

# Campus Energy Solution Promises Big Financial Savings

Case Study



Brunel University deploys Cisco Energy Management as first step towards full networked control of facilities power usage.

## EXECUTIVE SUMMARY

**Customer Name:** Brunel University

**Industry:** Education Sector

**Location:** West London, UK

**Number of Employees:** 1,620

### Challenge

- Employ IT infrastructure to measure, monitor and manage energy use
- Apply automated network policies to switch off PoE devices
- Establish foundation for full Cisco Building Energy Management solution

### Solution

- Live implementation including IP phones and WLAN in campus buildings
- Test-bed installation to verify impacts of varying energy use scenarios
- Collaboration with Cisco and partners to refine key system components

### Results

- Typical cost reduction including PCs and printers is £90,000 a year
- Successful application of policies shows larger savings to come
- Ensures compliance with new imperatives for improved sustainability

## Challenge

Brunel University is a big, forward-looking university on the fringes of West London. For 43 years, it has sought “to combine academic rigour with the practical, entrepreneurial and imaginative approach” of its namesake – the brilliant 19th century British engineer, Isambard Kingdom Brunel. Brunel offers courses in business, engineering and design, information systems and computing; health sciences and social care, law, social science, sport and education, and the arts. It is known for excellence in both teaching practice and research.

The university has more than 1,000 full-time academic and professional staff and employs about half that number of part-timers. In the 2008-09 academic year, almost 15,000 students were enrolled for graduate and post-graduate courses – an increase of more than seven percent over the previous year – representing around 100 nationalities. Now nearing completion of an ambitious £300 million redevelopment scheme, Brunel strives to offer courses tailored to the fast – changing social and business demands of the 21st century.

It has a similar agenda for its operational use of technology, having been an ‘early adopter’ among UK universities of solutions designed to harness the potential of networked ICT. Brunel had numerous IP-based devices deployed across its campus by 2008; but rising energy costs, budgetary pressure and the growing importance of sustainability issues drove it to seek an innovative solution to measure, monitor and manage power consumption more effectively, using the network as a powerful platform to implement new energy-saving policies.



“As the full cisco solution rolls out, we expect our savings to increase – if not quite in orders of magnitude, then certainly into significant thousands of pounds.”

Simon Furber, Network Manager  
Brunel University

### Solution

Brunel's network manager, Simon Furber, started discussing possible ways to utilise the university's network architecture with his various operational managers in autumn 2008, exploring ideas to enhance their control of campus power usage. At that stage, Brunel was using a large number of Cisco devices operated by Power over Ethernet (PoE), such as IP phones and Wireless Access Points. The only programmable options were to specify whether a device or group of devices should be on or off, and the instructions had to be manually input.

During a visit to the Cisco Networkers' meeting in 2009, Furber was intrigued to learn of Cisco Energy Management, a feature that can be activated, free of charge to the user, in the operating systems of certain classes of Catalyst switching. Not only did Cisco Energy Management promise detailed visibility of power usage; it would also enable the IT department to begin setting much more granular policies for buildings, for selected rooms within a building, or even for individual devices – and implement them programmatically over the network.

Furber was excited to find that Cisco Energy Management is just the first stage of Cisco's planned launch of a complete Sustainable Energy Management (SEM) solution. Cisco Energy Management is the foundation for Cisco's Building Energy Management (BEM) solution, which itself forms a key building block in the full Cisco SEM vision. It will integrate monitoring and control of IP-based information technology services with the monitoring and control of facilities-based services, including lighting, heating, air-conditioning, elevators, alarms, video surveillance equipment and access control technologies. The solution is being rolled out in three phases, scheduled to reach the end-point of full building automation control by Q3 in 2010.

Having a close relationship with Cisco of some years standing, Furber was quick to engage with the Cisco Energy Management team and gladly accepted a proposal to trial the new software on Brunel's IT system. The objectives would be to gauge the accuracy of Cisco Energy Management data by comparing it with readings recorded independently on IP-based electric metering; to test the effects, if any, of Cisco Energy Management on system server loads and the operation of other essential university applications; to determine how responsive the new control system is to commands; and – not least – to establish a benchmark for potential cost savings in the future.

At Brunel, the software was installed on the IOS systems of Catalyst 4500, 3560 and 3750 switches, covering around 80 physical switches and some 15 per cent of the university's network. Cisco Energy Management is capable of using both the established Simple Network Management Protocol (SNMP) or of being programmed via the Command Line Interface (CLI). Its Application Programming Interface (API) also enables integration with almost any management station, new or existing, and thus affords a wide range of customer options.

Furber found the installation simple to perform. “The configuration remains the same, and upgrading switches is a pretty routine thing for a network manager. The IOS develops naturally anyway, new features are added, older ones improved and bugs are fixed. Introducing things like Cisco Energy Management is simply an operational change management task, which can then be simply turned on if required,” he notes.

“Cisco Energy Management is becoming far more sophisticated in the way it negotiates with end devices in the network, adding more complex criteria and new levels of security.”

Simon Furber, Network Manager  
Brunel University

The implementation was in two parts. There was a “live” installation at a lecture block and Student Centre, equipped with 100 IP phones and 150 wireless access points; here system operations could be observed rather than changed in mid-stream. Running alongside it was a “test-bed” installation, equipped with around 30 IP phones, where changes could be made to verify the speed and responsiveness of the system to Cisco Energy Management commands, and the match between energy usage data from the system compared with separate metering.

### Results

Cisco commissioned an independent study of the Brunel Cisco Energy Management implementation from Professor Colin Pattinson, of Leeds Metropolitan University, which in 2007 led the People and Planet Green University League. Pattinson found no impact on system loads at Brunel from using Cisco Energy Management, while operation of other applications was unaffected. Correlations between energy usage levels recorded by Cisco Energy Management and separate metering were very close.

Pattinson then calculated the annual financial savings shown by the Brunel implementation – when extrapolated to reflect the IT equipment of a typical UK university using 3,000 IP phones, 300 wireless access points, 5,700 PCs, 1,100 printers and 1,630 servers – at £12,280 a year using Cisco Energy Management only, and £90,823 a year with PCs and printers included. This would equate to around £47 for every member of Brunel’s staff. Equivalent figures for a typical Further Education (FE) college – equipped with 300 IP phones, 30 wireless access points, 1,646 PCs, 228 printers and 54 servers – were £1,228 and £23,450 respectively.

Both Furber and Pattinson anticipate that additional elements of the Cisco Building Energy Management system, including Building Mediator and the Enterprise Energy dashboard, will push the financial savings to higher levels. “As the full Cisco solution rolls out, we expect our savings to increase – if not quite in orders of magnitude, then certainly into significant thousands of pounds, depending on how aggressively the features are used,” Furber comments.

Furber found Cisco’s rapid development of new versions of Cisco Energy Management software has, even during the Brunel trial, given him progressively higher levels of control. “We started with the ability to set times for switching devices on and off, so you can set recurring policies; as it develops, Cisco Energy Management is becoming far more sophisticated in the way it negotiates with end devices in the network, adding more complex criteria and new levels of security.”

Brunel tested another key component of the system, developed by Cisco technology partner SolarWinds: a real-time dashboard providing a graphical view of energy usage across the network. When the IT network is linked with building management systems, the dashboard will enable managers to adjust quickly to sudden surges due to unforeseen events, such as a heatwave. Summing up Cisco Energy Management and the potential of Cisco’s BEM Solution to save money and reduce greenhouse gas emissions, Furber says: “It’s only the tip of the iceberg.”

Professor Pattinson adds: “The opportunity to combine IT energy management with control of other energy- using devices in an integrated fashion offers truly significant savings and benefits: in a world where ‘everything over IP’ is becoming reality, a converged IP-based energy monitoring and control system is the logical solution.”

### Next Steps

Brunel is set to continue on its path towards the Cisco Building Energy Management solution as the system approaches completion in 2010. The next stage, starting in late 2009, will add key components such as Cisco Building Mediator and the Enterprise Energy dashboard, followed by integration of non-PoE devices, and finally, full building automation control in the second of half of 2010. Cisco’s system development path is supported by collaboration with key technology partners such as IBM, SolarWinds, Verdiem and Schneider Electric.

### For More Information

To find out more on Cisco Energy Management, or on Building Energy Management (BEM) and Sustainable Energy Management, please contact your Cisco account manager and also visit the links below.

Cisco Energy Management at: [www.cisco.com/go/energymanagement](http://www.cisco.com/go/energymanagement)

BEM at: [http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/ppt\\_c97-555538-00.pdf](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/ppt_c97-555538-00.pdf) [http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/ppt\\_c97-555834-00\\_ppt.pdf](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps10195/ppt_c97-555834-00_ppt.pdf)



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