CUSTOMER STORY

TEM: comfort and indoor air quality campaigns in buildings

TEM, a Belgian technical maintenance company now part of Equans, ran indoor air quality and comfort campaigns on Energis.Cloud: wireless sensors, thresholds based on the law, anomalies for the technical team, and figures a building manager could discuss with staff.

CUSTOMER	SECTOR	COUNTRY
TEM	Technical maintenance of buildings and industry	Belgium

8

dehumidifiers, sized from 22 sensors in one humidity audit, without overinvesting

900 ppm

CO_2 limit for Belgian workplaces, checked in every campaign

15 min

usual reading interval for temperature, humidity and CO_2

51.9%

of occupied hours within 18 to 25 °C in a courthouse in August 2020: the campaign showed why

At a glance

- **Who:** TEM, a Belgian company for the technical maintenance of buildings and industry, part of Engie Solutions at the time of these campaigns and today a subsidiary of Equans. It keeps occupants comfortable at the lowest energy cost in offices, schools, public buildings and plants.

- **What they set up:** campaigns from one week to several years, with Enless Wireless sensors sending temperature, humidity and CO_2 over Sigfox, thresholds based on the law, and anomalies for the technical team on Energis.Cloud.
- **The result:** comfort complaints settled with neutral figures, investments sized to the need (8 dehumidifiers from 22 sensors), and heating and ventilation schedules corrected without new equipment.

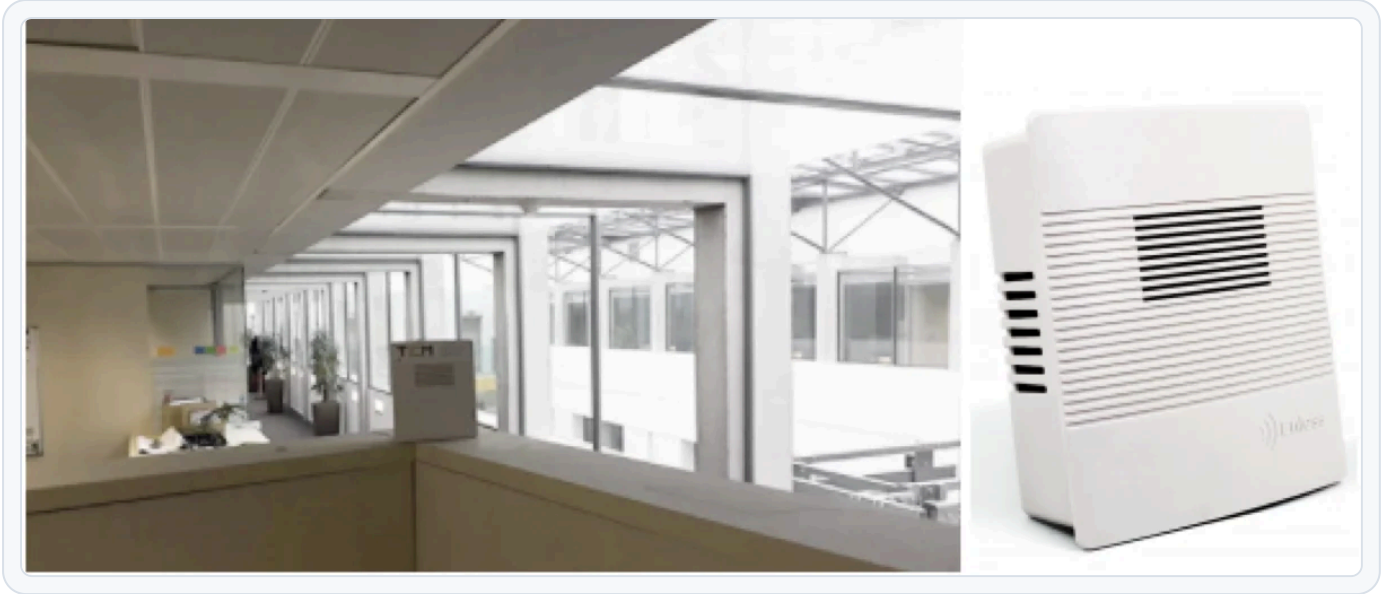
The challenge: comfort, air quality and energy at the same time

The temperature people feel and the air they breathe change how they work. Poor air causes fatigue, loss of concentration and sick leave, and discomfort often comes with wasted energy.

In Belgium, the Royal Decree of 2 May 2019 on indoor air quality (https://emploi.belgique.be/fr/actualites/nouvelles-regles-pour-la-qualite-de-lair-interieur-dans-les-locaux-de-travail) requires employers to keep the CO_2 concentration in workplaces generally below 900 ppm. Most of TEM's campaigns in offices start with a complaint about discomfort.

What they set up in Energis.Cloud

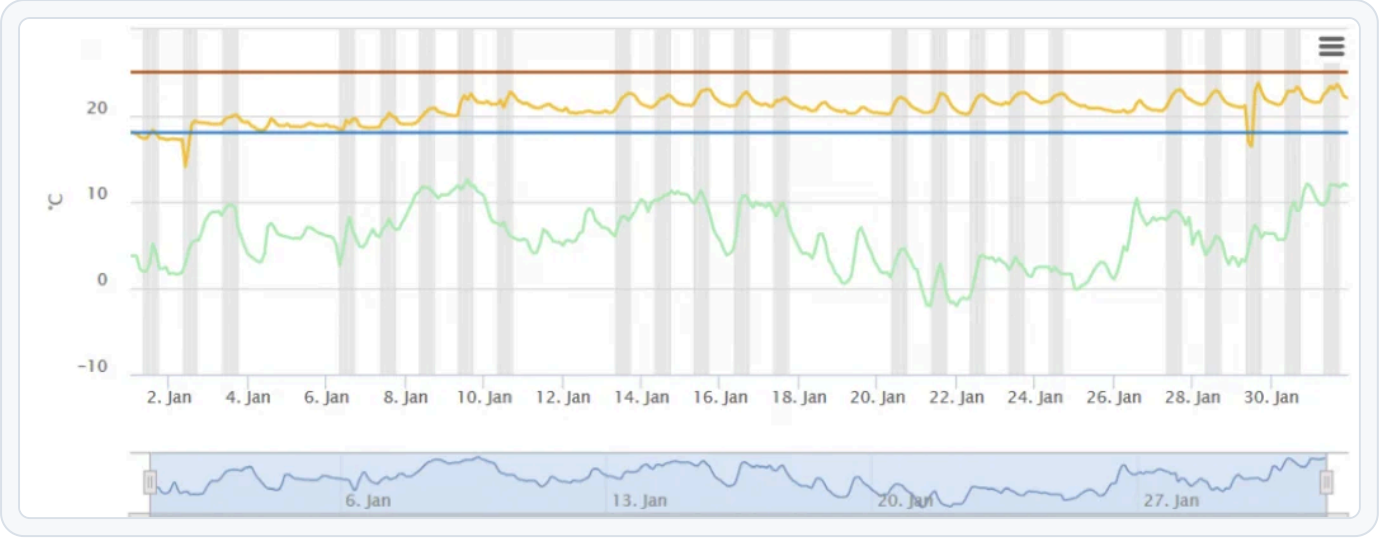
- **Wireless sensors, read every 15 minutes.** Enless Wireless ambient transmitters measure temperature, relative humidity and CO_2 and send them over the Sigfox network. The interval is set at installation and can be changed remotely. See data integration.
- **Thresholds based on the law.** Energis.Cloud checks every reading against the legal limits for temperature, humidity and CO2.
- **Anomalies for the technical team.** When a threshold is about to be exceeded, the team gets an anomaly and corrects the cause: operating hours, or a faulty piece of equipment. See anomaly detection.
- **A comfort score.** Dashboards show the share of occupied hours within the comfort range, a figure the building manager can discuss with staff. See dashboards.



An Enless ambient sensor in an office. Photo from the TEM case study.

Four campaigns

- **A short humidity audit.** In a tower block with a humidity problem, 22 sensors in the basement showed TEM exactly what to invest in: 8 dehumidifiers, and no more.
- **A comfort campaign in a courthouse.** Over more than a year, the readings showed discomfort and overconsumption. In August 2020 the temperature was between 18 and 25 °C for only 51.9% of the occupied hours. In winter the building was kept at 24 °C at night while it was 10 °C outside: out-of-hours consumption in its plainest form. Regulating the heating on the calendar and the occupancy saves energy directly, without new equipment.
- **Long-term humidity monitoring in a printing house.** Temperature and humidity transmitters protect the paper in stock, with anomalies before the quality thresholds are crossed.
- **Air quality and energy in an aerospace plant.** Mainly IoT sensors keep temperature and humidity within set limits, raise an anomaly when flue gases reach dangerous temperatures, and measure the savings from recovering their heat.



The courthouse in January: indoor temperature (yellow) against outdoor (green), with the 18 and 25 °C limits. The building stayed warm at night. From the TEM case study.

The results

	Before	With Energis.Cloud
Comfort complaints	Opinions	Neutral figures and a comfort score set against the law
Investments		Sized to the measured need: 8 dehumidifiers from 22 sensors
Schedules	Installations running at night, at weekends or in the hot season	Found by the campaign and corrected, without new equipment
CO_2		Checked against 900 ppm in every campaign

In their words

> “Most of the time, the results of the campaigns can reassure occupants: we provide neutral figures, meaningful graphics and a comfort score in relation to legislation. The building manager can then discuss with his staff, based on quantified elements, and find an agreement on the adjustment of the technical installations.”
>
> **Valentin Maerevoet**, Energy and Facility Manager, TEM

> “It also happens that major malfunctions are brought to light, for example unsuitable schedules causing the installations to run outside occupied hours (at night and on weekends) or when this is not necessary (heating in the hot season).”
>
> **Valentin Maerevoet**, Energy and Facility Manager, TEM

For whom

TEM delivers maintenance and energy services in its clients’ buildings: the work we describe for facility management and ESCOs.

Frequently asked questions

What is the CO_2 limit in Belgian workplaces?

Generally 900 ppm, under the Royal Decree of 2 May 2019 on indoor air quality, which corresponds to about 40 m^3 of fresh air per hour per person. A risk analysis can allow up to 1,200 ppm in some cases.

How do you settle a comfort complaint in an office?

Measure before you change anything. A few weeks of temperature, humidity and CO_2 readings, compared with the legal limits, give a neutral comfort score that the building manager and the staff can agree on.

How long does an indoor air quality campaign last?

From one week for a quick audit to several years for permanent monitoring, depending on the question. TEM’s campaigns covered both.

Can comfort monitoring save energy?

Yes. Campaigns often find installations running at night, at weekends or heating in summer. Correcting the schedules saves energy without buying new equipment, as in the courthouse TEM followed.