

# The sustainable data centre

The information-intensive UK government sector is aiming for carbon neutrality by 2012, with a 20% fall in carbon emissions by 2010. EDS's **Anne Augustine** shares latest developments in data centre design that will help with carbon reduction targets



EDS's new air cooled mega data centre, currently under construction at Wynyard near Billingham

**2**008 appeared to be a year of sustainability initiatives. In 2009, as economic confidence unravels, some are asking whether sustainability is a discretionary spend too far. As recession bites and growth slows, bankruptcies will soar. In these harsher circumstances some may axe green initiatives believing them to be incompatible with the provision of value for money options.

Going green isn't an easy option, but there is plenty of experience to show that embedding green principles into IT and business strategy can go hand in hand with saving resources and driving efficiency. The latest industry practice in this area represents mainstream solutions that can make a huge difference to your bottom line. Indeed, in its 2009 outlook, The Economist cited sustainability as a way of staying in

business for some organisations.

Moreover, there is no way the industry can ignore upcoming legislative changes, such as the Carbon Reduction Commitment. Analyst firm Verdantix suggests that the recession and financial turmoil will divide CEOs into two groups on the issue of climate change: the "strategy haves" and the "strategy have nots".

## Data centres – major greenhouse gas contributors

For most service sectors, data centres are a number-one source of greenhouse gas emissions. Between 2000 and 2006, the amount of energy used to store and handle data doubled, with the average data facility using as much energy as 25,000 households.

A square foot of data centre can do a lot more processing, but it requires a lot more

power. In terms of density per rack, power requirements in the UK have risen from 1kW to 2kW per rack in 2001 to 20kW or more today. Commercial prices for electricity are at around 6p per kilowatt hour (kWh). So, 13 MW of power costs £780 an hour, or £18,720 per day. Processing performance rose by 75 times from 1999 to 2006, but performance per watt increased only 16 times.

McKinsey estimates that by 2020 data centres will account for 22% of the total IT carbon footprint, compared to 13% in 2007. Despite virtualisation and other efficiency measures, data centres will grow faster than any other technology driven by need for storage and services hosted on volume servers.

But there are measures that can be taken to ensure that any growth is 'good growth'.

McKinsey's analysis indicates that nearly

every company could double its data centre energy efficiency over the next three or four years using currently available techniques and technology. Achieving this goal requires stronger data centre management, better planning, and increased accountability.

In the short to medium term, in preparation for compliance and reputation management as a result of the Carbon Reduction Commitment, organisations with significant computing facilities will need to continue to focus on cost reduction activities that also have positive carbon impacts. This will require the development of business cases that meet the chief financial officer's and chief information officer's – as well as corporate social responsibility – objectives.

### Maximising data centre efficiency through whole systems design

EDS recognises that the IT infrastructure and data centres that it operates are heavy consumers of electricity. As most consumption is driven by the technologies currently available from computer hardware manufacturers and is required to meet the business commitments of our clients, EDS sees significant opportunities for managing these assets, along with improvements in facility design and management, improving and maximising overall efficiency.

In partnership with the Rocky Mountain Institute, EDS convened a multi disciplinary and cross industry data centre design team. The team set aside convention regarding traditional data centre design and looked at technologies from other industries and sectors to see if they could be used to improve sustainability and efficiency while maintaining optimal levels of resilience and service availability. Operational and maintenance issues were also examined, as were equipment selection and build criteria, both IT and mechanical/electrical infrastructure.

The practical ideas were incorporated into what became known as the "Eco2 Data Centre", which forms the basis of the design that is currently in development in the build of a brand new mega data centre near Billingham in the North East of England.

### The air cooled giant of the north

The four-hall data centre at Wynyard will be one of the largest and most environmentally friendly in Europe. With the rising cost of energy, and mounting concern over the IT industry's contribution to carbon emissions, EDS' new data centre design for Wynyard sets a new standard for data centres.

The building design allows for the direct cooling of IT equipment and plant rooms using the external cool air associated with

**“we deliver services that add value, reduce risk, with a lower total cost of ownership and a carbon reduction”**



The Air Cooled Giant of the North incorporates latest innovations in sustainable data centre design

the North East of England. This will result in an anticipated annual energy saving of 40% compared to a typical data centre design. The use of innovative technology in the final design of the facility won EDS an award for Data Centre of the Year at the Data Centre Awards in December 2008.

Wynyard is able to reduce the cost of cooling in its facility through a number of design considerations: Eight 2.2m diameter fans in each of the four halls in the data centre used to supply air, and another eight used to exhaust air; a mixing chamber in the facility re-circulates air to maintain conditions in the 5m-high pressurised plenum below the computer equipment; and 8100m<sup>2</sup> of technical space at an average capacity of 2260 w/m<sup>2</sup> to a tier 3 standard. The data centre contains humidification and cooling coils to tune the outside air condition and remove contaminants.

The above measures offer the potential to improve the Data Centre Index of Efficiency (DCiE) from 57 to over 85%, yielding annual energy savings of 4.1GWh (per pod at 1kW/sq m) while providing three times the amount of computation per unit of IT power.

This added computation can serve proportionally more clients in the same data centre area, and offers a number of client benefits including increased utilisation of IT assets through virtualisation, thereby reducing the physical asset count and footprint in the data centre; lower carbon and energy impact and a reduced total cost of

ownership following transformation.

EDS is also improving operational efficiency and productivity in our existing data centres. By focusing on facilities, IT equipment and operations, our global environmental strategy can achieve a 33% reduction in EDS's projected, business-as-usual, corporate greenhouse gas emissions over three years. Optimising energy use in data centres can deliver 75% of the total projected emission reductions; and free up over 14 MW of energy capacity.

### Helping clients reduce their carbon footprint

We focus on helping our clients meet their own environmental sustainability objectives through our services. Our approach here is termed Eco2 – economically feasible and ecologically sustainable IT. That means our services must provide economic and ecological benefits – so we deliver services that add value, reduce risk, with a lower total cost of ownership and a carbon reduction. ●

Anne Augustine, head of global citizenship and environmental sustainability (EMEA region), EDS. Sources and acknowledgements:

Greening Government ICT, Cabinet Office, July 2008; McKinsey; Verdantix; Gartner; The Economist; Rocky Mountain Institute; CIO Magazine; The Green Grid, The Carbon Trust

