

Data Centre Solutions...energy efficient by design



Case Study Leicester City Council



Leicester City Council
Deploys New Sub 1.1 PUE₃
Data Centre Infrastructure.
Designed & Installed by
Workspace Technology



Creating an effective workspace environment



**Leicester
City Council**

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Leicester City Council is a unitary authority responsible for local government in the East Midlands city of Leicester. As a unitary authority, the council is responsible for running the majority of local services in Leicester and with a population of over 330,000, the highest in the region, Leicester is the tenth largest city in the United Kingdom.



Creating an effective workspace environment



Client Situation

Leicester City Council's legacy data centre was located in the New Walk Centre an obsolete 1960's concrete building which was condemned and due for demolition during 2014. The council identified an out of use training facility within the city boundary which was ideal to support not only the City Council ICT demands but also to provide the capability for the council to offer shared resource services for local public sector organisations in the wider Leicestershire and Nottinghamshire areas.

Leicester City Council's ambition was to create a centre of excellence, combined with exceptional energy performance, to help provide a significant and meaningful contribution to the council's carbon reduction commitments.

As part of a rigorous tender process Workspace Technology clearly demonstrated their expertise and leadership in energy efficient data centre design, build & management. The Council commented, "Workspace Technology's bid was outstanding, without a doubt they clearly demonstrated their understanding of the council's needs and it was obvious that Workspace Technology have unrivalled extensive knowledge and expertise in low carbon data centre design".

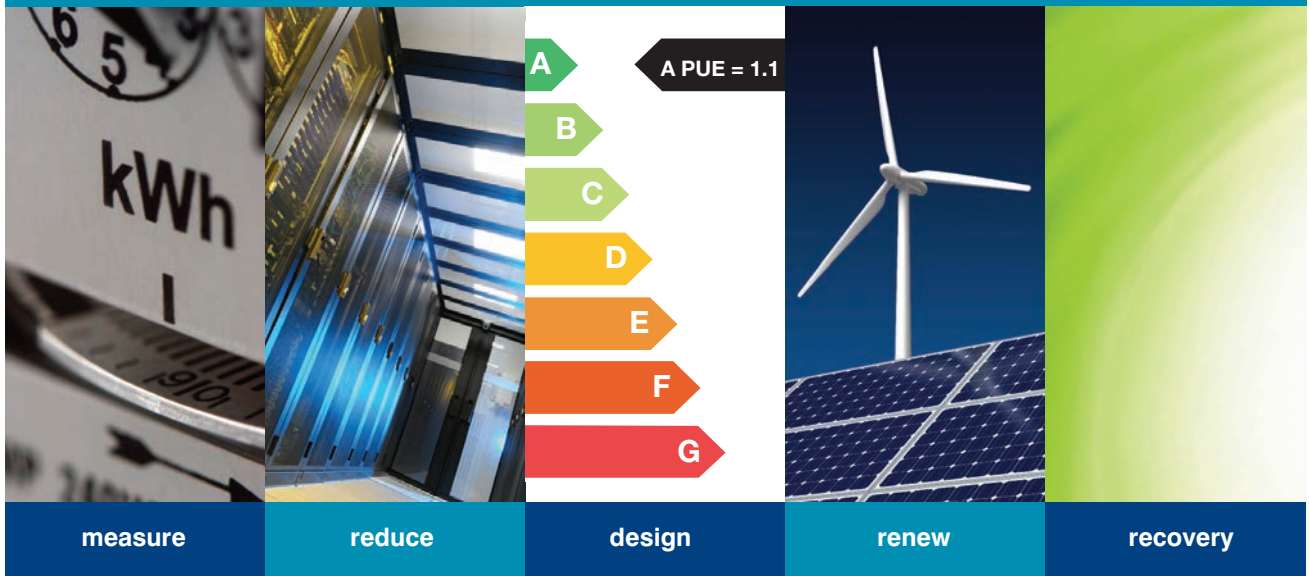
Design Overview

The city council wished to deliver direct fresh air cooling with a closed loop backup to mitigate any local air quality issues. Energy efficiency was central to the data centre requirements. Not only was an annualised PUE₃ of sub 1.1 demanded, but also the implementation of renewable energy technology and the utilisation of waste heat.

Summary Requirements:

- Tier 3 data centre architecture
- Sub 1.1 annualised PUE₃ performance
- Implementation of renewable energy
- Waste heat recovery
- 250kW I.T Load

Workspace Technology's 'Total Carbon Commitment'



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Workspace Technology's 'Total Carbon Commitment' delivers a unique holistic approach to data centre designs. By taking a much broader view when engaging in the design process, Workspace Technology ensures every aspect relating to the data centre efficiency is explored and not just those that directly relate to the data centre power and cooling.

The holistic approach encompasses:-

- Measure** Measurement is the key to unlocking our understanding of energy consumption and energy utilisation.
- Reduce** Reduction in demand through maximising 'useful work' per watt in turn reducing infrastructure overhead.
- Design** Deployment of 'Best Practice' Data Centre Design reduces infrastructure overhead relative to the critical load.
- Renew** Implementation of renewable energy sources lowers the carbon content of the energy profile.
- Recovery** Heat recovery enables waste heat to be put to productive use reducing downstream energy costs.



Freecool®

Workspace Technology is an established industry leader in data centre direct fresh air cooling deployments. Freecool® was the technology of choice and the only technology on the market that could fulfil the PUE design requirements of the council.

Freecool® Evaporative Free Air Cooling by Workspace Technology delivers innovative low energy cooling for a range of applications including data centre environments. The implementation of the 'Cool Wall' module delivers mechanical backup or top up cooling for all modes of system operation.

installations are designed and built from scalable standardised modules that can be interconnected in a bespoke arrangement supporting 'real world' customer applications. The Leicester City Council project was no exception, the solution was designed to support a maximum critical load of 250kW N+1 with a deployment of nine 30kW Freecool® units.

Freecool® Design Features for Leicester City Council Include:

Double Filtration delivered through a combination of G3 and G4 air intake filtration systems eliminate data centre contamination.

'Atemperation™' accurately mixes the percentage of hot exit air with cold intake air to produce a stable equipment intake temperature irrespective of external ambient conditions.

Dynamic Mode Temperature Control allows cold aisle temperatures of 18°C for the vast majority of the operating period without any compromise in energy efficiency.

Reduced Fan Power utilising energy efficient EC fans that use significantly less energy than conventional fan technology.





Cool Wall

As part of the deployment, Workspace Technology implemented the Cool Wall module which consists of a series of high efficiency chilled water coils, positioned within the Freecool® Mixing Box, combined with an external mechanical cooler and buffer tank. The Cool Wall module is designed to deliver the council's data centre with an independent back up cooling circuit. Cool Wall activation is based on a range of configurable environmental conditions including fire, air quality, temperature and humidity.

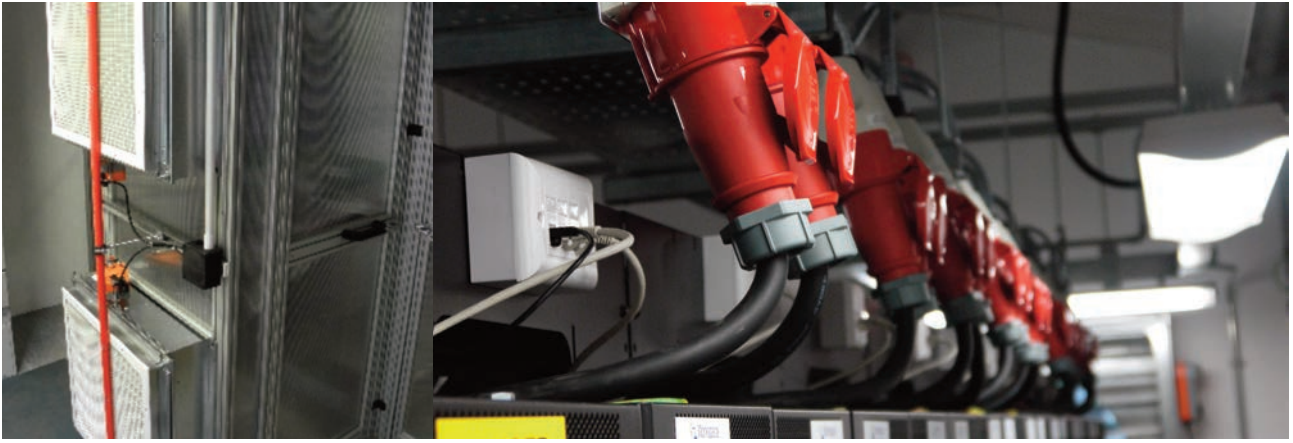
FlexAisle® Vendor Neutral Aisle Containment

As part of the managed airflow architecture and to help maximise temperature control and minimise fan energy consumption Workspace Technology deployed 'FlexAisle®', their multivendor aisle containment system, as part of the data centre solution.

A combined cold and hot aisle return plenum 'HARP' was deployed for the Council. The complete arrangement was self-supporting allowing the simple installation and removal of equipment racks without the need to dismantle aisle containment systems.

Renewable Technology Delivers True Carbon Neutral Cooling

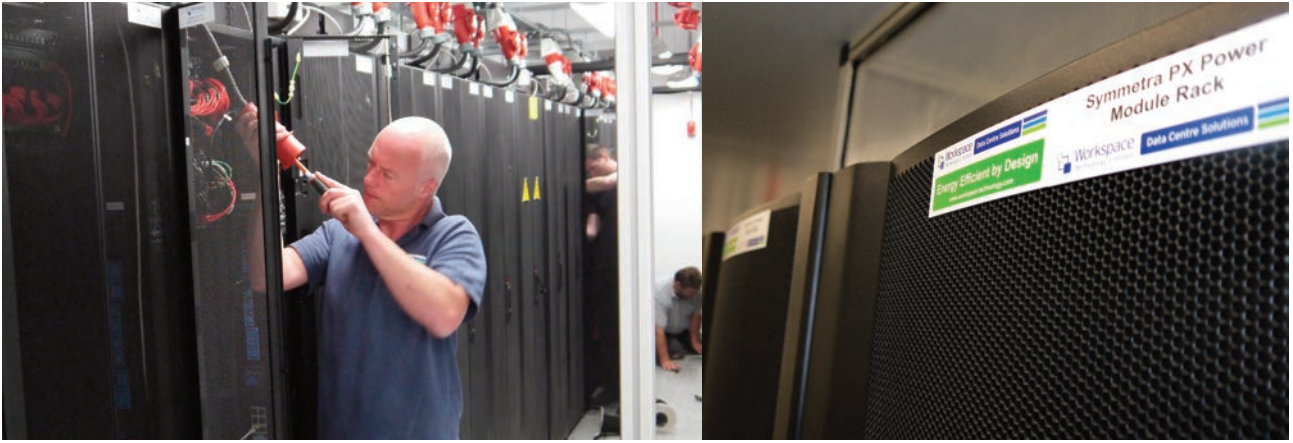
Photovoltaic (PV) technology delivering up to 35kW of power was installed as part of the project. The PV based kWh power contribution exceeds that of the Freecool® kWh power consumption. As a direct result, the Council's data centre facility can truly describe it's cooling as carbon neutral. This is one of the first of its kind in the UK and it is hoped that this model will act as the template for future data centre deployments.



Heat Recovery

Workspace Technology's team took every opportunity to further reduce energy consumption. The use of free air cooling for the UPS equipment is standard design for many plant rooms today. This was no exception for the council's new data centre, but Workspace Technology took this one step further by using waste heat from the UPS room to maintain temperature for the battery room during cooler periods thus eliminating the need for mechanical heating.

The use of heat recovery will reduce the energy costs associated with maintaining UPS battery temperatures by as much as 80%.



Complete Electrical Design

Workspace Technology's in house Data Centre Solutions Division designed and installed a complete end to end electrical installation including HV power feeds, transformers, LV Switchgear, critical and mechanical power distribution.

High quality Form 4 Type 6 Schneider Electric switchgear was deployed throughout including Mains Intake, UPSLVP and Generator panels.

In-Row CPDU Workspace Technology's deployment of their innovative rack based In-Row Critical Power Distribution Units incorporating Schneider Electric Acti9 sub pan assemblies mounted within APC Netshelter SX racks provided the perfect configuration for overhead power distribution. As with conventional perimeter PDU breakers, these are pre-wired to a terminal field to allow for safe and easy connectivity of distribution cabling.

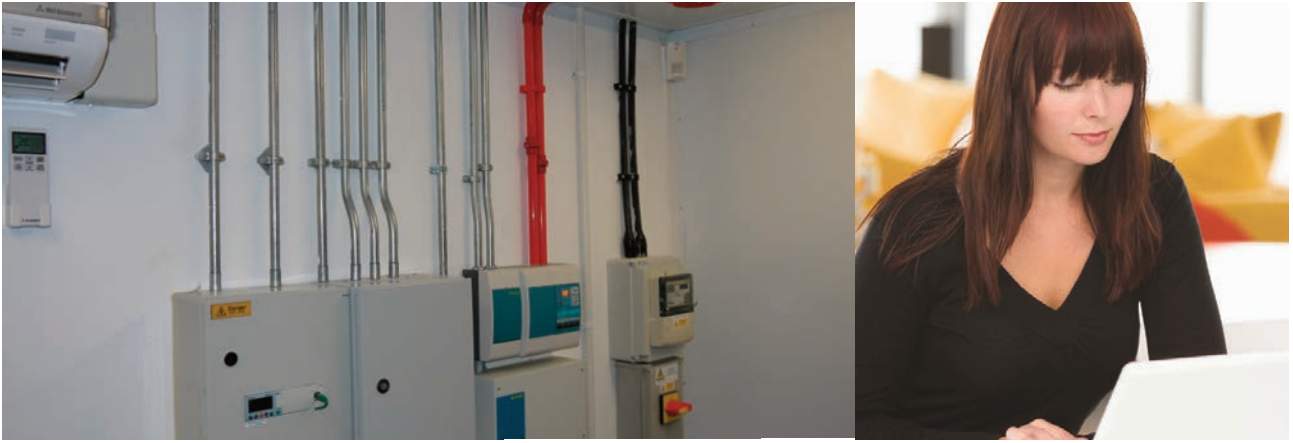
Schneider Electric PM750 meters were deployed throughout enabling power monitoring through the StruxureWare Power Management Expert energy management software.

Workspace Technology's Power Generation Division relocated and refurbished an existing generator which was formally situated at the old data centre location. Works included installation of a new BS compliant fuel storage and distribution system, and a full engine overhaul.

Technical Infrastructure

As part of the installation Workspace Technology deployed 60 x Schneider Electric APC NetShelter SX multivendor equipment racks, intelligent metered rack PDUs and Belden Cat6A I/O rack to rack cabling links.

Workspace Technology also installed ACT Access Control, intruder alarm systems and CCTV throughout the complex as well as e-established existing building fire alarm systems as part of the overall data centre project.



Technical Challenges

As data centre floor space was at a premium, Workspace Technology's team cleverly created an external Freecool® mixing box and plant room area which ensured all of the floor space was available for equipment racks.

Detailed space planning within the power plant area also ensured that the data centre could be expanded to support the council's ambition to develop a local public sector shared resources ICT facility.

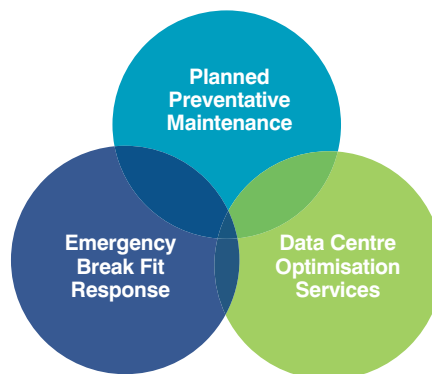
Project Team Success

A strict design review and agreement regime was implemented by Workspace Technology to ensure that the delivery team were able to engineer absolute levels of accuracy, which paid back many times over by ensuring first time success. Also, the implementation of risk analysis to every potential failure scenario enabled the team to eliminate the loss of customer service through engineering excellence and innovation.

The project team left no stone unturned by implementing 'what if' analysis strategy as part of the design phase, and by applying a 'getting back to basics' method, Workspace Technology ensured electrical and cooling design principles were correctly applied with appropriate discrimination and safety margins to deliver a robust data centre design.

Complete Integration & Support Services

The complete data centre is supported by Workspace Technology's Engineering & Support Services Division via a comprehensive maintenance contract, which includes planned preventative maintenance, emergency callout and data centre optimisation services.



About Workspace Technology

Workspace Technology's Data Centre Solutions division is dedicated to delivering industry-leading service, support & optimisation for our customers across the UK. By engaging you and taking the time to understand the business and performance related issues Workspace Technology is able to effectively address the demands of your business.

Workspace Technology welcomes this opportunity to connect with you as a valued customer. We would like to share our vision and expertise through a partnership approach. Our ability to deliver integrated, scalable, energy efficient solutions has made us the preferred choice for many public sector and commercial businesses today.

Operating throughout the UK, Workspace Technology offers clients an enthusiastic and refreshing approach, combined with teamwork that takes performance and service to new levels of excellence.

Further details of Workspace Technology's products and services can be found at www.workspace-technology.com.



Approved 'Endorser' EU Code of Conduct on Data Centre Efficiency



APC Elite Partner
Data Centre Certified



Corporate Partner of the
Data Centre Industry Association



Workspace Technology's "Commitment to help clients reduce their carbon footprint through the deployment of energy efficient technology and design".



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