Sustainability Case Study Professional Standards

BRIGHT: Optimise Energy Consumption

CLIENT
Sonae Sierra

PROPERTY
Le Terrazze

LOCATION
La Spezia, Italy

BUILDING TYPE
Shopping centre

AREA
38,500 m²

SAVINGS
- €163,000
- 27% of electricity bill

What is BRIGHT?

BRIGHT is an innovative project developed by Sonae Sierra in 2014, which uses a theoretical model to produce optimal energy consumption figures for each of its shopping centres.

Since then, Sonae Sierra calculated that actions implemented as a result of the BRIGHT analyses would deliver savings of over €1.4 million with an average payback period of less than one year, and that a further €4.72 million savings could be derived from further actions identified.

How are such savings achieved?

Le Terrazze in Italy provides a case in point. After applying the Bright analysis, it was found that the shopping centre was consuming more energy in practice than it should in theory.

It was identified that energy savings could be achieved through adjustments to the condensation pumps, cooling towers and rooftops.

Through a series of management measures, and the introduction of free cooling, Le Terrazze was able to identify potential savings of €163,000 – equivalent to 27% of the shopping centre's annual electricity bill.

Introduction

Energy use constitutes a major environmental and economic impact in Sonae Sierra's shopping centre portfolio. But whilst the centres have similar energy systems, comparing their actual energy consumptions and defining their optimal energy performance is a complex task. It was to this effect that Sonae Sierra developed BRIGHT, a model which allows us to monitor the energy consumption of our shopping centres against a virtual simulation, identifying technical improvements and enhancing management practices.

When Bright was applied at Le Terrazze, the team identified that the energy systems were consuming significantly more in practice than they should do in theory. What is more, they were pressed to act in a timely manner to optimise the centre's energy consumption as winter set in. With a challenging theoretical target to meet, what actions could the team take to deliver the expected results, without incurring investment costs?

Background

Although Sonae Sierra has been continuously improving the energy intensity of its shopping centres' common parts areas since 2002, there were some irregularities in the various shopping centres that could not be explained by local factors such as size, climate and opening hours.

It was in this context that Sonae Sierra developed the Bright tool to explore the differences between different shopping centres in their portfolio and establish specific improvement measures to lower energy consumption while maintaining, or even improving, the level of service to tenants and visitors.

After a series of tests, a virtual standard shopping centre was developed which takes into account relevant characteristics such as architecture and construction, lighting, HVAC systems and use patterns. When applied to Le Terrazze, deviations between the theoretical target and its real energy consumption were identified, with the revelation that the shopping centre's energy systems were consuming between one and a half to five times more energy than they should be.

Challenge

This presented the challenge of how to reduce the shopping centre's energy consumption as quickly and cost effectively as possible. The Bright model had indicated that the energy systems with the greatest potential for optimisation were the condensation pumps, cooling towers and rooftops. It also showed the energy wastage that results from the tenant's winter cooling requirements, which pose a challenge in regulating tenant unit and mall area temperatures simultaneously.

Solution

Working together with the shopping centre team and maintenance service supplier, a series of initiatives were applied:

- Reducing the condensation pumps pressure set-point and adjusting the schedule.
- Adjusting the rooftops that were in operation when the shopping is not opened to the public.
- Establishing a better maintenance contract for the building management system.
- Cleaning the plate heat exchangers (mechanical cleaning in order to reduce energy consumption and avoid overheating).
- Reducing power in car parks and the shopping centre during cleaning times.

It has been calculated that with these adjustments, savings of €163,000, equivalent to 27% of Le Terrazze's total electricity bill will be achieved. Moreover,a strategy of free-cooling to balance energy consumption needs during the winter has been adopted. This solved the need to ensure a good temperature both inside shop units and in the common areas despite their different thermal requirements. As a result of this measure, a further €37,000 in electricity costs and €9,600 in natural gas costs during the winter of 2014/2015 were saved in comparison to the same time period during the previous year.

Closure

Le Terrazze has demonstrated that by using the Bright modelling tool and engaging shopping centre teams and contractors, it is possible to identify and deliver significant energy savings with little or no investment cost.

In 2015, summer cooling needs were 40% higher compared to the previous year, but Le Terrazze was still able to reduce its electricity consumption by 10%.

The process of fine tuning this internal benchmarking tool has ended up unveiling a huge potential to improve energy efficiency and reduce costs across the Sonae Sierra portfolio, and Le Terrazze has pointed the way for other shopping centres to follow.

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