University of Hertfordshire

Winner - Green ICT
Reduction And Re-use of Energy in Institutional data Centres (RARE-IDC)

Summary
- Achieved a substantial and sustainable reduction in the Total Cost of Operation and environmental impact associated with our Data Centre
- Reduced risk and impact to University Systems of fire, flood, criminal damage, loss of power and/or cooling systems
- Raised standards and specification of the accommodation for the University's core network and systems to deliver highly available and resilient IT services

Category sponsor

Profile
- 27,700 FTE students
- 2,300 staff
- Semi-Rural
- 3 Data Centres on 2 sites

Project partners
50% funded by the JISC Institutional Innovation Programme
Engaged supplier - Future-Tech SGI Ltd

The problem
There were two key elements to this project:
1. To raise the standard and specification of the accommodation hosting The University's core network and systems to deliver highly available and resilient IT services. This is one of two Data Centres for the University.
2. To achieve a substantial reduction in the environmental impact, reduce our Total Cost of Operation associated with the Data Centre, and to reduce the impact to the University of fire, flood, criminal damage, loss of power and/or cooling systems.

Environmental sustainability must also be demonstrated by capping or reducing the energy consumption through increasing energy efficiency, removing unnecessary duplication of services.

The approach
- Formed a project board with all key stakeholders represented including Estates and the Environment Team
- Mitigated the risks with the existing facility by moving into a temporary room
- Bolstered our skills in best practices, cutting-edge sustainable technologies and thought leadership on reducing the carbon impact of Data Centres
- Opted for a tender process that included "Design and Build" to transfer risk to the supplier and keep costs under control
- Pre-Qualification Questionnaire (PQQ) helped to reduce the number of appropriate responses
- The Invitation to Tender (I.T.T) Included Best Practices (EU Code of Conduct for Data Centres) and British & International Standards (TIA942)

Our goals
3. To achieve a substantial and sustainable reduction in the environmental impact associated with a Data Centre
4. To reduce the Total Cost of Operation by achieving a return on investment from the solutions implemented
5. To reduce the risk and impact to University Systems of fire, flood, criminal damage, loss of power and/or cooling systems
6. To raise the standard and specification of the accommodation for the University's core network and systems to deliver highly available and resilient IT services
7. To demonstrate and share the techniques used and lessons learned, providing a model for other institutions to follow in achieving the "Greening" of their data centres

Obstacles and solutions

Design and Build contract attracts a large No. of very different responses that are difficult to compare	To overcome this we created a spreadsheet containing all the requirements broken down into sections (Electrics, Cooling, Fire & Flood, etc) and asked the shortlisted suppliers to move their costs into it from their responses to our ITT
Many and various room constraints including: • Pillars & a riser within the data room space • Capacity • Contamination from work areas • An overhead bulkhead • Lack of under floor capacity (only 250mm) • Legacy incorrect (and dangerous) power cabling	With the Design & Build contract, the supplier did detailed surveys prior to bidding and carrried the risk if actuality did not measure up to expectations. Innovation was key with this approach and suppliers were asked to overcome room constraints in their own way, while still meeting our overall requirements
Limited plant space and restricted external build space	The winning design avoided any additional building work – keeping costs low and using existing space to its maximum capacity
"Meet-Me" point for all network cabling	Comms racks were left in place during the refurbishment work and carefully re-housed during migration
The data centre had no external walls	Limited the solutions available for 'free air' cooling, but we could still employ an indirect air-cooled system

Performance and results
- PUE Now down to 1.19L2,MD – 1.33L2,MD (Winter/Spring/Summer readings)
  - Target = 1.22
  - Actual = 1.26L2,MD
- Refurbishment not new Build
- Re-use of some Equipment
- Increase in capacity of 69% with a 55% reduction in the carbon footprint
- Operational cost savings of £38,000 up to a target of £39,000 per annum
- Using a contained Hot Aisle configuration, waste heat is recycled into the building's hot water supply
- Our pathfinder project enables others to follow our success and apply the lessons we've learned along the way
- The first University in Europe to achieve compliance against the EU Code of Conduct for Data Centres

Lessons learned
- Data Centre Size doesn't matter!
  - Great results can be achieved even in small facilities
  - Learn from others by visiting other data centres and reading case studies
- Realising that not all DC providers are the same
  - Involve the supplier as partner for maximum flexibility and effective results
  - Don't be afraid to challenge them
- Cultural changes that breed success
  - Work closely with your Estates dept, gain agreement from them on the final design
  - Embed sustainable processes and technology into everyday data centre processes
- Remember the four M's – **M**eter power usage, **M**onitor equipment and environment, **M**aintain to manufacturer–recommended levels and **M**anage issues immediately before they effect efficiency

Further information
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Environmental Association for Universities and Colleges