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Giuseppe Giordano
Founder & CEO

www.enerbrain.com

Your innovation partner for a sustainable future

40% of the world's energy is consumed **by buildings**

US Green Building Council

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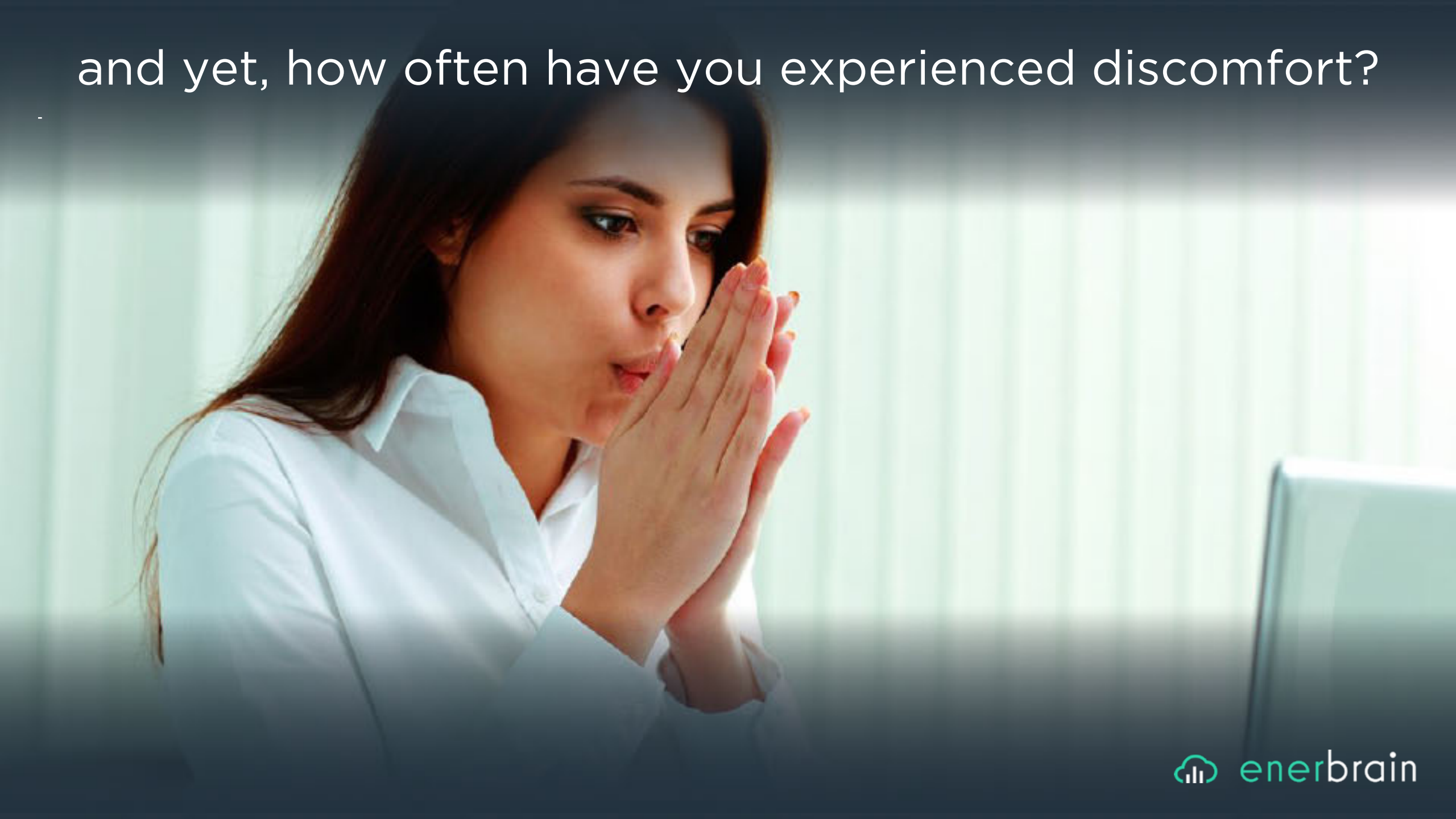
and yet, how often have you experienced discomfort?



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indoor air quality impacts **performance**

Taking a test in a room with high **CO_2** results in **50% increase in mistakes**

HEALTH, WELLBEING & PRODUCTIVITY: The impact of green buildings on people and profit, 2016

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and it affects businesses' **bottom line**

In a mall, when dwell time doubles
sales increase by 130%

Time is Money. Shoppers buy more when they stay longer. Pathintelligence

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most HVAC systems are not up to the task

Do not monitor T, Co2 and humidity in real time

Require constant supervision by trained staff

Proprietary and expensive upgrades and maintenance

Image credit: Mattias Adolfsson

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So what?

... High level of energy costs

... Low level of comfort

... Strong dependency from system producers

... Difficult management of building portfolio

Enerbrain turns wasteful buildings into **sustainable ones**

EFFICIENCY

30% energy savings and significant CO_2 emissions reduction

COMFORT

Productivity increase & less sick hours

ENGAGEMENT

Promote Social Corporate Responsibility

Savings calculated according to UNI EN 15603

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Energy Cloud: our **HVAC IoT retrofit** solution

Self-learning Algorithms

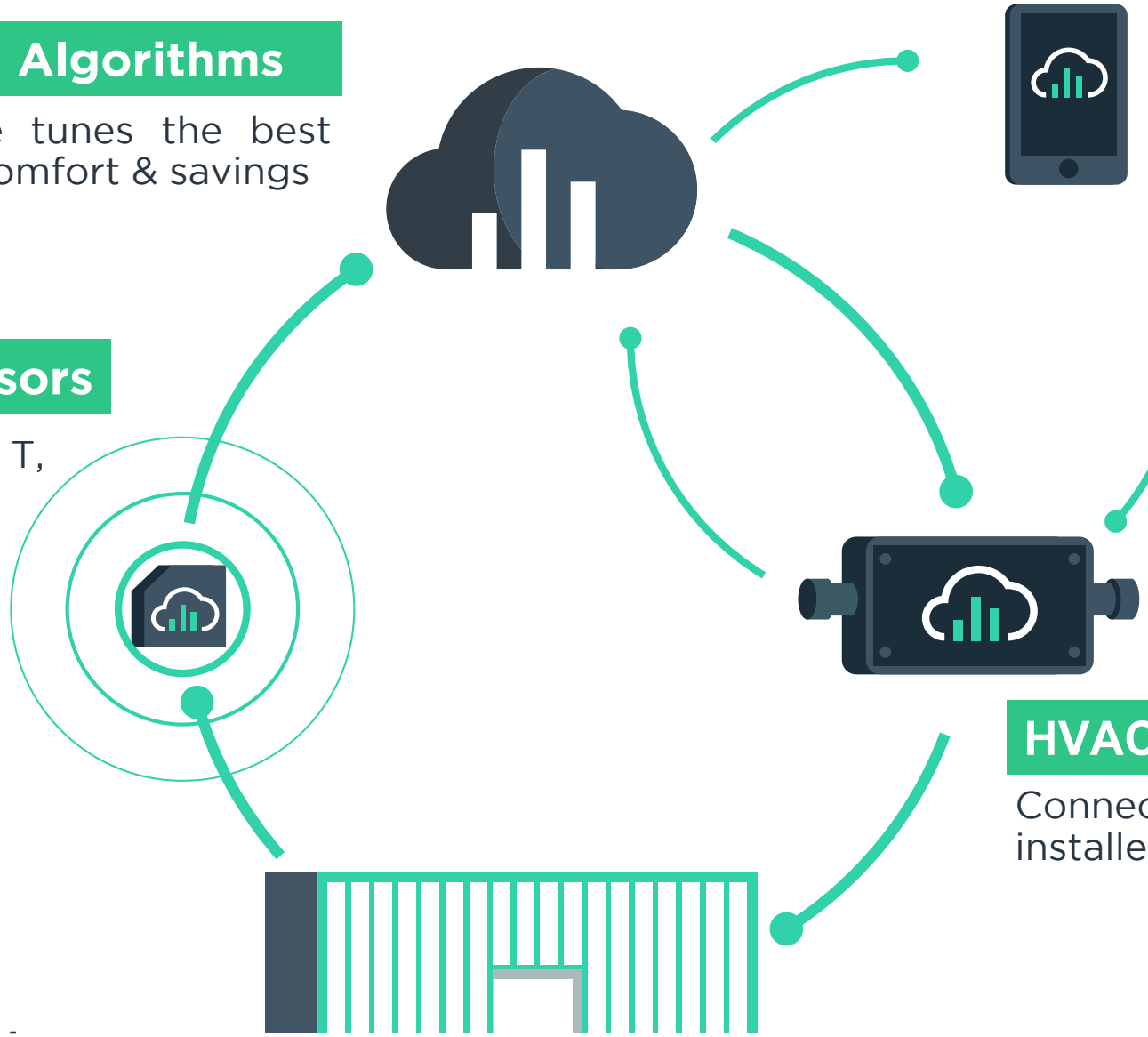
Dynamically fine tunes the best parameters for comfort & savings

Mobile App

Remote management from any mobile device

Environmental Sensors

Monitor occupancy, CO_2, T, humidity & air quality



HVAC Actuators

Connected to the cloud and installed on any HVAC system

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Sensor - eSense

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T, RH, CO_2 every 10'

Sigfox connectivity

SIGFOX
One network A billion dreams

4 Year Battery Life

Already configured

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Algorithms – Energy Cloud

Integration through API

PID + fuzzy logic

Input from indoor, weather & historical

EU patent pending

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Actuators - eNode

-

Remotely controls valves & air gates

Encrypted communication

3G connectivity

SORACOM

SW & HW bypass, electrically failsafe

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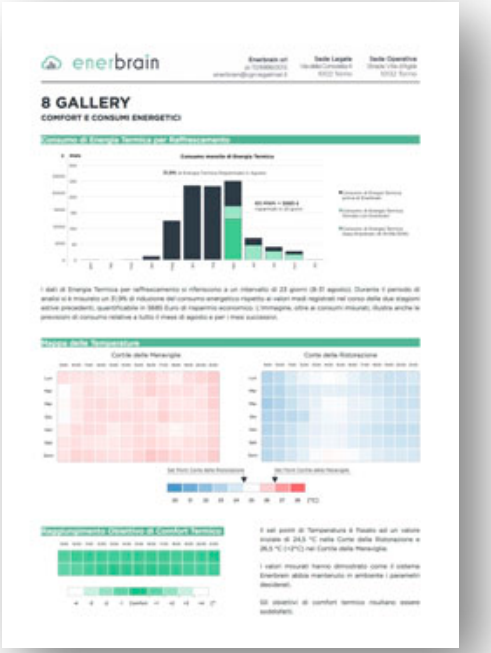
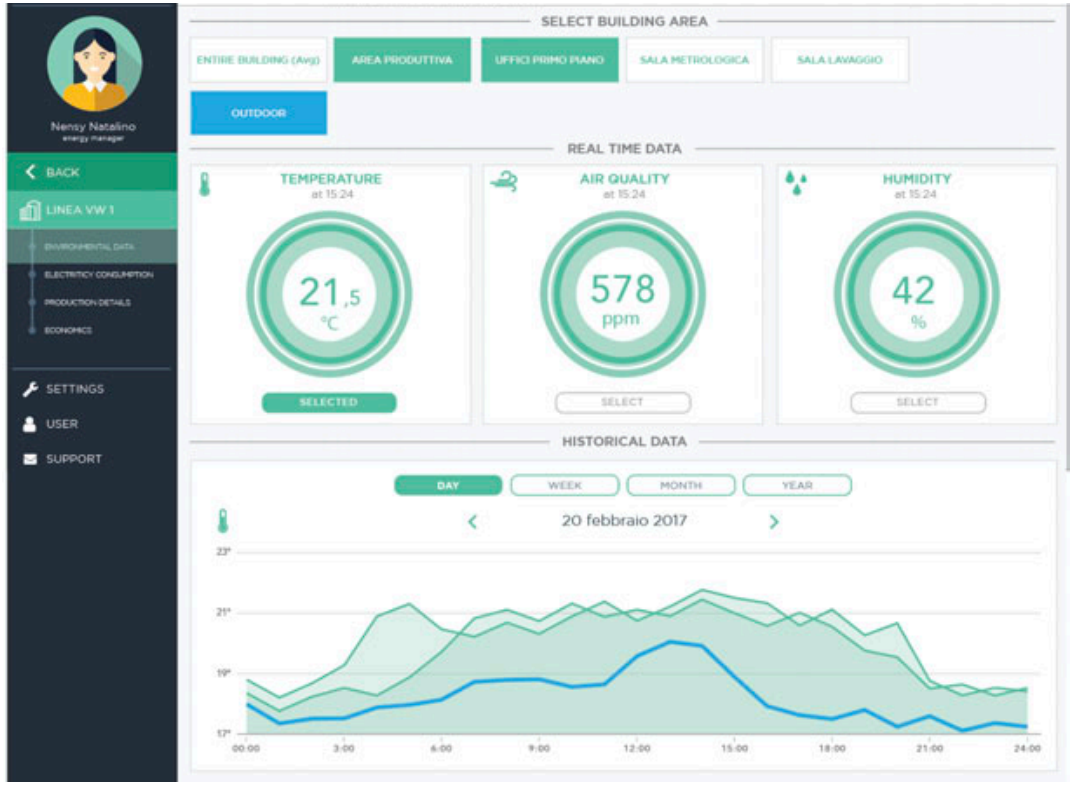
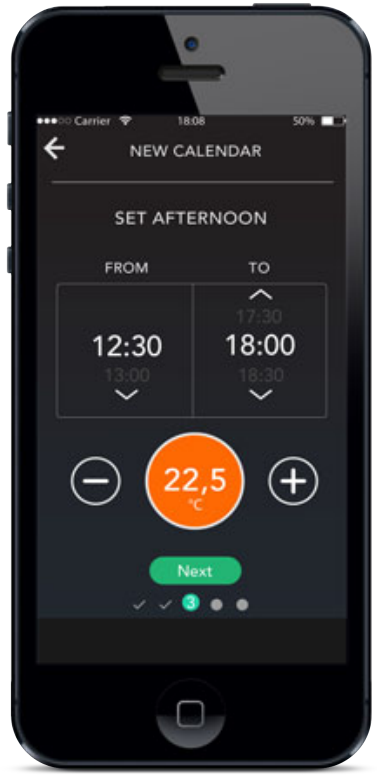
Reports, Dashboards and App







Detailed reports

Portfolio Management

Real time monitoring

Remote access

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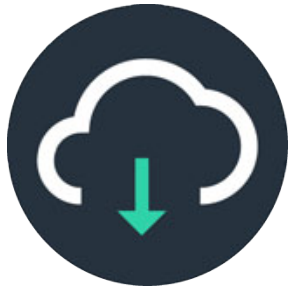
Enerbrain in three key points

Flexible

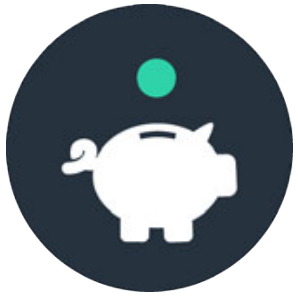
Suitable for any system:

- 100% compatible with any HVAC system
- Non invasive 2 days installation



Advanced

Self-learning algorithms with automatic actuation of hardware systems



Profitable

High redditivity rate

- NPV and IRR
- WIN-WIN solution

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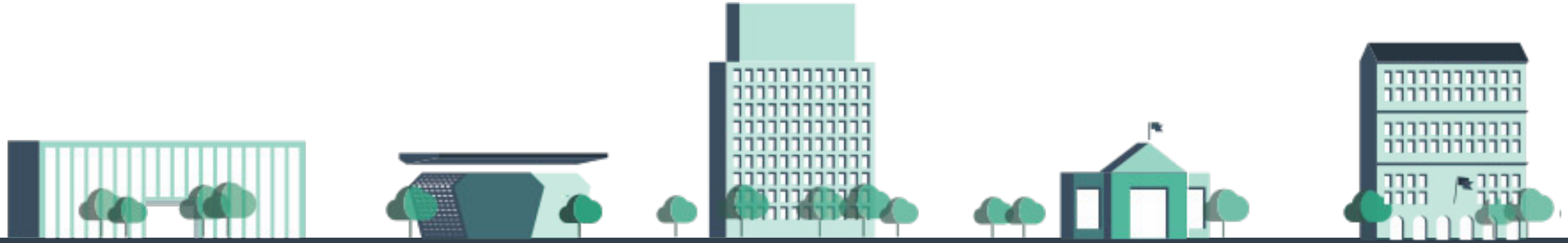
Target verticals



Retail | **Airports** | **Office** | **Venues** | **Public Administration**

target building spends > **100k €/yr** in heating & cooling

seeking **partnerships** with real estate companies and utilities

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Enerbrain's Customers

-

AUTOGRILL

8 Gallery LINGOTTO

Collegio Universitario Renato Einaudi Torino, 1935

FCA FIAT CHRYSLER AUTOMOBILES

SH SCUOLA HOLDEN Storytelling & Performing Arts

TEATRO STABILE TORINO

Carrefour

SAN MAURIZIO 1619

ENDURANCE FONDALMEC

edp

BIARRITZ

QUIKSILVER

LAAX Flims Laax Falera

PLANET THE SMART CITY

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Case Study – 8 Gallery

Mall
Torino, Italy

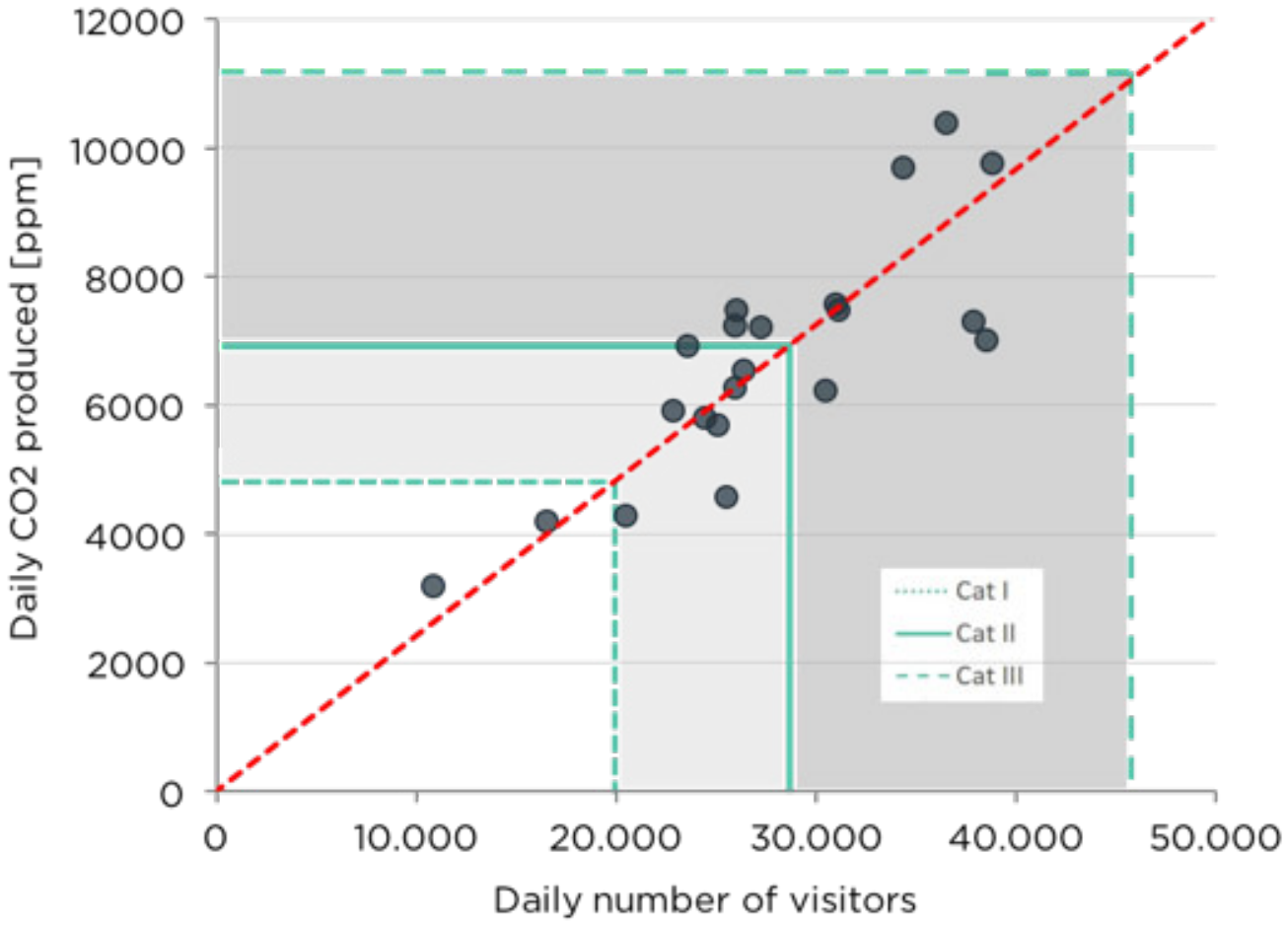
35% Energy Saving

30.000 sqm

2 Days installation

100% **Comfort**

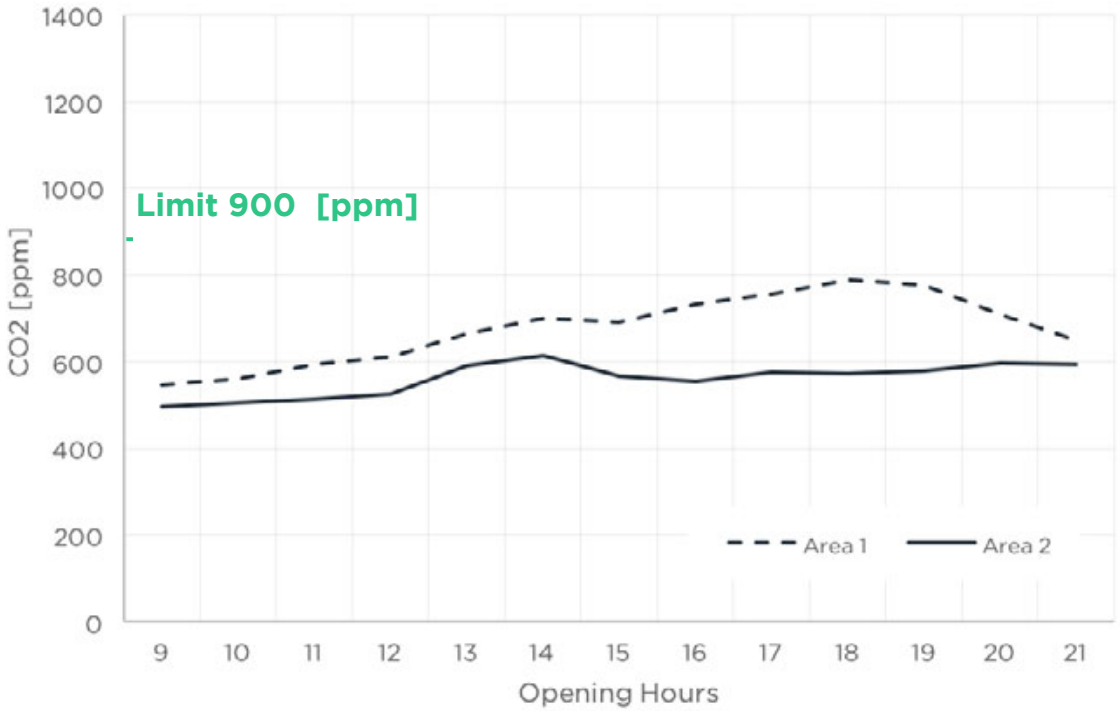
High level of air quality degradation due to visitors



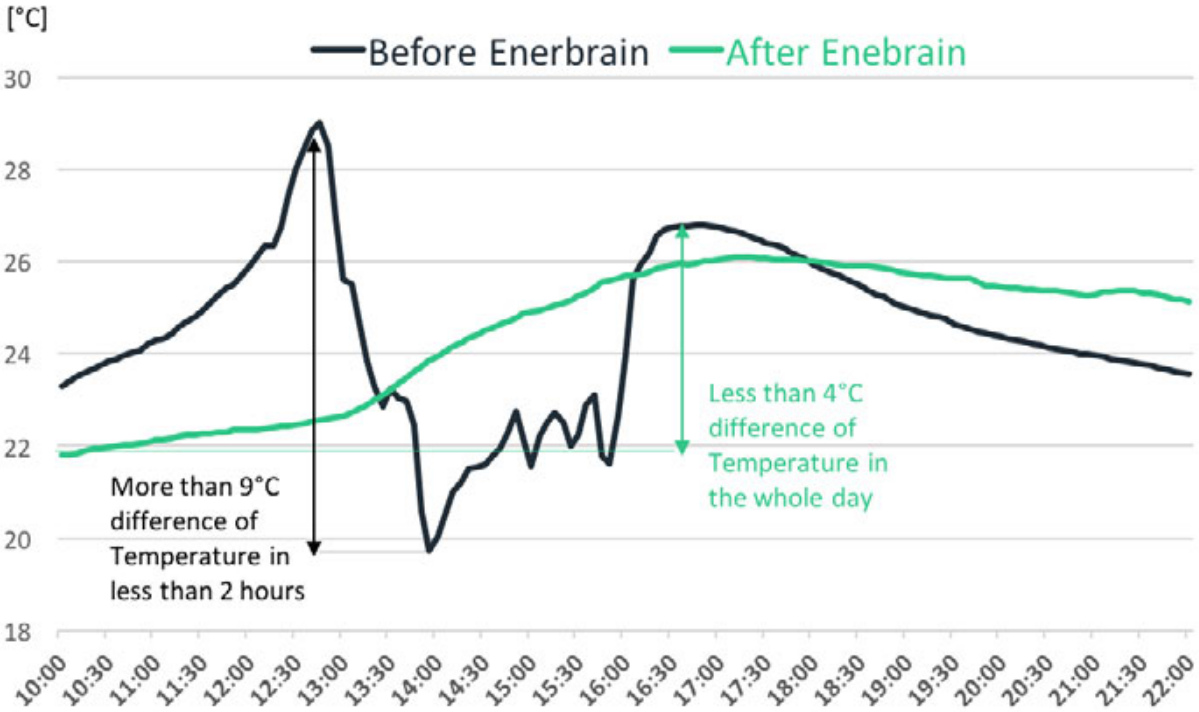
During peak hours in the food court CO_2 levels reached 2.000ppm because of manual management of air circulation

Air quality improvement thanks to Enerbrain

Air circulation is automatically managed below law limits by Enerbrain

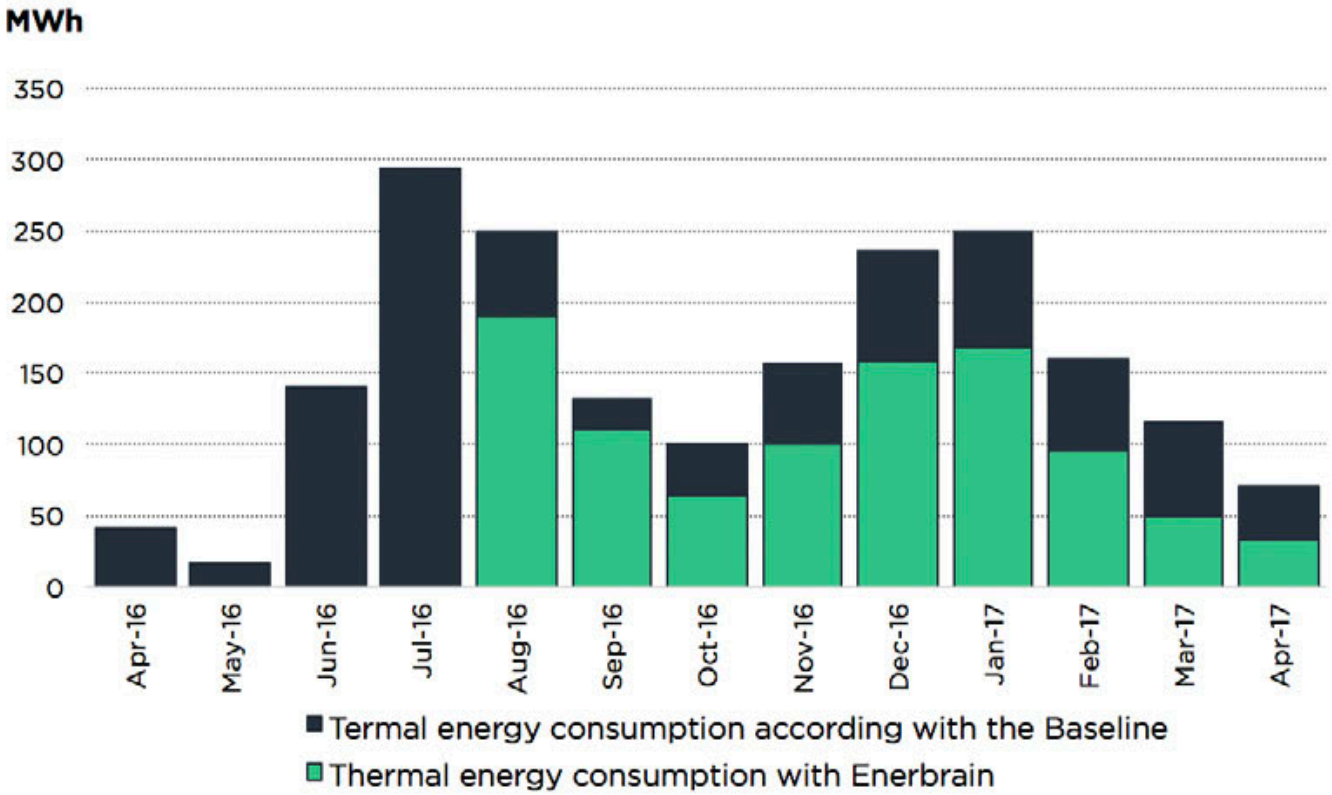


Indoor temperature variations during lunch are offset by Enerbrain



Over 35% energy savings, all seasons

Thermal energy consumption before and after Enerbrain



Savings:

Aug	31,5%
Sept	16,0%
Oct	35,5%
Nov	35,5%
Dec	32,9%
Jan	32,5%
Feb	40,1%
Mar	57,0%
Apr	54,6%

Savings calculated according to UNI EN 15603

Case Study – Autogrill

Restaurant + Retail
Ceriale, Italy

31% Energy Saving

1.000 sqm

4 Hours installation

100% **Comfort**

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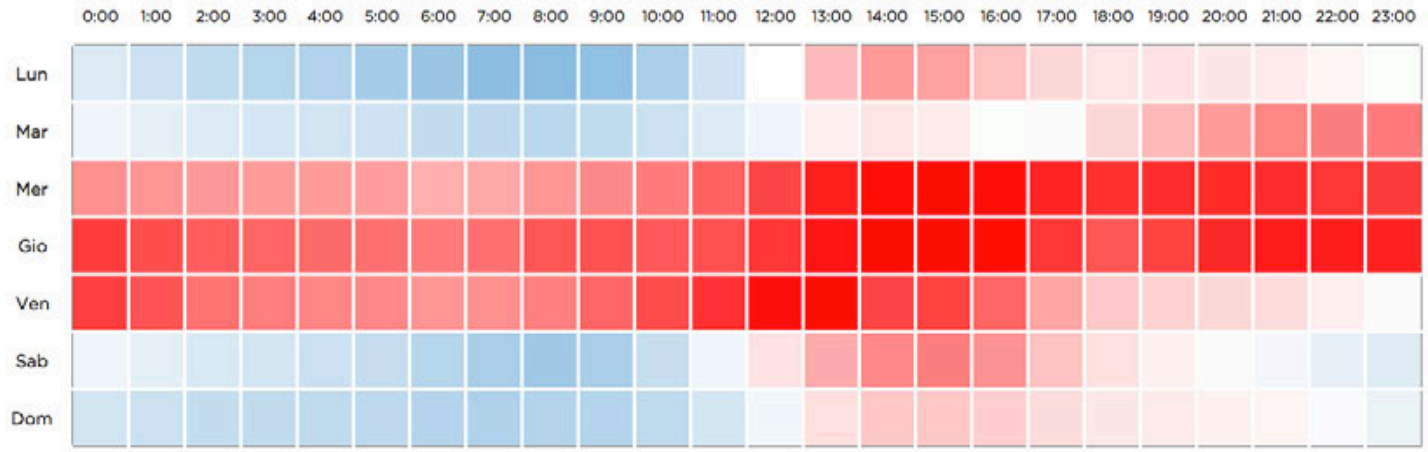
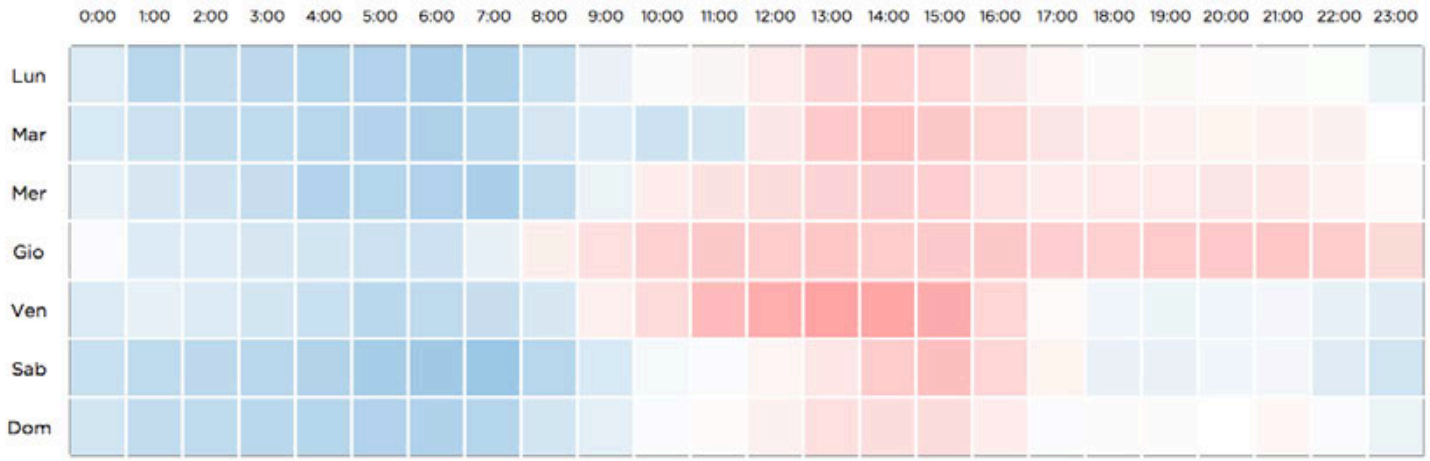
No more waste due to manual HVAC management

Pre Enerbrain



Post Enerbrain

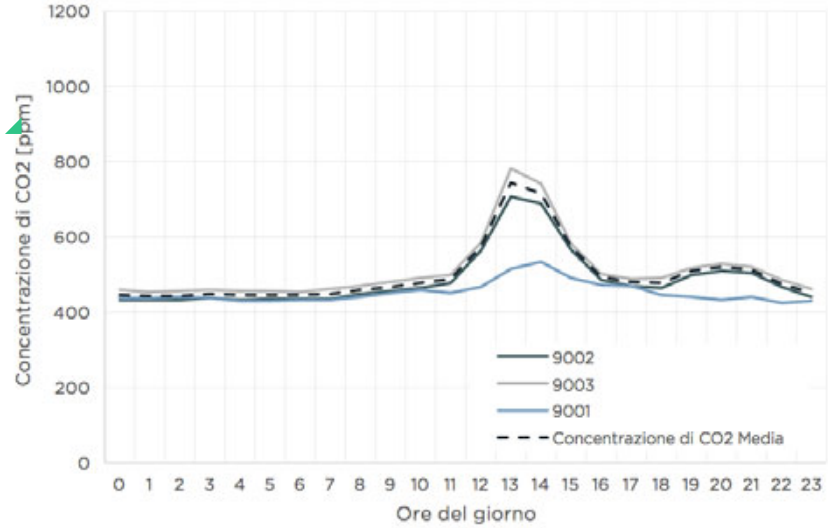


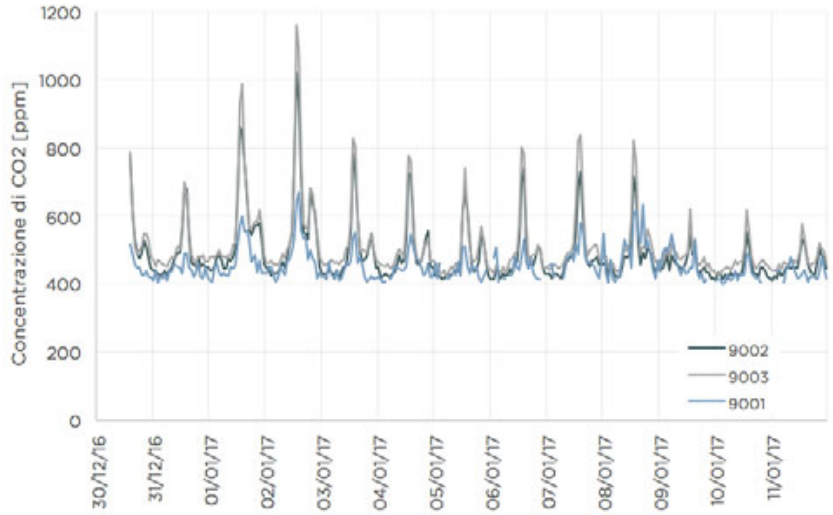
Hourly T measurements during one week

Improved air circulation during peak hour

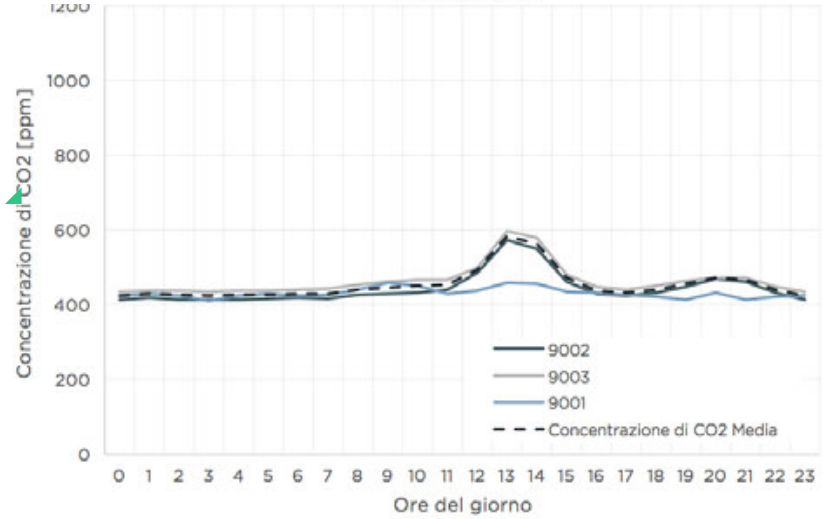
Daily and weekly CO_2 measurements

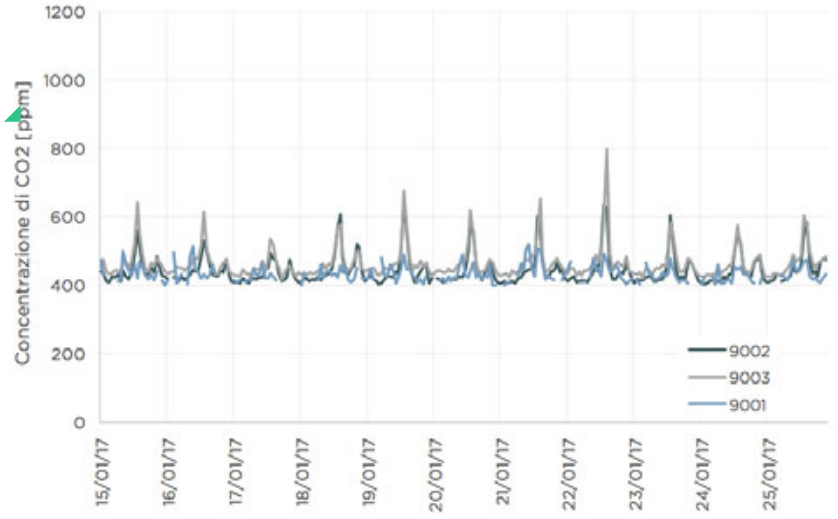
Pre Enerbrain





Post Enerbrain

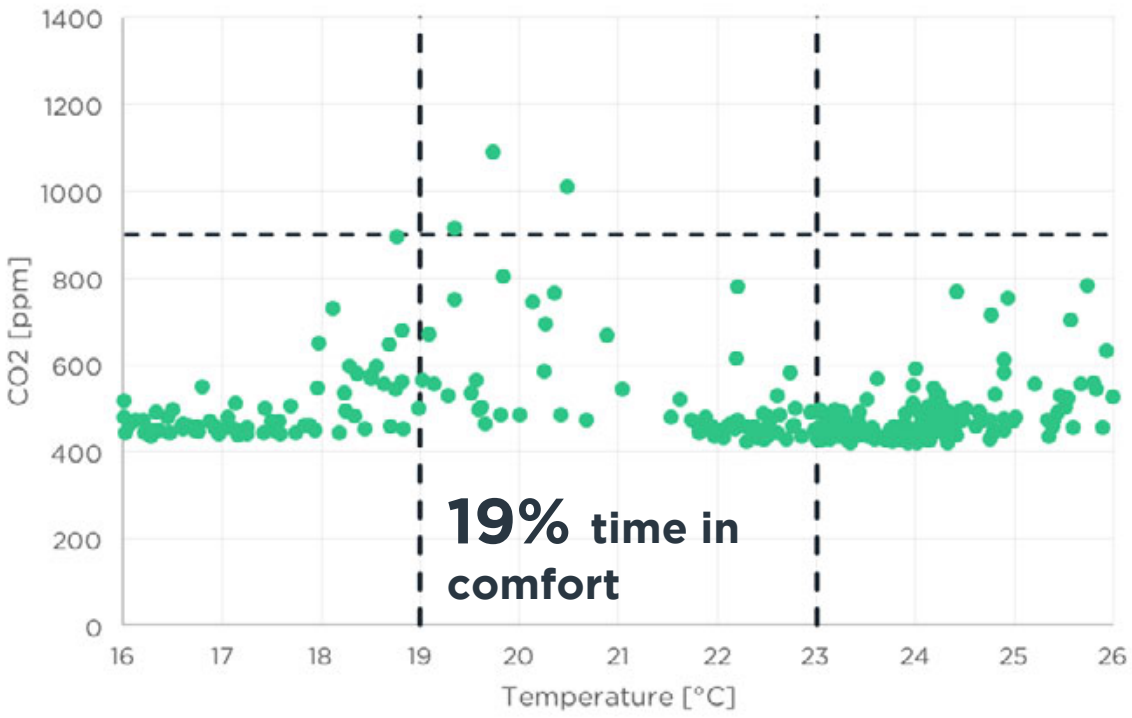




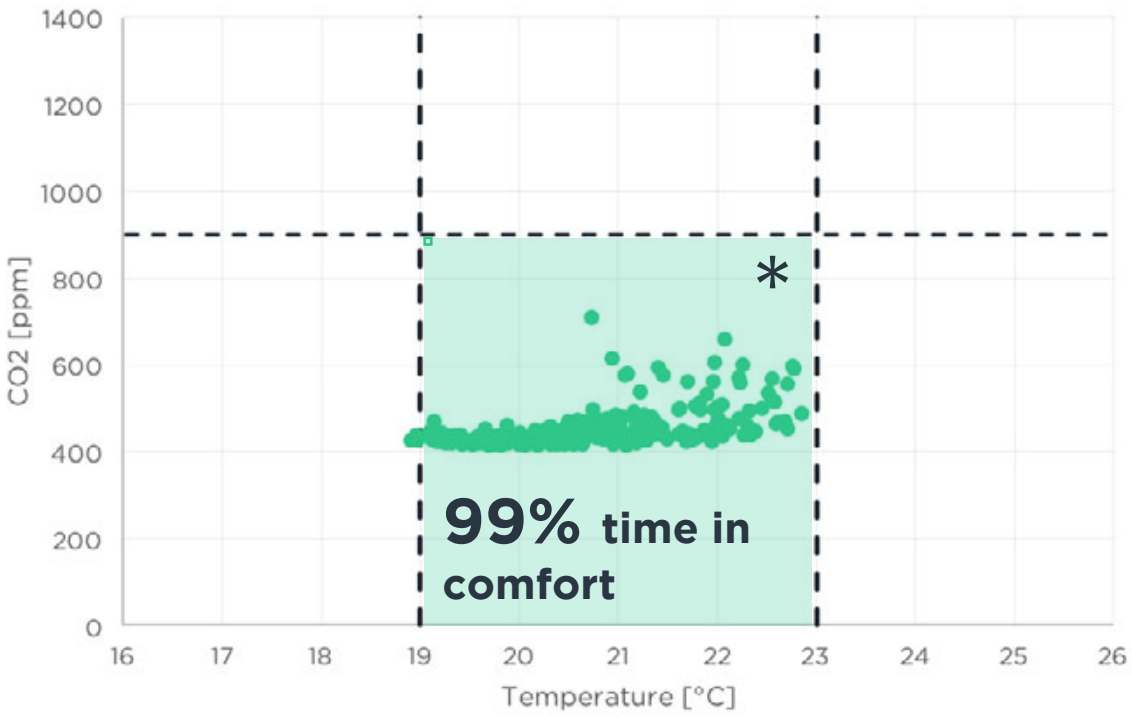
Improved time in comfort thanks to Enerbrain

Hourly comfort monitoring during a week (7days x 24h, T and CO_2)

Pre Enerbrain



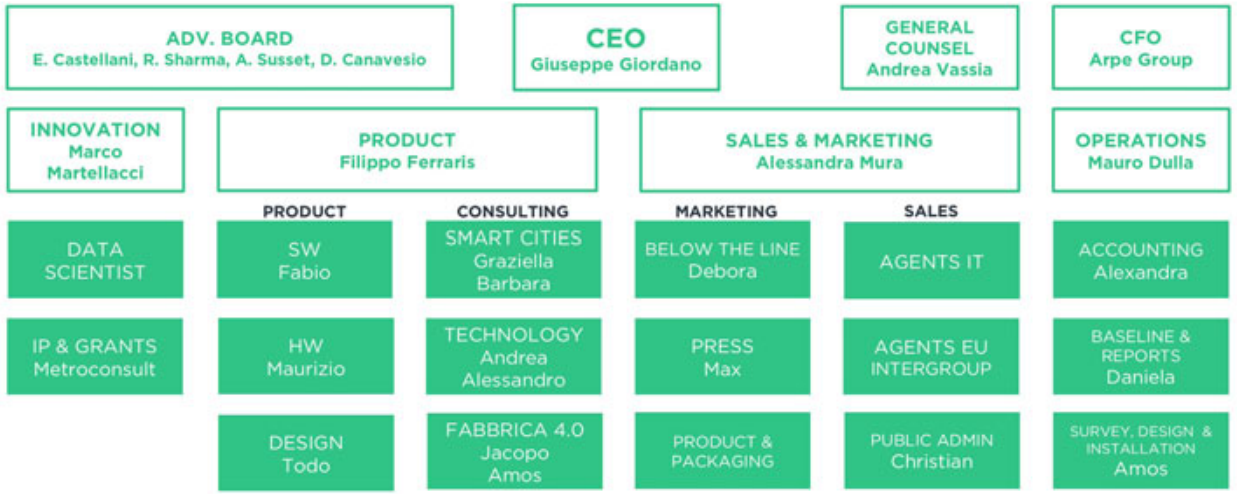
Post Enerbrain



* Comfort zone: 21°+/- 2 < 900ppm

Enerbrain: Team, Partners, Press & Awards

TEAM



PARTNERS

SORACOM · SIGFOX One network A billion dreams · Gartner · marcusevans · Intergroup Accelerating your business · Lindab

PRESS

Rai 1 · Gartner · Il Sole 24 ORE · WIRED · la Repubblica · LA STAMPA

AWARDS

Gartner cool vendor · TECHTOUR 25 SELECTED COMPANIES · 10° PREMIO BEST PRACTICES per l'innovazione

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Giuseppe Giordano
Founder & CEO

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Your innovation partner for a sustainable future

Technical details

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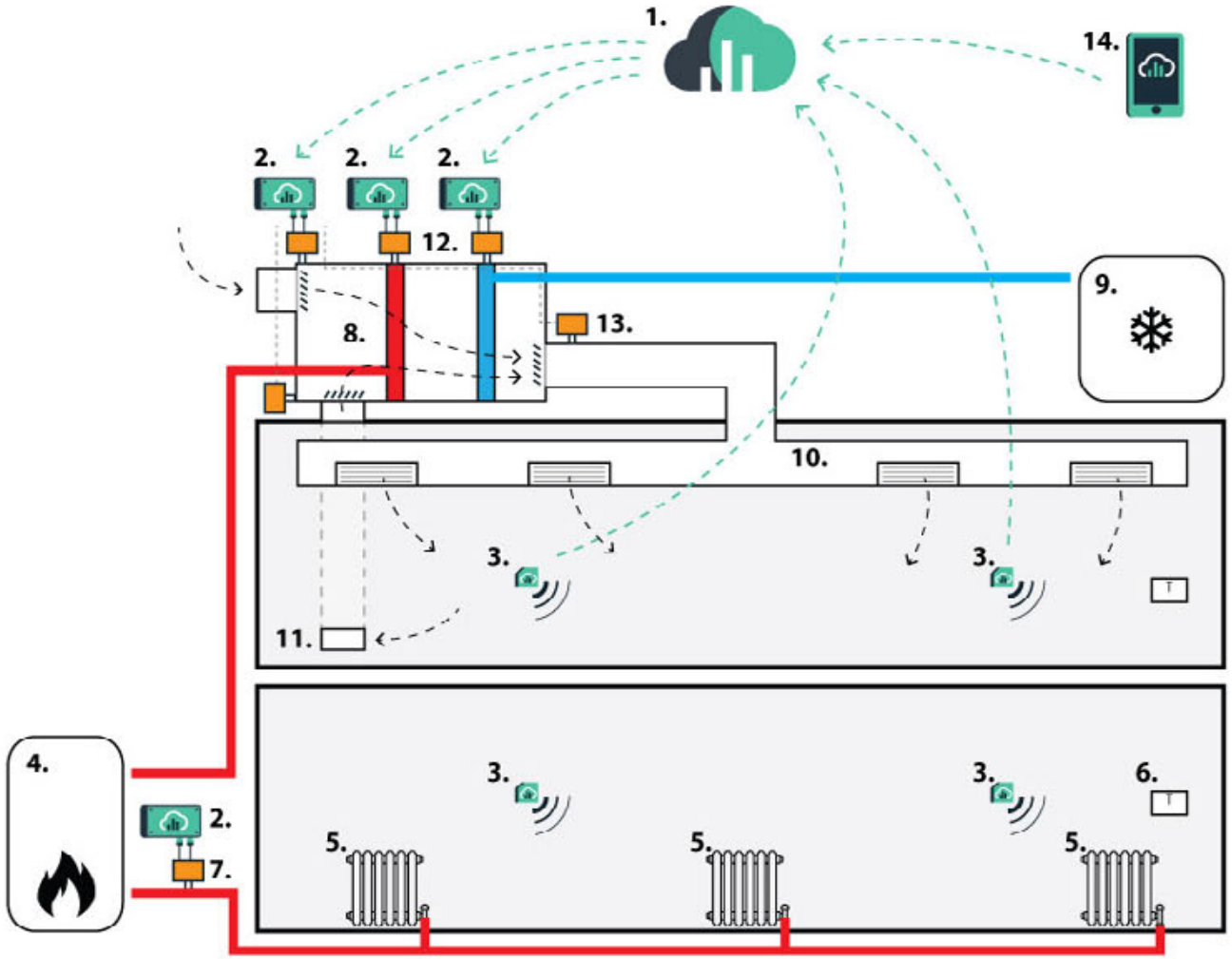
Plug & Play integration with any HVAC system

THE ENERBRAIN SYSTEM

1. Algorythms and Enerbrain Cloud
2. Energy Node by Enerbrain
3. Sensors by Enerbrain
4. Existing heat generation
5. Existing water heaters
6. Existing thermostats
7. Existing 3-way valve
8. Air HVAC Unit
9. Existing Chiller
10. Existing outgoing air-ducts
11. Existing incoming air-ducts
12. 3-way HVAC valves (hot-cold)
13. 3-way HVAC valves (gates)
14. App to control set-points



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Safety first: why we are different

-

TESTED

- CE and ROHS compliant
- **Each device** passes 3 different tests in different locations
- Each SW release is thoroughly tested live before rollout

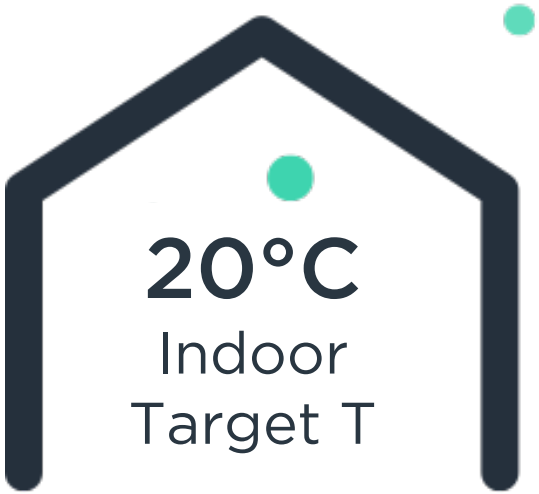
FAILSAFE

- eNode is **electrically bypassed** by a built-in switch in case of failure or maintenance: HVAC **still works without** Enerbrain
- Our cloud and services rely on leading service providers for **safety, reliability & performance**

ENCRYPTED

- End-to-end encrypted communication via **LTE/3G using any provider available**
- Thanks to private connection services our IoT system is **not exposing data to the Internet**

How seasonal temperature affects energy usage



<20°C
Outdoor
Avg T

Heating needed

≅20°C
Outdoor
Avg T

Very Low Energy Usage

>20°C
Outdoor
Avg T

Cooling needed

Heating Degree Days measure the T difference between outdoor and the indoor target of 20°C

Summer Indoor Target is 26°C. Reference values vary from countries.

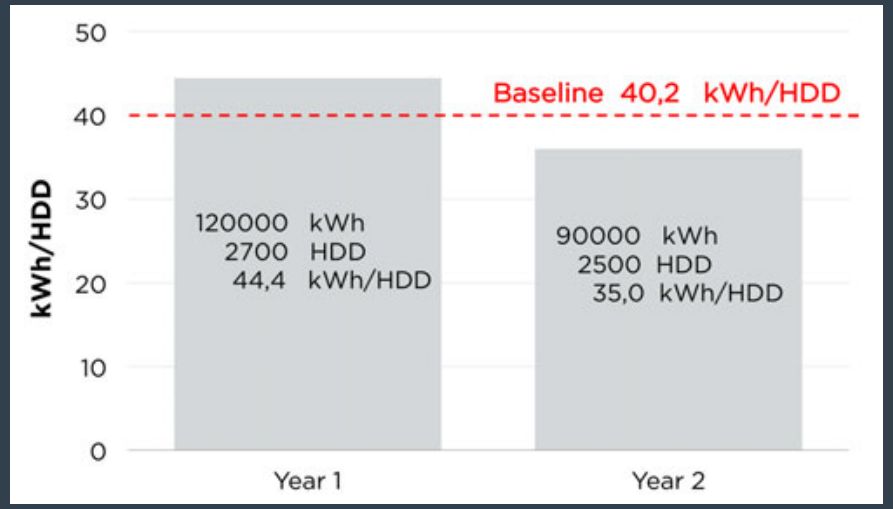
Savings calculated according with UNI EN 15603

-

Savings = Consumption from Baseline – Actual Consumption

$$\text{Baseline} = \text{average of } \frac{\text{Past Consumption}}{\text{Past Degree Days}}$$

Example of Savings and Baseline calculation based on two years of past consumptions



$$\frac{\frac{120000}{2700} + \frac{90000}{2500}}{2} = \frac{44{,}4 + 36{,}0}{2} = \mathbf{40{,}2} \text{ kWh/HDD}$$

If actual HDD= 2500, and actual consumptions = 70000 kWh

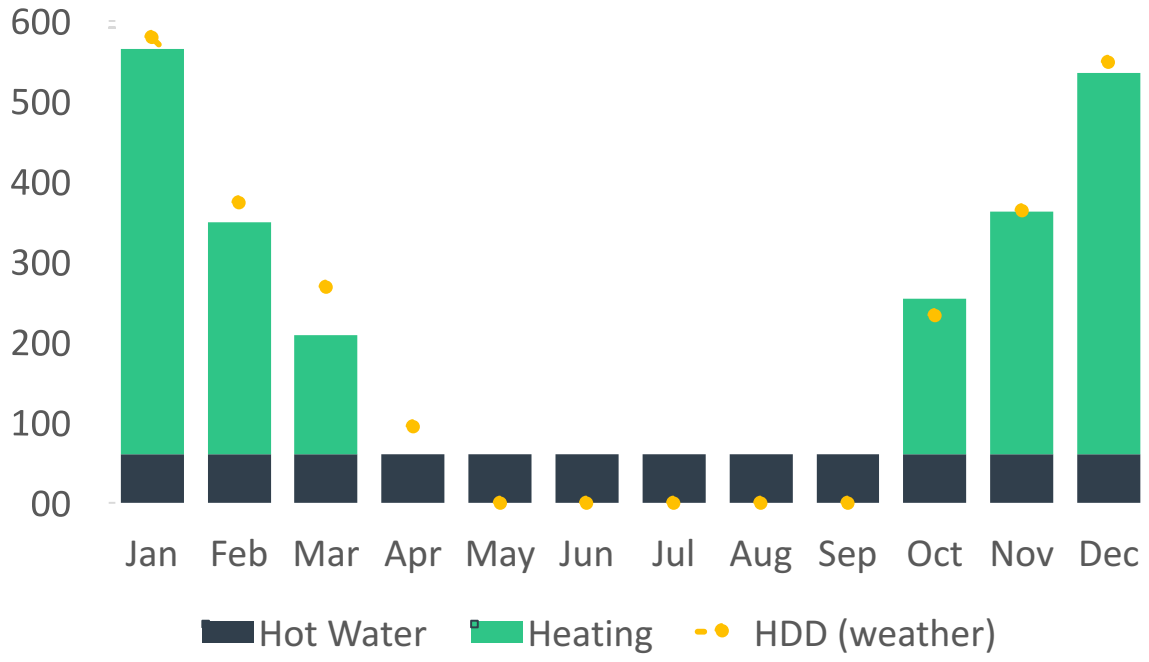
Consumption from Baseline = 40,2 kWh/HDD * 2500 HDD = 100.500 kWh

Savings = 100.500-70.000= 30.500 kWh **~30%**

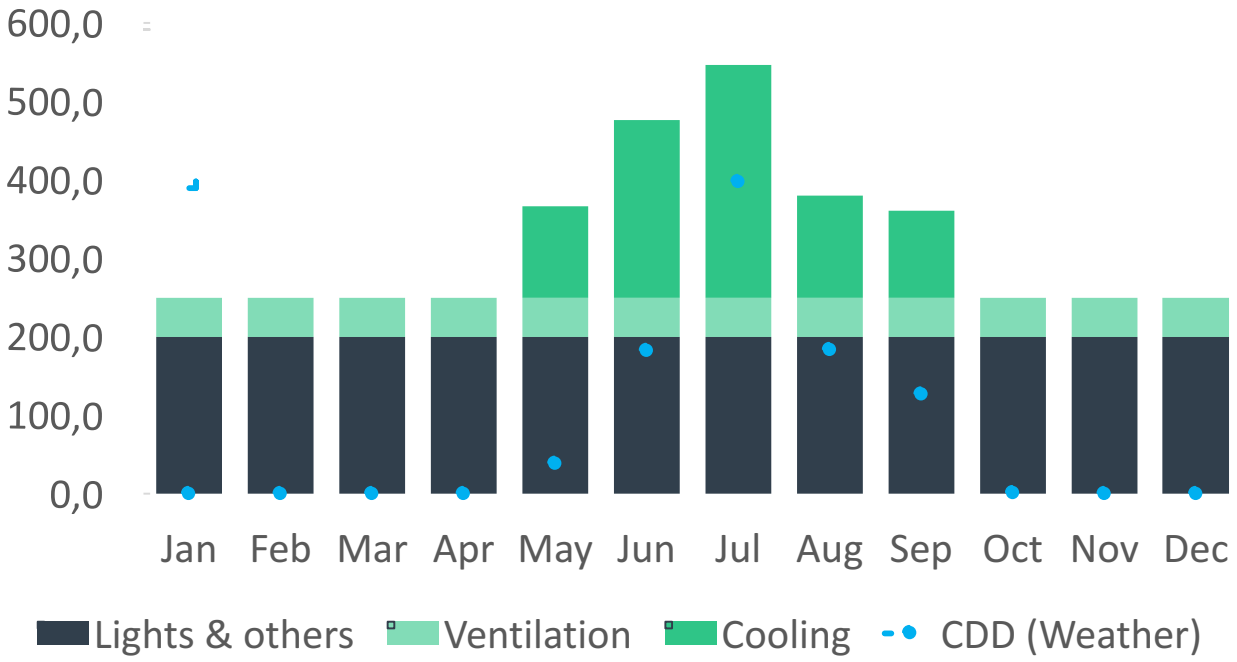
From global consumption to HVAC

-

Heating
monthly fossil fuel usage (MWh)



Cooling & Ventilation
monthly electricity usage (MWh)



Bill auditing & seasonal weather allow us to identify the energy used for HVAC

The baseline is **always approved by the client and can be updated** if there are changes to the building or its use by switching Energy Cloud on/off for a few days

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Compatibility: why we are different

What's missing: truly smart HVAC control

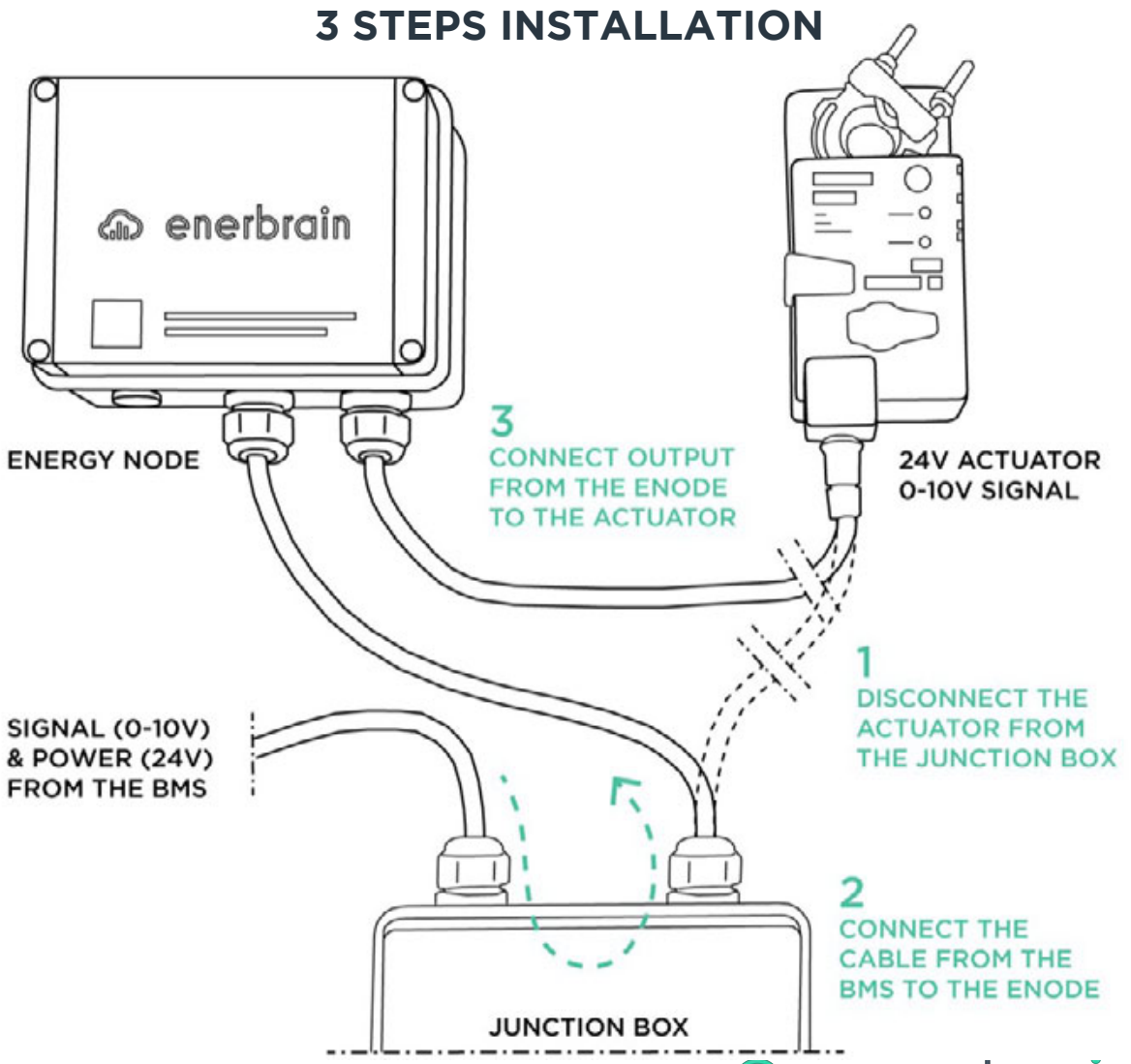
Replacing your equipment or hacking the BMS is not the way to go because:

- BMS communication protocols are unsafe, closed and many. It's expensive and lengthy
- The BMS collects little data from old sensors

We integrate to your HVAC with IoT devices

By making your HVAC actuators connected, Energy Cloud can control them in real time to set temperature, humidity, ventilation while monitoring energy usage and system status.

The actuators - **still connected to the BMS** - will take the input from Energy Cloud anytime it's possible **to maximize savings and comfort**.



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Winning *vs* competition

	enerbrain	Big Companies	Small Companies	Esco
100% compatible	V			
Quick Installation	V			
No changes to the system	V		V	
Reports and maintenance SW and HW	V	V	V	
Portfolio buildings management	V	V		V

Enerbrain Step by Step

An agreement founded on EPC model of sharing benefits

1.

Technical inspection, data collection and bill and portfolio audit

2.

24 months Energy Performance Contract, installation in 45 days

3.

Installation on site and remote commissioning
→ Immediate saving

4.

Automatic renewal from Y3

Enerbrain Investments:

Assessment + Hardware + Installation + Energy Cloud License + Connectivity + System Management + Maintenance + Insurance + Upgrades

Your innovation partner for a sustainable future

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