

### WHY GREENER MUSEUMS?

Creswell Crags is a museum and heritage centre for the neighbouring limestone gorge and caves that were in use in the last ice age.

The centre includes exhibitions, education and private hire rooms, café, shop and offices. Built in 2009, the contemporary building won the East Midlands Award for its low carbon design, materials and technologies.



*Creswell Crags - museum entrance*

The building has solar panels, rainwater harvesting and ground source heat pumps, the latter providing heating and cooling to the building. Ventilation is primarily provided through air handling units and in 2016 lighting types comprised a mixture of fluorescent, LED and halogen. The majority of services are controlled by the building management system.

Despite the low carbon design of the building, when the museum joined the [Greener Museums](#) programme, it was experiencing high energy usage, equipment breakdowns and poor system performance.

Historically, a limited understanding of the systems and barriers to preventative maintenance were key factors in this downward spiral of performance. Staff had already started to tackle the myriad of issues but sought assistance from the programme to help accelerate this process.

### REVELATIONS OF THE PROCESS

The heritage centre has no less than 9 systems that work together to condition the environment. The in-house Maintenance Technician and Operations Manager unearthed numerous issues that were having a negative impact on staff and visitor welfare and contributing to unprecedented levels of electricity and water usage.

“We were trying to get our heads around what works and what doesn’t and then all of the sudden this came along so we could prioritise things and see what would save us the most money and what would benefit the staff and visitors the most.”

Paul Kaye, Operations Manager

Data analysis indicated that use of electricity had increased by 180% and water usage had doubled compared to the early years. Although the systems and services in use were proven and reliable technologies, many parts requiring regular maintenance (e.g. air filters) were either blocked in behind other services or inaccessible without scaffolding.

Inadequate information on system operation and maintenance meant that, historically, systems were left to run on old settings and a preventative maintenance regime had not been created or budgeted for. These issues are likely to stem back to when the systems were installed and then ‘handed over’ to the museum. Guidance and training is important, particularly when faced with managing systems (e.g. ground source heat pumps) that are less well known and understood.

Challenges have included maintaining desirable temperatures in key areas of the building and dealing with regular breakdown of essential equipment, such as kitchen ventilation and cooling systems. Lack of awareness also led to people regularly setting temperature thermostats high to try and compensate for system issues and doors left open. However this had the opposite effect on the underfloor heating and would cause the system to ‘lock up’ and stop altogether. Staff used to spend a lot of time trying to minimise water wastage and flooding that arose from school children leaving taps running in the toilets. Wastage of hot water also led to increased use of electricity.



## OUTCOMES AND PLANS

When Creswell Crags joined the Greener Museums programme, the programme Advisor worked with staff and contractors to put together all of the knowledge gained on the building's systems.

Interrogation of the building management system (BMS) revealed that systems were timed to come on outside of current operating hours and temperature parameters were overly narrow encouraging heating and cooling systems to fight each other. These issues have since been rectified, and key staff have learned how to change BMS settings, thereby increasing efficiency, saving money and improving temperature control in the building.

Cascade training has been undertaken with all staff, and staff also seek to educate visitors and school groups about how they can help to keep the building green. Now, staff rarely need to be reminded to switch lights off, close doors or resist changing the heating thermostat. Tamper-proof controls are also to be installed in public areas to prevent this recurring.

Staff are putting together a comprehensive preventative maintenance schedule that advises what needs to be done and when, and which company is contracted to undertake it. This schedule will not only ensure knowledge is easily transferable to other staff, but it will help ensure associated health and safety requirements are met.

The MDEM small grant has enabled the museum to invest in automatic flow taps in the public toilets. Freezers have been consolidated and moved to a ventilated room where the units will operate more efficiently. The museum is now planning to use the spare room as a lunch space for schools, enabling an additional school per day to book in to help meet income targets.

The work and investigations are ongoing, but by a process of improvement and elimination, staff are ensuring the building and organisation reaches its full potential.



*New automatic taps*

**“In addition to the report we got the action plan and a grant to install new automatic taps...it's had a massive impact already”**

**Paul Kaye, Operations Manager**

**Annual energy and water costs:**

**£27,500 (2015/16)**

**Savings identified: £6,500-£8,500 (25%)**

**Annual CO<sub>2</sub> savings: 20 tonnes**



**To hear the full audio case study by members of Creswell Crags please go to [www.mdem.org.uk/case-studies/greener-museums-case-studies](http://www.mdem.org.uk/case-studies/greener-museums-case-studies)**

## ABOUT THE GREENER MUSEUMS PROGRAMME

In 2016/17 museums joined the **MDEM Greener Museums** programme to access specialist advice and support from a dedicated Advisor. Museums received an on-site review to identify opportunities to become greener and more resilient, followed by a report and action planning development meeting. An MDEM small grant was also made available to museums on the programme.

**Greener Museums** is part of the wider Museum Development Programme run by MDEM and funded by the Arts Council England. To find out more please go to: [www.mdem.org.uk/green-museums-2016](http://www.mdem.org.uk/green-museums-2016)