

## Our recipe for success: reducing costs while improving efficiency and tenant satisfaction



Parque D. Pedro Shopping



394 shops



Campinas, Brazil



Sustainability

### KEY HIGHLIGHTS

- Political instability, social tension and an economic and resource crisis, led Sonae Sierra to design a strategic sustainability efficiency plan for the Parque D. Pedro Shopping to drive down its energy and water costs, thus reducing common charges for tenants.
- Highly committed to the sustainable operation of the centre, the management team designed a plan that includes six main actions to optimise the use of these resources in the shopping centre's day-to-day operations.

### SOLUTION

- Several actions were implemented, previously identified in our energy and water programme audits, Bright & Dive:
  - Changes to the Mall Water Matrix;
  - Automation system to control the parameters of the HVAC system's efficiency;
  - Change the Cooling Tower Fillers;
  - Retrofit of a System Chiller;
  - Installation of a film to increase the retention of solar irradiation in skylights to address the problems associated with solar heat gain and glare and winter heat loss;
  - Improvements to the Building Management System (BMS).

### KEY NUMBERS (ANNUAL ACHIEVEMENTS)

**€51,000**

in water savings

**€132,000**

in energy savings

**1 million kWh**

reduction in energy  
consumption

**91 tCO<sub>2</sub>**

avoided emissions

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### Abstract

Managing shopping centres against the background of a severe economic and resource crisis is one of the principal challenges for Sonae Sierra in Brazil. In addition to the adverse political and economic environment, resources are becoming scarcer and costlier every day, driving our teams to act and improve the efficiency of our shopping centres.

The management team of Parque D. Pedro Shopping took this challenge to heart and dedicated their expertise to obtaining the lowest possible common charges for its tenants. Based on our energy and water efficiency programmes' audits, Bright and Dive, the team designed a plan to improve the efficiency of the shopping centre. Several actions were successfully implemented, such as a change in the shopping centre's water matrix, an automation system to control the water quality for the heating, ventilation and air conditioning (HVAC) system, substitution of the cooling tower fillers, retrofit of a system chiller, installation of a film and several improvements in the Building Management System (BMS).

The implementation of these actions allowed the shopping centre team to successfully reduce the common charges for tenants, driving down energy and water consumption and cutting down costs in relation to the shopping centre's day-to-day operations.

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## Introduction

In 2002, Sonae Sierra Brasil opened the Parque D. Pedro Shopping, in Campinas, a populous municipality in the state of São Paulo. The shopping centre boasts 394 shops and more than 127 thousand sqm of GLA, the most complete shopping, leisure, entertainment and services offer in Campinas.

The political instability, social tension and economic crisis of the past few years has had a significant impact on the population and business environment in Brazil. Furthermore, since 2014, Brazil has also suffered from a severe drought in multiple areas of the country, due to low rainfall and the increasing and irresponsible use of this scarce resource. This crisis has led to an increase in water rates and shortage of water in the dams. Electricity production were also affected by this situation, as rates increased.

Due to this situation and aiming to provide its tenants with lower common charges, Parque D. Pedro management team analysed the Bright and Dive benchmarking results and identified several improvement opportunities. As a result, the team designed a strategic sustainability efficiency plan to reduce energy and water costs.

## Background

Humanity is using resources 1.7 times faster than the earth can regenerate them, which means that in 2018, by August 1<sup>st</sup>, humanity had already consumed all the natural resources for that year<sup>1</sup>.

In 2016, 35 million Brazilians did not have access to drinking water and over 100 million people lived without adequate sanitation or any kind of wastewater treatment.

These conditions raised the population's awareness of the need to preserve the environment and encourage the responsible use of resources, especially for those without access to such luxuries. In addition to the adverse economic conditions, the scarcity of resources demands urgent and effective sustainable actions.

## Challenge

In operation for more than 15 years, Parque D. Pedro Shopping faced several challenges.

One, was related to the outdated equipment in the HVAC system installed in 2002, the efficiency of which was compromised.

Another was related to the shopping centre's water matrix, as all the water used in the HVAC system came from the utility company, whose adjustments to the water rates had a direct impact on the annual budget, due to the fact that the increased rates were higher than those initially budgeted for.

Parque D. Pedro Shopping also had a wastewater treatment station that produced wastewater for reuse in the shopping centre, but only a portion of the water produced was used by the centre and in order to increase its capacity, investment and new treatment processes were needed.

With the threat of an economic crisis, in such a key shopping centre, the management team could not run the risk of raising costs for its tenants and decided to take this as an opportunity to improve performance levels and reduce energy and water consumption costs and become more efficient.

## Solution

In 2014, Sonae Sierra's Sustainability team carried out Bright and Dive audits, our holistic energy and water efficiency programmes divided into 5 phases:

### 1. PORTFOLIO ANALYSIS AND BENCHMARKING

Energy and water use can vary significantly between real estate assets. This is due to various factors, namely the systems in place, infrastructure, layout, design, operations, climate and weather. By calculating and assessing the expected energy and water use, in addition to comparing sites within a portfolio, valuable data was gained that was used to inform and shape decision-making processes.

<sup>1</sup> According to the Global Footprint Network Report

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### 2. SPECIALISED AUDIT & RECOMMENDATIONS

Knowing how resources were used was key to understand where changes could be made to ensure the greatest benefit. Specialised audits offered a detailed review of energy and water use, from equipment and control systems to processes and management practices. Recommendations were then made for ways to improve resource usage, with each assessment further enhanced thanks to state-of-the-art building modelling tools.

### 3. TECHNICAL SUPPORT & DELIVERY

First-class delivery and installation of energy and water efficiency upgrades were achieved through the compilation of detailed specifications, designed to facilitate procurement of the best solutions. Our technical expertise enabled the smooth implementation of measures and ensured the savings and benefits detailed in the specialised audit were achieved.

### 4. PERFORMANCE MONITORING

This was carried out by ensuring that meters are optimally located and configured, connected to monitoring applications and collecting real-time quality consumption data from across the entire asset. This solution is even more precise when key systems are fine-tuned, ensuring maximum efficiency levels are reached.

### 5. RESOURCE MANAGEMENT

Enabled inefficiencies to be identified at an early stage and alerted the teams so they could be quickly rectified. Based on the performance monitoring, an innovative method was developed, leading to the rapid identification of inefficiencies, minimising the effort needed from staff and false alarms.

Sustainability Office has implemented phase 1 and 2 in Parque D. Pedro Shopping and, using the recommendations of the Bright & Dive specialised audits, the team committed and focused their efforts towards the efficient operation of the shopping centre, optimise the use of its resources and designed a plan with six main actions:

- **Change to the shopping centre's water matrix:** the operations department studied the feasibility of implementing a water treatment plant, which allowed any excess reused water produced to be used in the HVAC system without damaging the equipment.
- **Automation system to control the water quality for the HVAC system:** the team identified the need to implement an automation system to monitor the physicochemical parameters of the reused water to be used in the cooling towers to reduce the disposal of water through purges. Purges are only performed when parameters reach critical control levels. Previously, the purges were carried out based on estimated periods and continuously.
- **Substitution of the cooling tower fillers:** when the management team identified that the cooling towers were showing low performance levels in the exchange of thermal heat. This inefficiency was linked to the deposition of suspended solid particles in this equipment.
- **Retrofit of a chiller:** because of use, age and damage of the air conditioning equipment, it was necessary to retrofit one of the chillers, improving energy consumption and increasing the lifespan of the equipment.
- **Installation of a skylight film:** the centre was designed with large glazed areas to optimise the use of natural light, however, there were significant gains of heat due to solar incidence in these areas. The team searched for products with state-of-the-art technology in the market to address these problems associated with solar heat gain and glare and began the installation of nanotechnological films, reducing the heat gain by 21% and directly contributing to the improved operation of the air conditioning system, in addition to increasing thermal comfort.

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- **Improvements in the Building Management System (BMS):** to guarantee increased enthalpy control (internal versus external air exchange process) and increased efficiency of the HVAC system as a whole, changes were made to the automation programming logic. New sensors and monitoring devices were also installed to ensure that air exchanges between the indoor and outdoor environment were optimised, thereby reducing the energy consumption.

Community engagement was also a crucial factor to take into consideration vis-à-vis the Parque D. Pedro Shopping, therefore the management team periodically carried out an action entitled *School Project*. This initiative took place through several workshops with children and teenagers from schools in the region, demonstrating how Sonae Sierra manages natural resources and sustainability issues. The team explained the action plan implemented to 440 children in 2016 and 2017, directly contributing to the education and increased awareness of future generations.

### Conclusion

The implementation of these actions led to the achievement of some outstanding results for the sustainable performance of Parque D. Pedro Shopping.

Regarding water consumption, the shopping centre stopped buying 25,000 m<sup>3</sup> of water from the public utility company in 2017, corresponding to more than €51,000. The public utility company in turn, also implemented operational improvements. Therefore, all the combined actions led to a reduction in water consumption and cost savings.

The team set the goal of reducing water consumption to 5.5l/visit in 2020. In 2017, they managed to supersede this goal with the rate of 4.27 l/visit, a decrease of 48% when compared with 2012. More than 14,000 m<sup>3</sup> of water were saved in 2017 comparing to the previous year.

The replacement of the water supply from drinking water to reused water in the cooling towers represented a 32% increase of the total reused water in 2017, compared to 2016.

Regarding the improvements in energy consumption, the team's effort resulted in savings of more than €131,700 in 2017 compared to 2016. A total of almost 1 million kWh saved, equivalent to 91 tCO<sub>2</sub> avoided emissions, corresponding to the consumption of more than 6,000 homes for one month<sup>2</sup>.

This initiative was vital for tenants and their satisfaction levels, as these actions allowed the fees for the common charges to be adjusted to a level lower than that of the country's inflation adjustment over the last 3 years.

<sup>3</sup> Based on the average consumption of 157 kWh per home, per month established by the Empresa Pesquisa Energética (EPE).