

CHP System Solution for UK's Largest Water Park

Client: Castle Water Park

Location: Blackpool

Overview

Sandcastle Water Park was approaching the limit of available mains power and, as energy costs had risen considerably in the last 5 years, two outdated boilers was proving expensive to run. shentongroup provided the UK's largest water park with a solution comprising a 200kWe Centro Natural Gas-powered Combined Heat and Power unit, along with high efficiency condensing boilers and rapid-recovery hot water storage cylinders, all supplied to a tight timescale which ensured the Water Park was fully operational in time for the peak summer season.

The Problem

The 26 year old boilers at Sandcastle Water Park posed a number of risks to the day-to-day operation of the business. Energy costs had risen to over 40% of operating overheads in the last 5 years and therefore, park management needed to reduce energy consumption without limiting the visitor experience. In addition, the facility was approaching its limit of available mains power, thus impeding the potential for future growth.

On busy days, boilers could not produce enough hot water to meet the demand. A boiler breakdown reduced air and water temperatures so much that in the winter it could take up to 48 hours to recover and during the holiday periods, a boiler breakdown would completely shut the water park, resulting in significant loss of revenue.

However, the boilers were not the only issue; Investment in new water park features was attracting more visitors, but the infrastructure was not able to support the impact of the upgrades. The hot water storage tanks were unable to meet demand and not all visitors could enjoy hot showers. If the park had to operate on only 2 boilers it could only sustain a few hours of use. Any serious failure of the existing plant boilers and associated pumps and pipework would close the park. Also, locating parts for old or obsolete plant was becoming more difficult.

Because of limited access to the plant room – via a spiral staircase for personnel and with a small access panel in the roof, if the existing plant did suffer serious failure, the logistical and structural issues meant a straightforward replacement could take up to 5 weeks.



Solution

shentongroup's Sales and Marketing Director, Curtis Meek, outlined shentongroup's initial approach to the project: "A pre-tender survey was essential to progress the layout of the boiler plant, roof access requirements and structural implications. In addition, because the installation had to be completed before the summer season began, the programme required works to be carried out during winter shutdown. Therefore, the shentongroup team had to work effectively, accurately and rapidly in order to reach this strict deadline".

A recommendation was made to replace the boiler plant and add a Combined Heat and Power Unit. A Council report was completed and recommended "That the boiler plant and Combined Heat and Power Unit is purchased by the Council at a cost of £606,972 and met through Prudential Borrowing. The cost of the scheme will be paid back through savings on energy costs over a period of up to 10 years and recovered by the Council via reduced subsidy."

Preston Lee Chambers, working as the client's consultant, chose the shentongroup 200 kWe Natural Gas Cento Indoor Acoustic unit. The thermal demand was carefully modelled to ensure heat output could be utilised. Curtis Meek confirmed; "shentongroup worked closely with Preston Lee Chambers throughout the design and selection process and made available a number of desktop study scenario's using our 'Power Therm Savings Calculator', which included assessments of financial and carbon savings". Curtis added; "Including the initial cost and maintenance, the return on investment is expected to be less than 3 years".

Output and resilience of boilerplant + CHP unit* :-
Existing boilerplant output = 2,250kW
New boilerplant + CHP unit output = 2,950kW

Existing boilerplant output with one boiler failure = 1,500kW
New boilerplant + CHP unit with one boiler failure= 2,411kW
* Source Exec Report from Blackpool Operating Board

The proposal formed part of a 'spend-to-save initiative' as the alternative option was to install new boilers, at a cost of £451,000, without delivering the same savings on day-to-day running of a CHP system.

A heat dump radiator was installed to permit electrical peak lopping, even when limited thermal demand was available. This allowed future-proofing of the incoming electrical supply by giving the mains incomer 200kW of spare head room as a result of generating it on-site.

The narrow compact footprint of the Cento CHP Unit design allowed lifting through the limited space via the plant room roof. During installation, modifications were made and bespoke hinges were fitted onto the CHP unit's doors to allow optimum functionality in a limited space.

The Cento CHP unit is maintained on a shentongroup Infinium24 programme fixed-price maintenance contract which includes a lifetime warranty covering; parts, consumables, call-outs, remote monitoring and technical support 24/7. Curtis Meek explained; "This contract enables the client to place all maintenance risks with shentongroup, thus giving totally predictable maintenance costs, as well as peace-of-mind".

In addition to the Combined Heat and Power unit, high efficiency condensing boilers and rapid recovery hot water storage cylinders were also specified. System back-up was also factored in to provide flexibility and resilience via 5 boilers (4 running/1 standby) + CHP unit.



“The organisation has additional peace-of-mind that business and service continuity will not be threatened”

Outcomes

The job was completed within the tight deadline set out by Sandcastle Water Park. The Centro CHP unit is now providing a large proportion of the total site demand per year, significantly offsetting grid electrical and thermal energy.

As well as benefitting from a more than capable solution which, not only allows for business expansion, the Centro CHP system also brings with it significant day-to-day energy savings.

Because Sandcastle Water Park's Centro CHP system is fully supported by shentonggroup's Infinium24, CHP maintenance and support programme, the organisation has additional peace-of-mind that business and service continuity will not be threatened.

About shentonggroup

shentonggroup is the UK's leading technical expert in standby power, uninterruptible power supplies, and combined heat and power supplies. The company provides continuous power supply solutions to organisations spanning key sectors including; healthcare, finance, telecoms, manufacturing, retail, education, government, utilities, and of course, sports and leisure.

With the flexibility to support both inside and outside applications, shentonggroup is a leading force in the provision of Combined Heat and Power solutions and supplies a range of CHP systems under its Powertherm label. CHP is increasingly becoming the energy choice for projects that require large volumes of hot water. Generating power from a number of sustainable fuels, including less-expensive natural gas, the heat generated from this process is channelled into heating, hot water supplies and even air conditioning, proving to be a more affordable, greener alternative. CHP reduces overall energy consumption and thereby enables commercial and industrial customers to offset gas and electricity consumption. The system's very low exhaust emissions ensure that Powertherm complies with, or exceeds UK regulations.

shentonggroup's comprehensive CHP support and maintenance service, Infinium24, monitors the CHP system 24 hours a day. With a number of depots throughout the UK, shentonggroup engineers can be onsite in a

matter of just 4 hours. An 8,000-hour support contract charged at a fixed hourly rate covers all parts, labour, travel, fuels, and engineers expenses. There is a minimum annual charge of 2,000 hours, therefore making predictable budgeting much easier, and as each year passes, clients are likely to save even more money – this is because mains power and fuel prices typically rise, whereas your good-as-new Powertherm CHP generator will be performing just as well as when we first installed it.

Find out more about specifying CHP systems to improve business service efficiency at www.shentonggroup.co.uk

About Sandcastle Water Park

The largest in the UK, this indoor water park features an 84-degree tropical climate located at Blackpool's South Beach. Opened in 1986, it now boasts 18 slides and attractions, including water slides, fun pools, wave machine, water chutes, burger bars, snack bar, arcades, swim shop and more. The park attracts approximately 300,000 visitors each year and has won a number of awards and accolades, including; VAQAS Gold Certificate Holder, Investors in People Accolade, is World Host recognised and it has won both the Access For All Silver and Access For All Gold VisitEngland Awards For Excellence.