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CASE STUDY

A BRIGHT future – Sonae Sierra develops a brighter model for energy efficiency

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Case Study | Executive Summary

A BRIGHT FUTURE – SONAE SIERRA DEVELOPS A BRIGHTER MODEL FOR ENERGY EFFICIENCY

Sonae Sierra has developed Bright®, an energy efficiency programme designed to reduce the energy expenditure and improve the carbon footprint of real estate assets.

Challenge

Energy use constitutes a major environmental and economic impact for retail real estate owners and investors. But while assets may have similar designs and characteristics, actual performance and energy use can vary significantly between assets and equipment.

Knowing how energy is being consumed is key to understanding how these variations occur and identifying where the most effective changes should be made. Factors including energy systems, infrastructure, layout, design, operations, climate, and weather all have an influence, so detangling these factors is a complex task that none in the market could provide.

Although Sonae Sierra has been continuously improving its energy intensity since 2002, there have often been behaviours in the energy performance that couldn't be explained by local factors such as size, climate and opening hours.

Solution

As a result, Sonae Sierra began looking for a tool that offered the level of detail and analysis that would explain the variation between an asset's optimal energy consumption, and its actual consumption. Having found that no solution was available on the market that offered the sophisticated insight Sonae Sierra needed, we decided to create our own tool.

Bright® is a modelling tool which allows us to analyse the energy consumption of real estate assets against a theoretical simulation, identifying technical improvements and enhancing management practices.
By comparing the optimal energy consumption (assessed by the tool), with the real one, and comparing assets within a portfolio, investors can for example determine the ones that have high consumptions due to outdated systems, poor management practices or unavoidable factors.
Therefore, clients gain valuable data that can be used to inform and shape decision-making, allowing them to assess the assets towards which the efforts should be driven.

Case Study | Executive Summary

A BRIGHT FUTURE – SONAE SIERRA DEVELOPS A BRIGHTER MODEL FOR ENERGY EFFICIENCY

Outcome

The process of developing Bright® has ended up unveiling a huge potential to improve energy efficiency and reduce costs across our clients' portfolios.

Highlights

- **Between 2013 and 2019, Bright® identified 292 energy optimisation measures across 28 assets.**
- **218 of these measures implemented enable to avoid annually 21,400,000 kWh of electricity, equivalent to €2.8 million in costs and around 5,700 tonnes of CO2e.**
- **Implemented measures required a total investment of €2.7 million.**
- **51% of the actions implemented were quick wins. €0.22 million invested on these quick-wins generated €1.05 million, 38% of all potential savings of the project.**
- **In 2018 Bright® was awarded a Silver Stevie® Award in the "Energy Industry Innovation of the Year" in the 15th Annual International Business Awards®.**

KEY RESULTS

2018 STEVIE SILVER WINNER INTERNATIONAL BUSINESS AWARDS

STEVIE AWARD ®
WINNDER

€2.7M
total investment cost

€2.8M
annual costs savings

21,400,000 kWh
annual reduction in electricity consumption

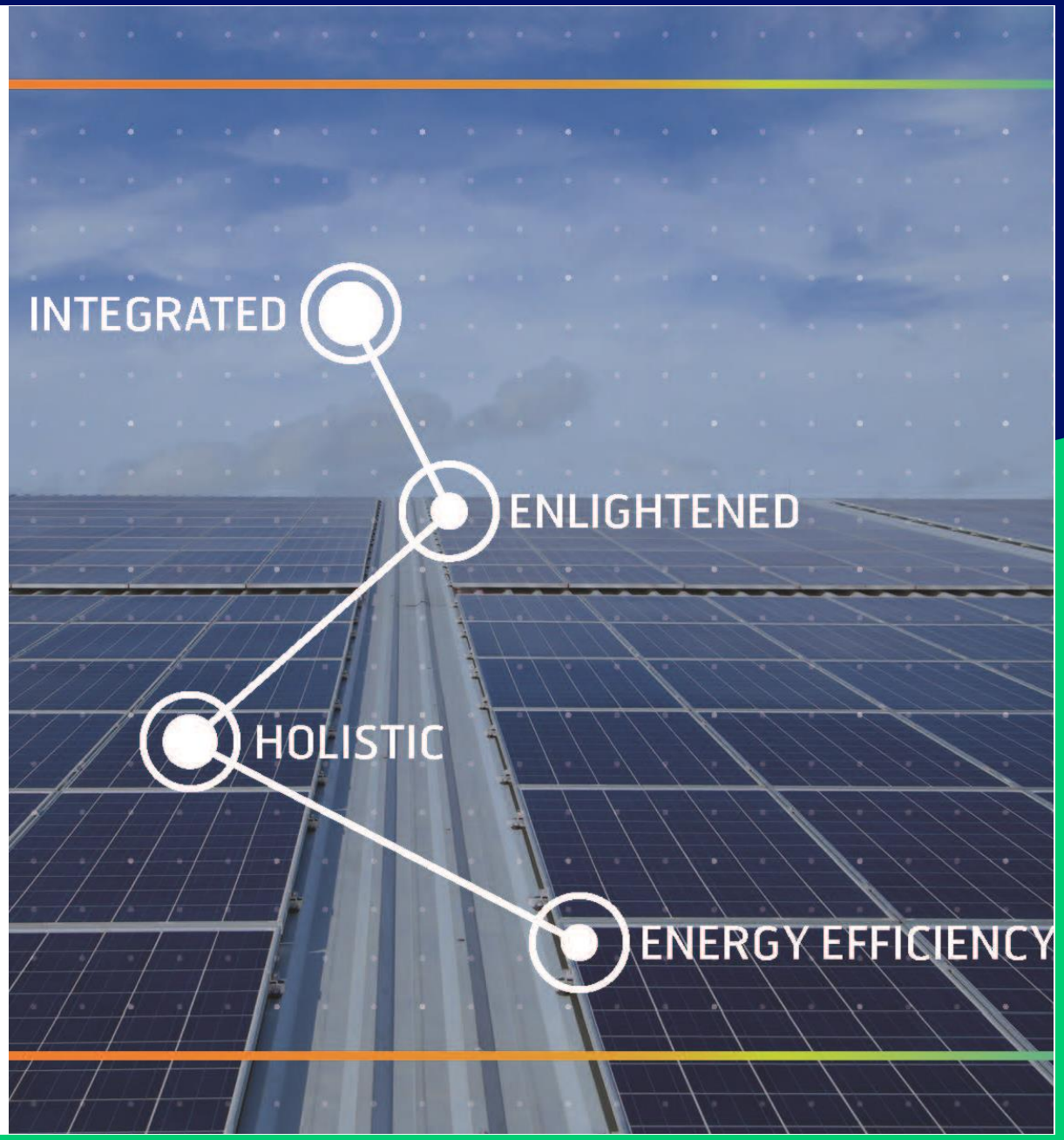
Abstract

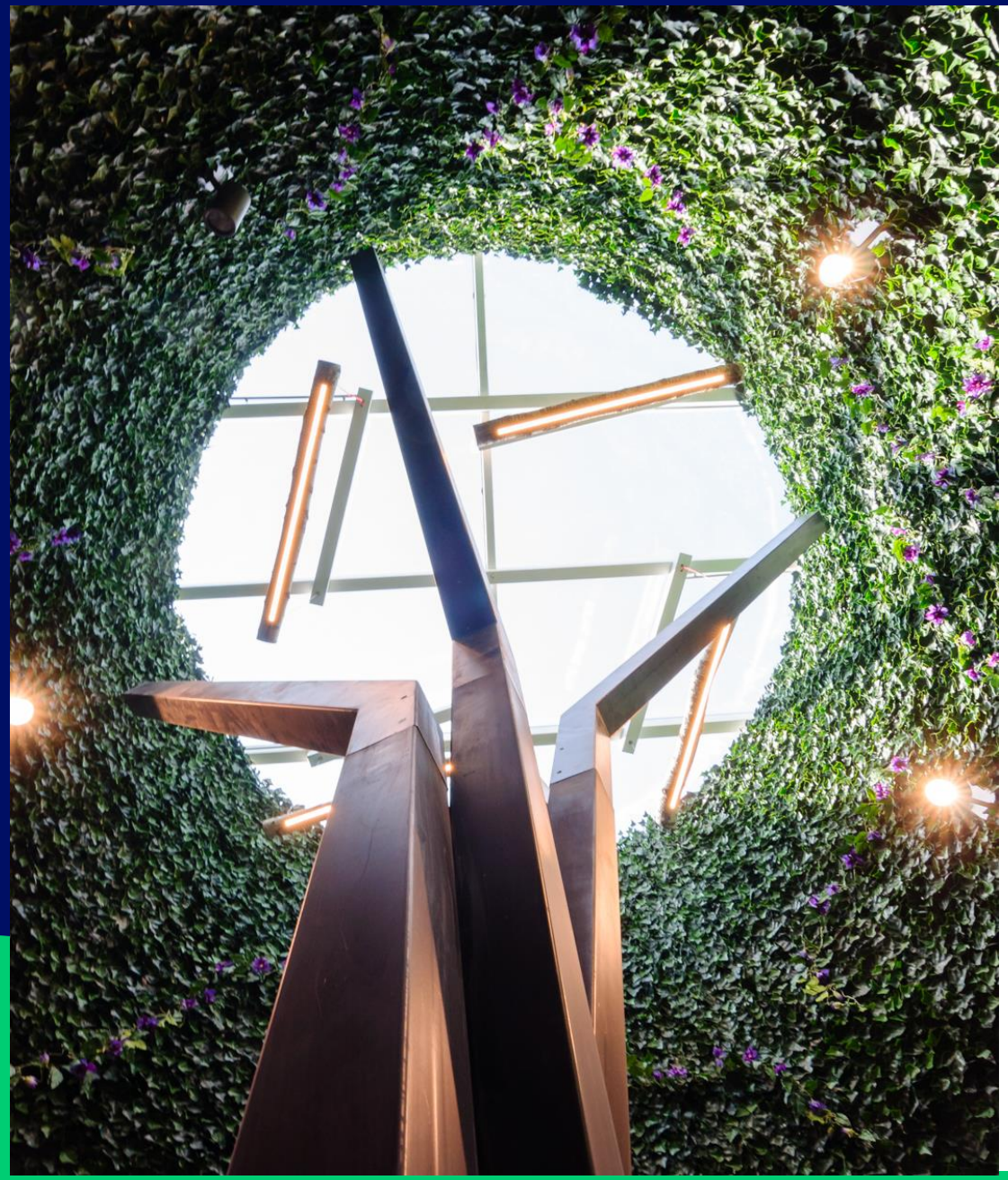
Sonae Sierra has developed Bright®, an energy efficiency programme designed to reduce the energy expenditure and improve the carbon footprint of real estate assets.

Bright® is unique, it takes a holistic approach looking at every aspect of a real estate asset's operations; from building and energy systems, to the behaviour of the people using it and region-specific factors. It uses the power of real data to facilitate a maximum return on investment, both on an environmental and economic level; and builds on the accumulated knowledge Sonae Sierra has gained from more than 30 years in the development, investment and management of real estate assets.

Sonae Sierra has used Bright® to target €2.7 million in investments across 28 assets. Actions implemented throughout the years as a result of Bright®, have enabled us to reduce electricity consumption equivalent to €2.8 million in costs in 2019.

Underpinning our commitment to create shared value for our business and clients alike, Bright® forms part of our integrated client offer and is available as a complete turn-key service or as stand-alone options.





Introduction

Energy use constitutes a major environmental and economic impact for retail real estate owners and investors. But while assets may have similar designs and characteristics, actual performance and energy use can vary significantly between assets and equipment.

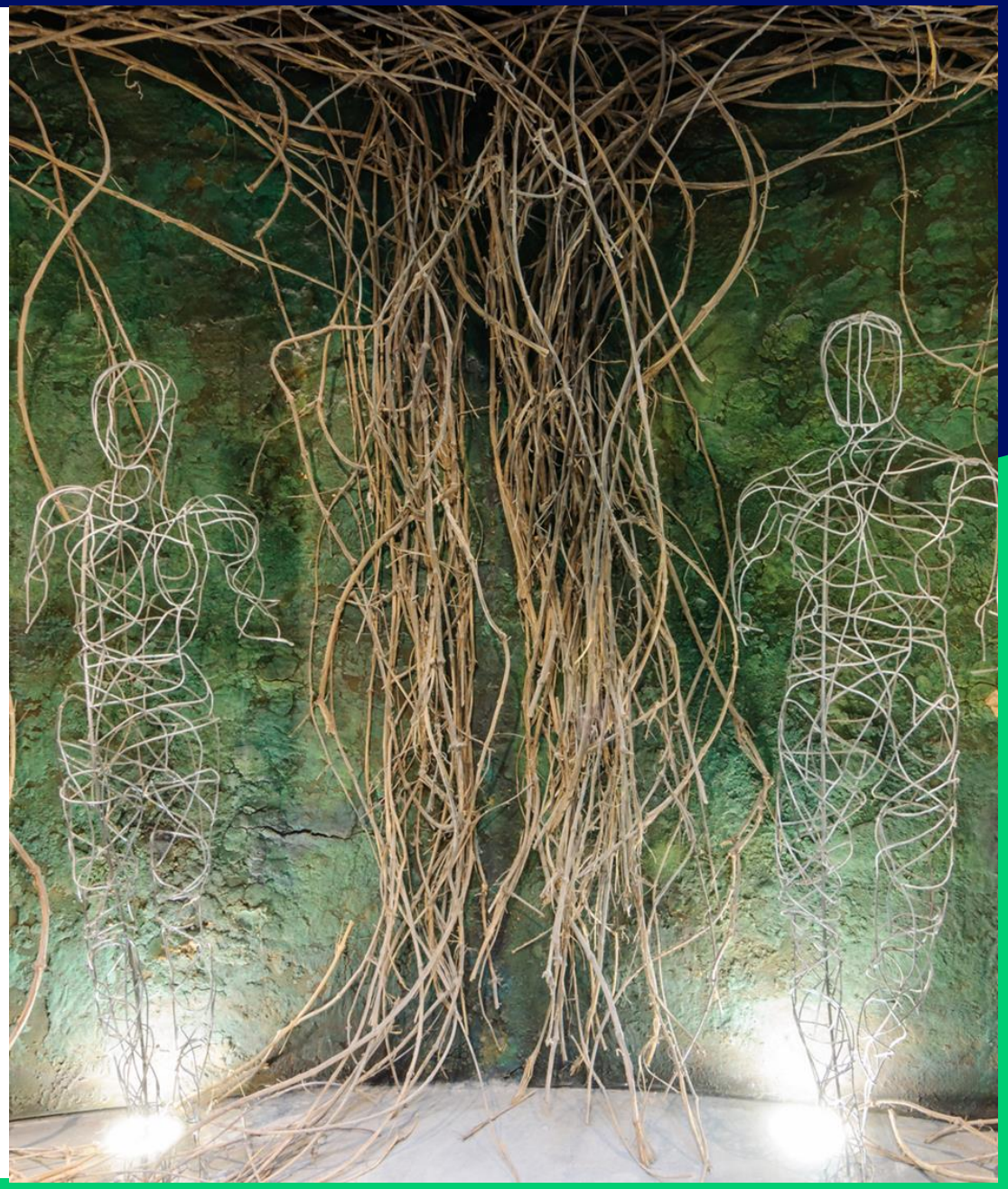
Knowing how energy is being consumed is key to understanding how these variations occur, and identifying where the most effective changes should be made. Factors including energy systems, infrastructure, layout, design, operations, climate and weather all have an influence, so detangling these factors and comparing actual energy consumption with the optimal energy performance is a complex task that no service in the market could provide.

Background

With more than 30 years' experience in developing, investing and managing real estate assets across more than 30 countries in four different continents, Sonae Sierra has unrivalled expertise and an enviable track record.

Our approach to sustainability is embedded in the way we do business, earning us a strong reputation and various awards. Underpinning our approach is the goal of Creating Shared Value, and enhancing the sustainability credentials of our real estate assets, and those of our clients, is of the utmost importance to this goal.

We have long been committed to looking at ways to reduce energy use and improve efficiency across our portfolio, and helping our clients to do the same by demonstrating the business case and delivering sustainability services.



Challenge

Although Sonae Sierra has been continuously improving the energy intensity of its assets since 2002, there have often been behaviours in the energy performance that could not be explained by local factors such as size, climate and opening hours.

As a result, Sonae Sierra began looking for a tool that offered the level of detail and analysis that would explain the variation between an asset's expected energy consumption, and its actual consumption. Having found that no solution was available on the market that offered the sophisticated insight Sonae Sierra needed, we decided to develop our own tool that could establish specific improvement measures to lower energy consumption whilst maintaining, or even improving, the level of service to tenants and visitors.

Consequently, we developed Bright®, a modelling tool which allows us to analyse the energy consumption of real estate assets against a theoretical simulation, identifying technical improvements and enhancing management practices.

Following a series of studies, we created a virtual model which considers relevant characteristics such as architecture, construction, lighting, HVAC systems and use patterns. The model allows us to compare the performance of an actual asset against this theoretical model, enabling us to identify where and how inefficiencies occur, and target improvements where they will be most effective.

Built around **five distinct phases**, Bright® has developed into a comprehensive energy management and improvement programme that can either be provided as a complete turn-key service, or as standalone services for our clients.

Bright® was trialled across Sonae Sierra's own portfolio allowing us to test and refine the tool to ensure it met our ambitious objectives.

Solution

1. PORTFOLIO ANALYSIS AND BENCHMARKING

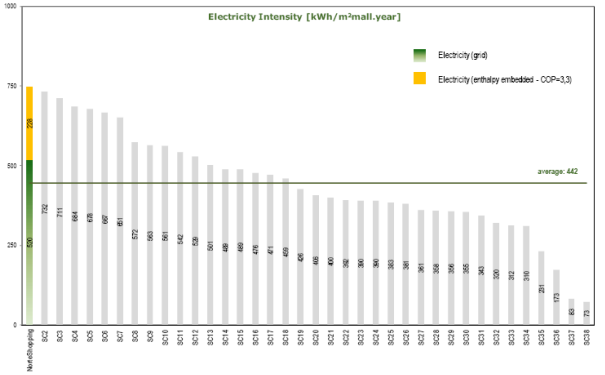
Compares and evaluates optimal energy use with the real energy use, and allows comparison of assets within a portfolio.

Energy use varies significantly between real estate assets. This is due to factors such as energy systems, infrastructure, layout, design, operations, climate and weather. By comparing expected energy usage with the real energy use and comparing assets within a portfolio, **clients gain valuable data that can be used to inform and shape decision-making.**

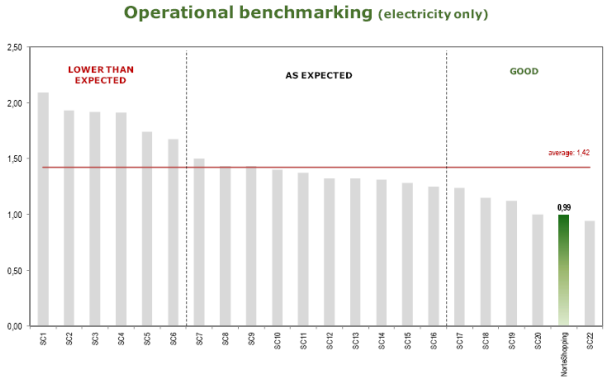
As an example, one of our assets, NorteShopping (in Portugal), had an energy use higher than other assets within the portfolio. A traditional data analysis would define it as a bad performer and the asset would be targeted for investment as well as management efforts to improve its performance. However, with the implementation of this phase it was possible to confirm that considering the asset's intrinsic characteristics and context, its real energy consumption was close to the optimal, and therefore it was performing good.

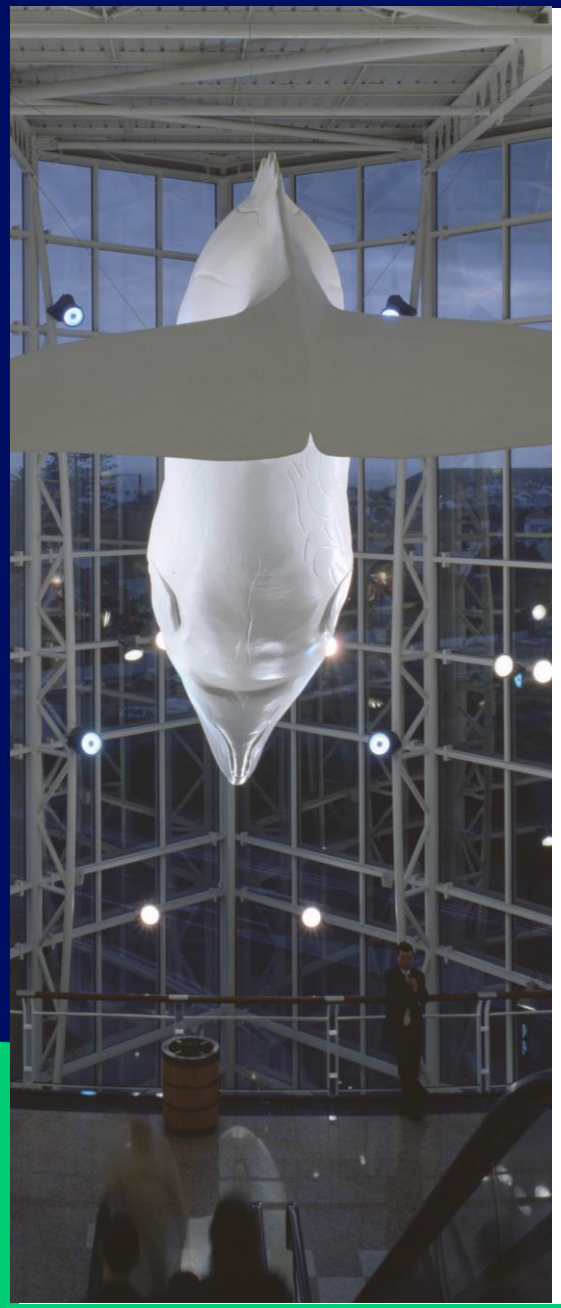
Bright® sophisticated benchmark and portfolio analysis offers investors a more in-depth knowledge that provides them a precise picture of their portfolio worst performers and allows them to target investment where it will have the greatest impact.

NORTESHOPPING "TRADITIONAL" BENCHMARKING



NORTESHOPPING SPECIALISED BENCHMARKING





Solution

2. SPECIALISED AUDIT & RECOMMENDATIONS

Specialised energy audits are performed and recommendations are then made for ways to improve energy usage.

These innovative specialised audits use a modelling tool which applies a virtual model to predict the optimal consumption of each individual asset. These identify, system by system, which ones have potential for improvement presenting grounded recommendations quantified with the corresponding expected impact.

In Parque Atlântico, in Portugal, for example, with these audits it was possible to identify 9 improvement measures that with a total investment of around €61,000, led to costs avoided of around €52,000 annually (452,000 kWh). The implementation of these measures correspond to 220 tonnes of CO2e emissions avoided.

In Área Sur, in Spain, several opportunities to reduce energy costs were identified, summing up total potential savings of €43,000 per year with an estimate investment lower than €35,000, meaning these measures have an overall **payback period of less than 1 year.**

Up to 2019, Bright® audits identified **292 energy optimisation measures across 28 shopping centres**.

With a **total investment cost of €2.7 million**, 218 of these measures are implemented or undergoing and enable to **avoid annually 21,400,000 kWh of electricity** (which is equivalent to 20% of Sonae Sierra 2019 electricity consumption) and **€2.8 million in operating costs**. This corresponds to around 5,700 tonnes of CO_2e avoided.

51% of those actions were quick-wins with no or little investment required: € 0.22 million invested on these quick-wins generated € 1.05 million, 38% of all potential savings of the project.

There are 35 measures being assessed that will require €1.1 million of investment and will generate yearly potential savings of €0.6 million (5,100,000 kWh).

Solution

3. TECHNICAL SUPPORT AND DELIVERY

The first-class delivery and installation of energy efficiency upgrades are achieved through the compilation of detailed specifications, designed to facilitate procurement of the best solutions identified on benchmarking and, or on the specialised audit.

Our technical expertise enables the smooth implementation of measures guaranteeing their correct implementation, while ensuring the achievement of the savings and benefits and support. Some examples of measures implemented:

Le Terrazze, in Italy:

In Le Terrazze it was identified that the energy systems were consuming significantly more in practice than they should do in theory.

The Bright® model indicated that the energy systems with the greatest potential for optimisation were the condensation pumps, cooling towers and rooftops. It also made us aware of the energy wastage that results from our tenant's winter cooling requirements.

With the implementation of management practices and other low-cost measures, savings of €163,000 were achieved, the equivalent to 27% of Le Terrazze's total electricity bill at the time.

Solution

3. TECHNICAL SUPPORT AND DELIVERY

LeiriaShopping, in Portugal:

Despite being awarded the highest energy performance certificate (A+), Bright® identified several deviations from the optimal energy consumption of equipment such as chillers and air handling units.

Several measures (representing an investment of €58,000) were implemented and as a result, LeiriaShopping reduced its electricity consumption by 29% between 2011 and 2013, which corresponded to savings of €139,000.

Parque D. Pedro Shopping, in Brazil:

Several actions were successfully implemented, such as substitution of the cooling tower fillers, chiller retrofit, installation of skylight film and several improvements in the Building Management System (BMS). **This resulted in savings of more than €131,700 in one year. A total of almost 1 million kWh saved, equivalent to more than 10% of its 2018 electricity consumption and 91 tonnes of CO2e avoided emissions.**

This initiative was vital for tenants and their satisfaction levels, as these actions allowed the fees for the common charges to be adjusted.

Solution

4. PERFORMANCE MONITORING

The ability to track energy use and the performance of energy efficiency measures on an ongoing basis forms a vital part of the Bright® programme. All information is detailed in an on-line user's manual, ensuring energy is managed efficiently throughout time.

This phase was implemented in several assets ensuring that maximum efficiency is embraced. Performance monitoring is done by ensuring for example, that metres are optimally located and configured, connected to an Energy Monitoring Application collecting real-time quality consumption data from across the asset. The solution is even more targeted when fine-tuning of key systems is made, ensuring that maximum efficiency is embraced.

To maintain consumption on track it is created a manual with all configurations and different BMS access levels can be activated to avoid deviations from optimum control by someone without the access to do so.

Le Terrazze, Italy

Lighting control is essential to achieve a good energy performance. As the systems grow in complexity, as it happens in large buildings, it's necessary to have a systematic approach to configuration of control.

It is of utmost importance to control lighting adequately, adjusting the lighting levels to the different periods and zones requirements (e.g. adjust mall lighting levels to closed periods).

To perform the lighting control fine tuning, the following steps were adopted:

- Events definition: relevant events are registered to understand the operation of the building and the different lighting needs along the day for each zone.
- Scenarios/services: Lighting services are defined to meet the lighting requirements for each event, with the minimum power on.
- Links: the control capacity installed is evaluated and links were stablished between each control component (e.g. BMS button) and the circuits controlled.
- Fine-tuning: lighting control is adjusted to create the scenarios that meet the services required. Schedules are defined and set for each circuit aiming to keep the lighting services (levels and uniformity) desired for each zone and period.

In Le Terrazze, the savings associated to the lighting control system reconfiguration were around 3% of the asset's electricity consumption, the equivalent to €12,000 annually. It also allowed extra savings associated with the prediction of load profile and consequent early detection of any deviations. A Manual was also delivered to allow the system to be re-configured at any moment, and to keep performance optimal even when teams change.

Solution

4. PERFORMANCE MONITORING

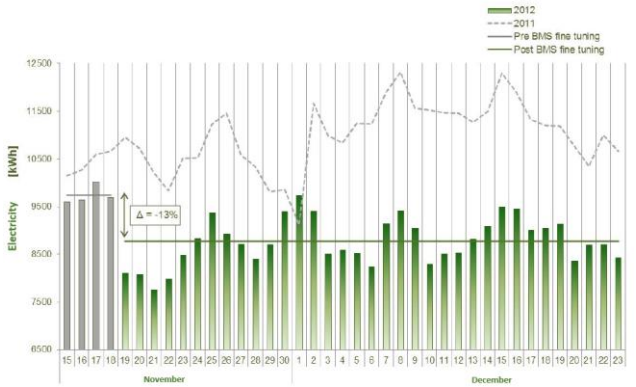
GaiaShopping, in Portugal:

The precise track of energy use allows a correct energy management and to quickly detect and correct abnormal patterns. In GaiaShopping we performed the evaluation of the sub-metres in place where 35 metres were commissioned and the communication with Wisemetering was tested. From this evaluation, it was detected that 66% of these were completely functional, 11% were functional with reservations (should be further investigated), and 23% were classified as not functional, and should be repaired/substituted.

It was possible to confirm that there were no anomalies in the communication of the metres with the application that monitors the consumptions – Wisemetering, and therefore are being correctly registered by the software.

LeiriaShopping, in Portugal

In LeiriaShopping it was contracted the fine-tuning of the centralized technical management of the asset. This involved the fine-tuning of sub-metering and reporting system, where several deficiencies were detected and corrected, and the systems optimized. In the graph there's the performance before and after this was implemented:



Solution

5. ENERGY MANAGEMENT

Enabling the early detection of inefficiencies and alerting teams so they can be quickly rectified is a key objective of Bright®. An innovative model has been developed leading to a quick detection of inefficiencies, minimising the effort from staff and false alarms therefore optimising the operation.

ArrábidaShopping, in Portugal:

In ArrábidaShopping, in Portugal, for example, Energy management consisted in accompanying the asset's operation supporting the performance follow-up to guarantee it operates in its optimal point. This allows a quick detection of deviations allowing an immediate action, avoiding unnecessary increase in the consumptions and corresponding costs.

While upgrading equipment and systems' efficiency is a matter of investment, upgrading operations (e.g., control strategies and routines) is much more a matter of know-how and pro-activity, not requiring relevant investment and leading to energy savings with nearly immediate payback.

Solution

5. ENERGY MANAGEMENT

Centro Colombo, in Portugal:

A good example of this was the Performance Upgrade of Air Handling Units (AHU's) in Centro Colombo, implemented within the context of Energy Management services, where several efficiency upgrades were introduced in the Operation & Maintenance (O&M) of the Air Handling Units, as for example:

- Optimization of enabling schedules (linkage to events – opening to the public, cleaning, cinema, etc);
- Automatic Start and Stop (based on indoor temperature, CO2 and CO thresholds);
- Automatic fans speed regulation based on thermal load and indoor air quality;
- Valve control enhancement for free-cooling;
- Installation of functional monitoring capacity, via BMS (detailed data recording associated with AHU's internal components, allowing in-depth analysis and immediate contact with O&M staff in case of inefficiency signs).

Although these upgrades did not require additional investment, they produced significant relevant energy savings. Even with unfavourable climate variations, savings of around €56,000 were achieved (€27,000 in electricity use and €29,000 in enthalpy use).

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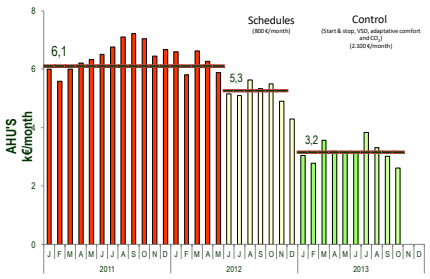
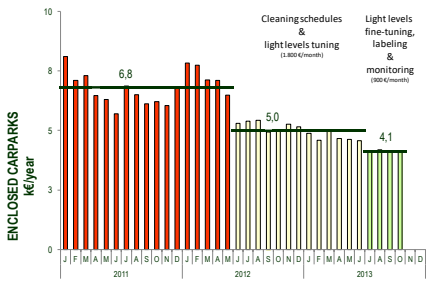
Solution

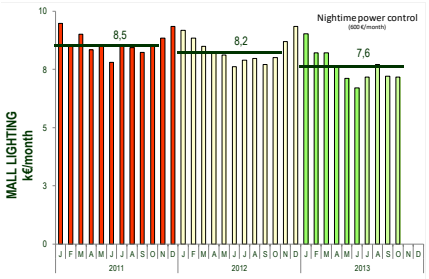
5. ENERGY MANAGEMENT

LeiriaShopping, in Portugal:

In LeiriaShopping, in Portugal, Energy management phase started in April 2013, after a specialised audit done in April 2012 and a BMS fine-tuning in October 2012. This allowed further energy savings that complemented the other phases implemented, as it can be seen below.







Conclusion

Bright® was created thanks to the accumulated wealth of knowledge at Sonae Sierra. Having found that no single tool available offered the sophisticated solution Sonae Sierra needed, our specialists developed their own.

The experience gained across our own portfolio has demonstrated, that by using the Bright® modelling tool and engaging the asset's teams and contractors, it is possible to identify and deliver significant energy savings with little or no investment cost.

Between 2013 and 2019, Bright® identified 292 energy optimisation measures across 28 shopping centres. With a **total** investment cost of €2.7 million, 218 of these measures are implemented or undergoing and enable to avoid **annually** 21,400,000 kWh of electricity, equivalent to € 2.8 million in costs. This also delivered a reduction in greenhouse gas emissions of around 5,700 tonnes of CO2e.

51% of the actions implemented were quick-wins with no or little investment required, €0.22 million invested on these quick-wins generated €1.05 million, 38% of all potential savings of the project.

Recognising its potential, in 2018 Bright® was awarded a Silver Stevie® Award in the "Energy Industry Innovation of the Year" in the 15th Annual International Business Awards®.

The process of developing Bright® has ended up unveiling a huge potential to improve energy efficiency and reduce costs across our clients' portfolios. From transforming the green credentials of global real estate, to generating financial savings in both the short and long-term, the future for real estate energy use looks Bright®.


www.sonaesierra.com