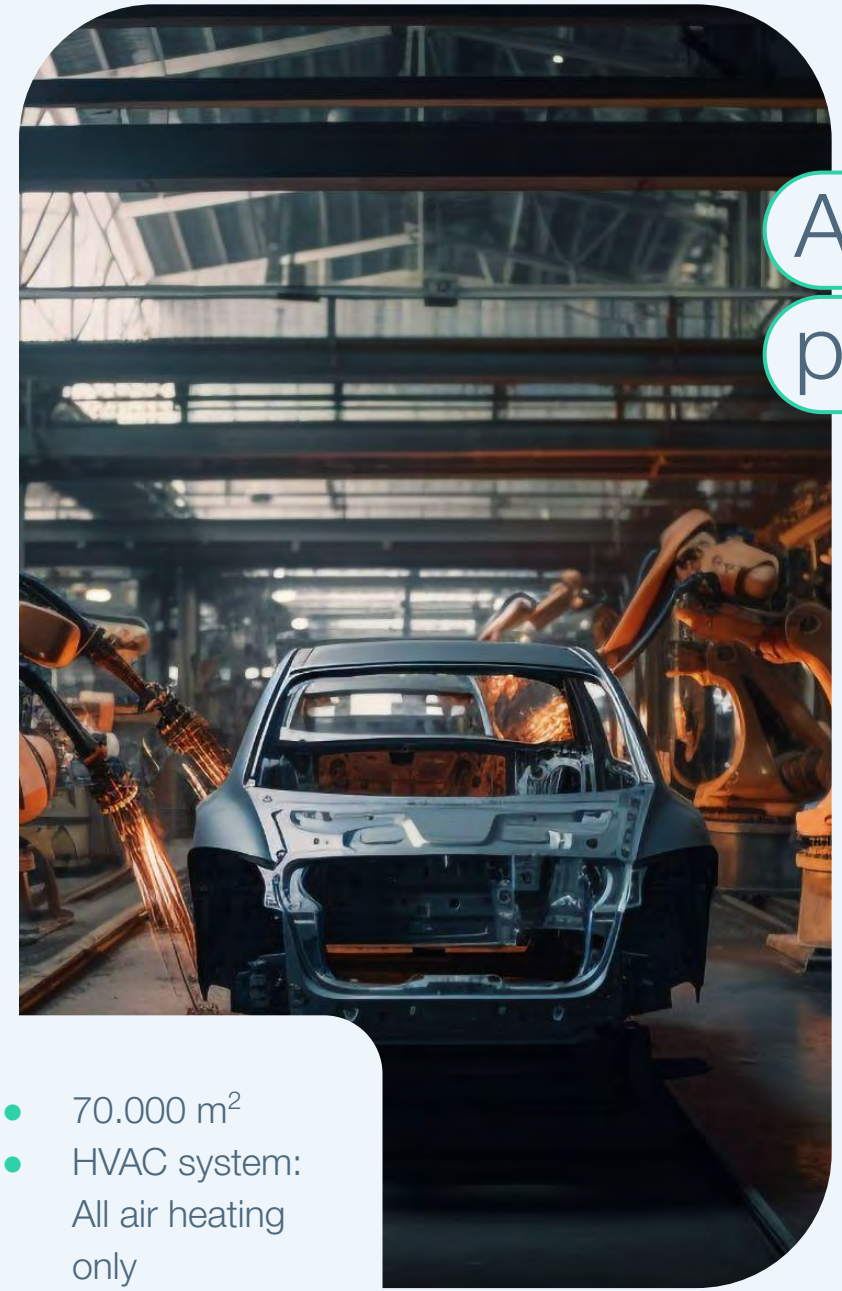
This schematic summarises the options to activate:

Energy Monitoring
Environmental Monitoring
HVAC energy efficiency

An efficiency project

HVAC system optimization and consumption awareness

The case of an industrial plant



Automotive plant

Automotive plant recognized internationally for the efficiency of its processes and its constant search for innovative and environmentally friendly solutions.

- 70.000 m^2
- HVAC system: All air heating only

Goal

Using existing HVAC hardware peripherals to optimize the ventilation and heating system of a large industrial production.

Results

EFFICIENCY

6%

Thermal energy savings

limited to existing steam generators do not allow direct control

EFFICIENCY

36%

Electricity energy savings

SUPERVISION

24h/24

Remote control

CONTROL

+500

points integrated with Enerbrain Algorithm in Cloud

Our **intervention**

Optimization of the ventilation and heating system

System control with thermal loads in very high environments (furnaces)

Use of existing hardware peripherals

Movicon System on Modbus Protocol

Control over:

10 flow controllers
17 support panels
for **134** destratifiers
21 AHUs

Separation of the warehouse into thermal zones of competence

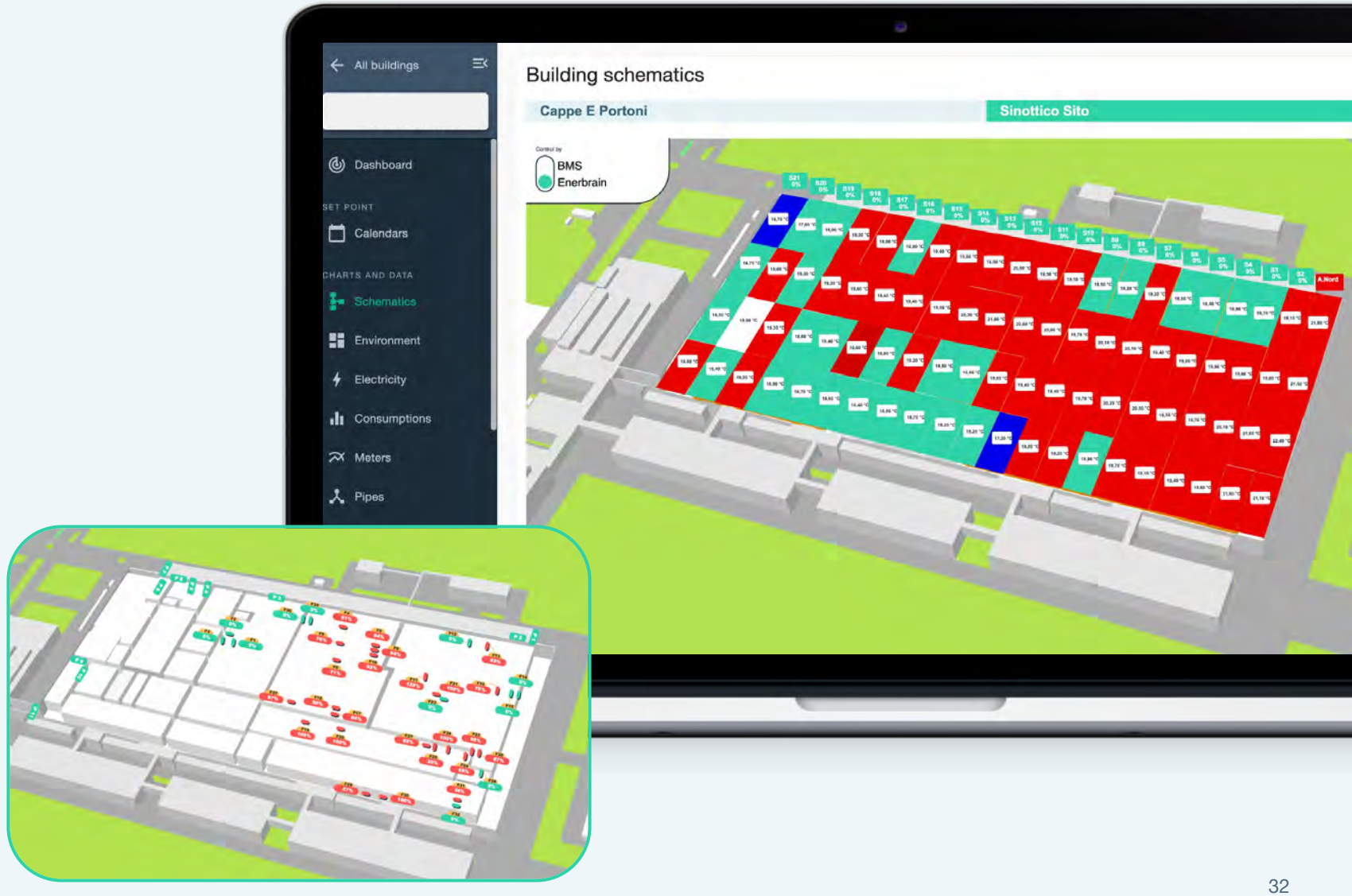
Technological innovation and non-invasive integration

in the service of sustainability

Customized synoptics

One tool for plant visualization

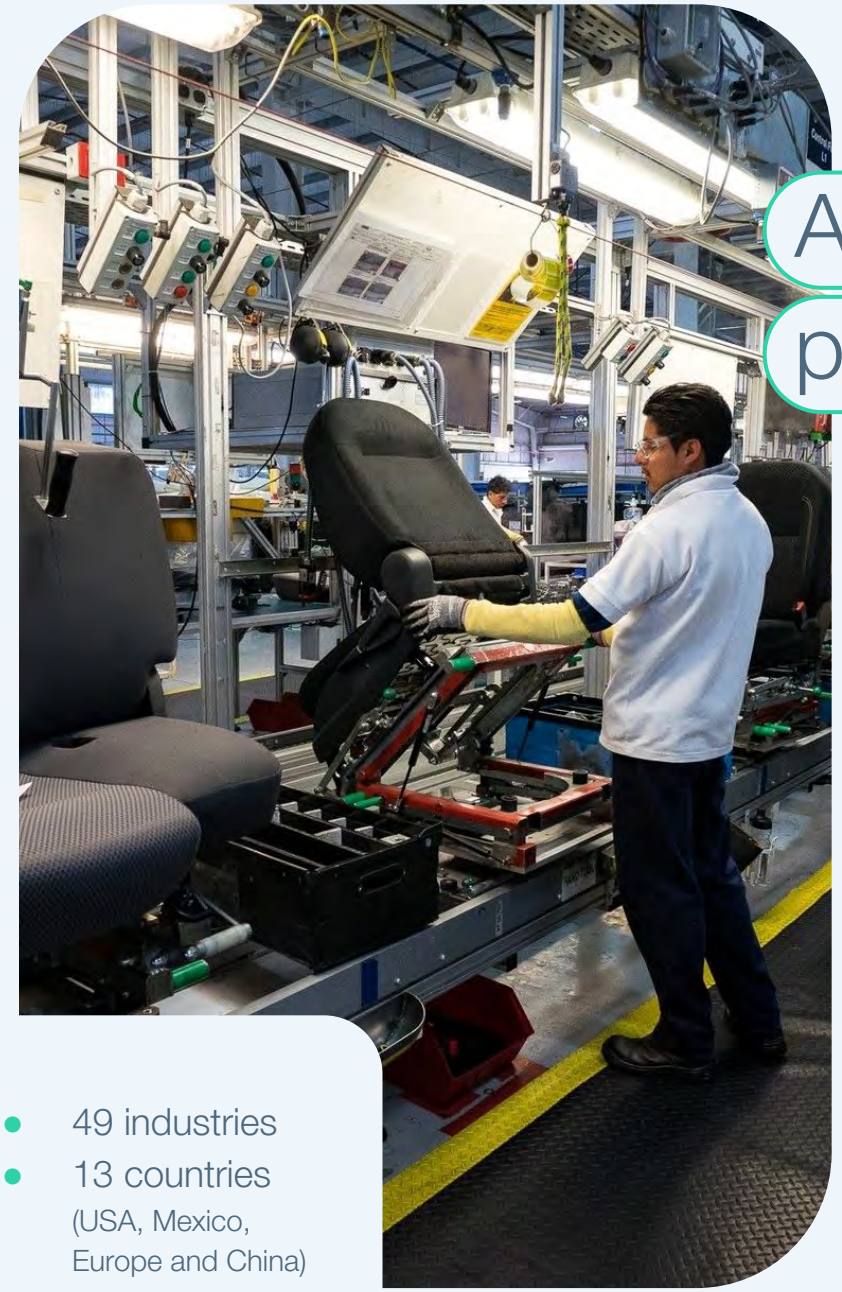
- Real-time photography of monitored conditions
- Comparison and download of measured data
- Control and setting of calendars with internal comfort setpoints



An efficiency project

A practical example of a roll-out

of a large global industrial customer



Automotive plant

World leader for automotive industry components.

- 49 industries
- 13 countries
  (USA, Mexico, Europe and China)

Goal

Create a global platform for energy monitoring and efficiency to be installed in 49 factories in 13 different countries.

Results

EFFICIENCY

15%

Average energy savings
on the HVAC share
achieved so far during implementation

SUPERVISION

24h/24

Remote control

CONTROL

> 4.100

electrical loads monitored

RETURN
OF INVESTMENT

under 3 years

The needs
of the Client

Energy knowledge and monitoring

disaggregation in the detail of electricity and gas consumption

Optimization of HVAC system operation

MONITORING

Measure at least 80% of consumption (electricity + gas)

Global integration without invasive changes

Detailed knowledge of energy use

to compare specific KPIs

HVAC EFFICIENCY

with a minimum savings by 10%

Our **intervention**

Turnkey solution

From inspection
to commissioning

The implementation
of the monitoring system

Movicon system on
Modbus protocol

Automatic ventilation
and heating control
to reduce HVAC costs

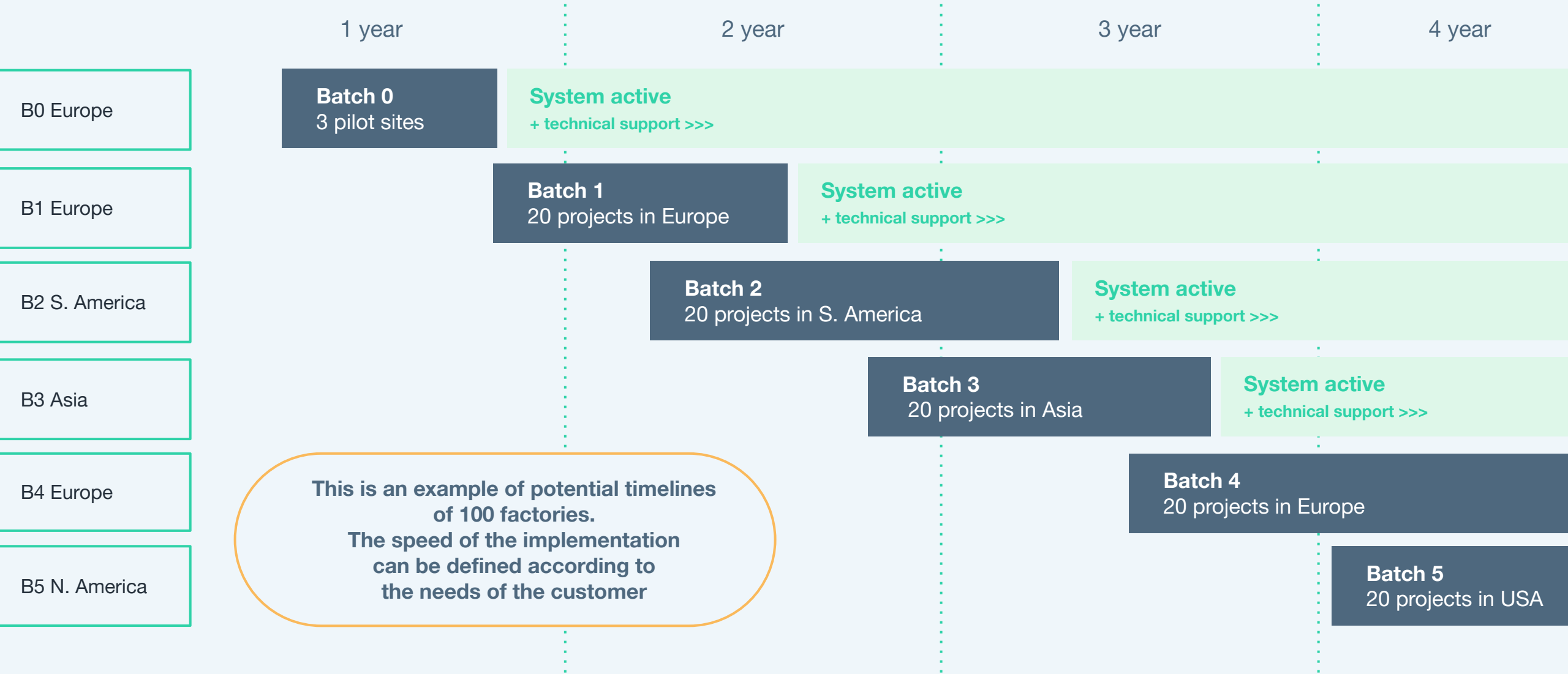
Server to server
API service

Technical support
for the system

for the next 10 years
(minimum)

Step installation

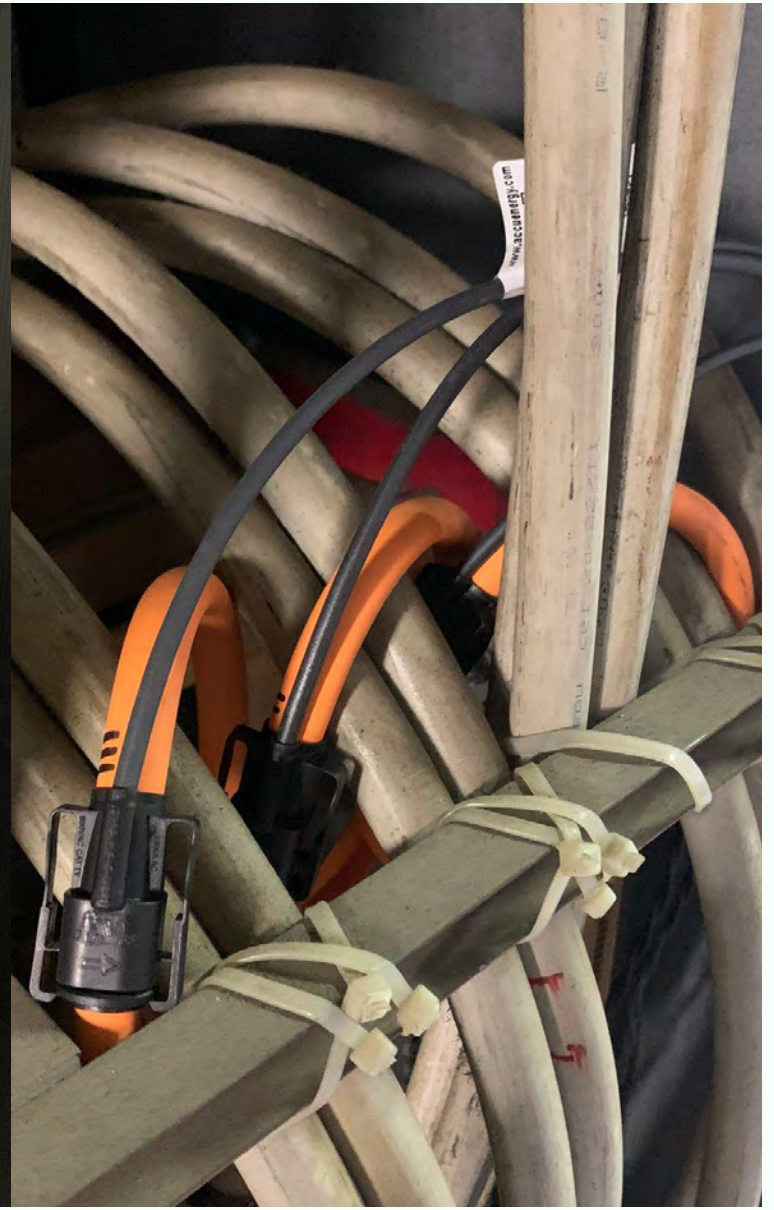
Example of a possible **roll-out**



Automotive factory producing seat components

Environmental and energy monitoring

eSense and eMeter positioning



HVAC optimization

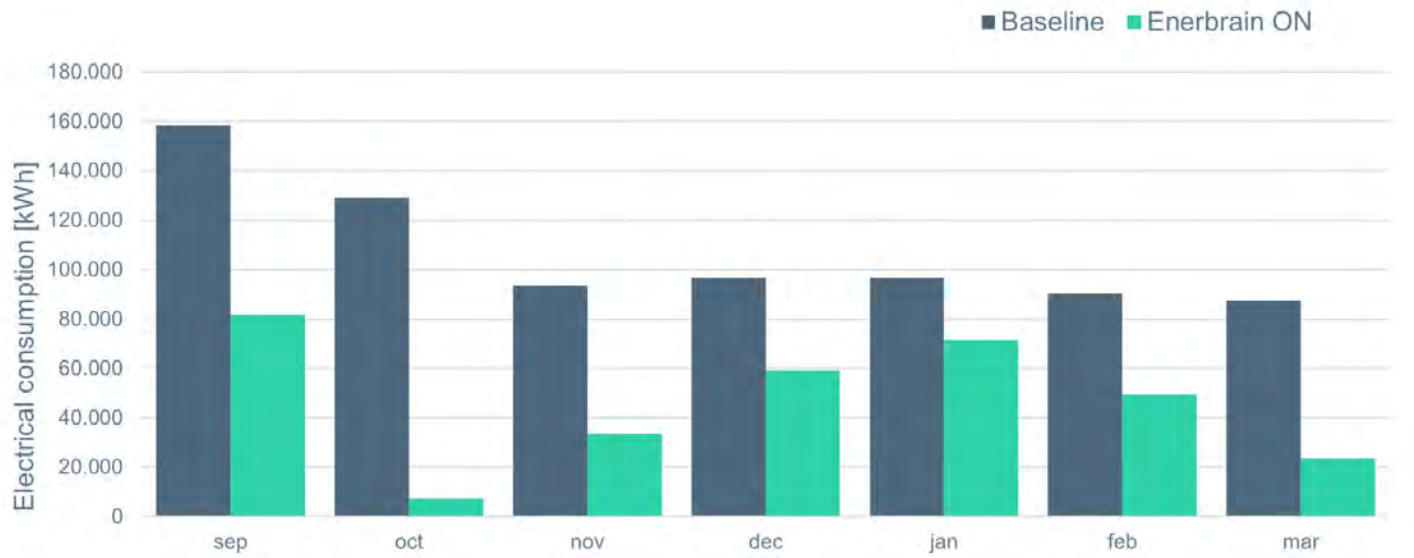
AHU 1&2 retrofit with ePLCs

Industry

Michelin

Monitoring on 500.000 m^2
Regulation on 35.000 m^2
HVAC consumption: 600.000€
Plant: all air conditioning and heating

Relationship between weekly consumption and outdoor temperatures during the test



Results

40%
Annual energy saving

1.030t
CO_2 not emitted in one year

85%
Time in comfort

Industria automotive

energy monitoring

Country: Poland
N. buildings: 1
Area: 7.000 mq
Total Energy Consumption:
2.400.000 € / year

BMS:
Present
(Siemens Desigo - 2012
not integrated with monitoring systems)
Energy monitoring:
Present (monitoring system only for total electricity consumption).
Gas and water are not monitored

Customer characteristics and needs

The client, being a TIER 1 Automotive supplier to major automakers, has the need to:

- **monitor all production lines** in order to be able to report to its customers the CO_2 emissions generated by the production of each individual component,
- embark on a path of **decarbonization and consumption reduction.**

Suggested Enerbrain services

- **Energy Monitoring**
  Disaggregation of consumption of major electrical loads (loads greater than 160A), as well as reading gas and water consumption.

What we could install

- **Modbus RTU eGateway:** to read consumption data from an existing multimeter installed on the general switchboard
- **4 eMeter CORE with CT and Rogowski clamps:** the production line is divided into 4 macro sections, each with a dedicated low voltage electrical panel from which all the 3-phase loads to feed the various stages of the production line (e.g., washing, welding, lathe, etc.) start. Enerbrain would install 1 eMeter with 15 ports available in each electrical panel, and for each line it has identified 5 three-phase loads to monitor, from 200A up to 1200A for larger loads.
- **1 ATEX LoRa pulse counter:** to monitor gas consumption, it was requested by the customer to have a pulse output from their gas meter, and with this device they could read the pulses by aggregating them in the platform every hour.
- **1 LoRa pulse counter:** to monitor in water consumption from 2 meters
- **1 LoRa gateway:** needed to read all data from LoRa devices

Possible expense

CAPEX: 24.400 €	**OPEX:** 2.900 € / year

EXPECTED RESULTS

4%
Energy saving
Through strategic choices based on the data collected

20
three-phase monitored loads
in this case from 200A up to over 3000A

1
ATEX gas meter monitored

2
water meters monitored

Industria automotive

HVAC optimization

Country: Poland
N. buildings: 1
Area: 13.000 mq
HVAC consumption: 680.660 kWh
Aerotherm gas bill: 88.300 €

HVAC plant:
Heating: **22 gas-fired unit heaters** (each with thermostat adjusted by hand by operators, no automation)
BMS:
Not present
Energy monitoring:
Not present

Customer characteristics and needs

Need to improve comfort and reduce gas consumption.
Unit heaters in the production area are loosely managed with "hand" adjusted thermostats forgotten turned on at the wrong times or with setpoints at the discretion of the nearest operator. To prevent tampering, the maintenance man has locked some thermostats, creating complaints. **A new BMS will be too expensive.**

Suggested Enerbrain services

- **HVAC Optimization** with replacement of 22 thermostats with smart controllers connected via Modbus. The client will have to do the Modbus wiring, but once wired the system will be controllable by the Enerbrain Algorithm and Web App.
- **Environmental monitoring** to improve indoor comfort and reduce complaints

What we could install

- **22 industrial smart thermostats:** replacing the existing thermostats is critical to better control comfort
- **eGateway Modbus:** to read data from all the meters *(excluded from the offer is the laying of the modbus cable, which will be done by the site FM maintainer)*
- **1 ATEX LoRa pulse counter:** to monitor gas consumption from the general meter. Access pulse output from the meter will be requested from the gas supplier
- **22 eSense:** a sensor will be added in each area served by the unit heaters, so that both the T recorded by the thermostat and the T of the neighboring area will be available, increasing granularity.
- **1 LoRa gateway:** needed to read all data from LoRa devices

Possible expense

CAPEX: 35.000 €	**OPEX:** 3.400 € / anno

ROI for the Enerbrain solution

1 years and 8 months

EXPECTED RESULTS

26%
Energy saving

80%
Time in comfort
Avoiding overheating during the heating season thanks to the Algorithm in Cloud

enerbrain®

Ready for an intelligent use of energy?

Discover more

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Enerbrain