

Value Engineering for Sustainable Data Centres

Agreeing the key design requirements, and spending some time Value Engineering the possible engineering solutions at concept stage is vital to ensure the successful delivery of cost-effective, sustainable data centres for the future, argues PM Group's Advanced Technology Sector Head, Brendan Roe.



The last few years have seen a marked increase in the number new data centres constructed worldwide. This trend, which is expected to continue for the foreseeable future, has been driven by a dramatic surge in data management requirements caused by, amongst other factors, the ongoing growth of web-based services, social networking sites and emerging technologies such as cloud computing. A 2007 US Environmental Protection Agency (EPA) report to the US congress suggests that data centre power requirements in the US would double between 2006 and 2011 and will account for over 100 billion kilowatt hours by 2011. With increased capacity requirements and with energy prices projected to continue to rise in the short term at least, one of the main challenges now facing all businesses is how best to maximise the energy efficiency of their data centre resources and, thereby, significantly drive down costs.

The key to building energy-efficient data centres is securing a full understanding and agreement of the client's requirements at the outset and then incorporating these into the building design, systems selection and construction methodology from the concept stage onwards. For me, carrying out value engineering studies early in the project in order to ensure the most cost effective systems and equipment are designed, selected and installed is absolutely vital, as the ability to positively influence the outcome of any project without





significantly impacting on costs and schedule diminishes as the project progresses,” PM Group’s Brendan Roe explains. “Data centres generally comprise many different interdependent systems, so changing even one of these at a late stage will have major cost and schedule implications.”

With 1,800 employees worldwide, leading engineering, architecture, project management and technical services company, PM Group has completed a number of major data centre projects under Brendan’s direction for leading blue chip clients over the past ten years. The Group has vast experience and expertise in the design, project and construction management, fit-out and commissioning of data centres. This experience covers up to Tier IV reliability, 100 MW electrical site infrastructure, 110 kV substations, LV and MV generators, UPS systems, air and water cooling systems, oil storage and utilities distribution on both brown- and green-field sites.

One of PM Group’s most recent projects, a 6,000 sq. m. 100 MW facility on the outskirts of Dublin, has been recognised by the European Commission’s Sustainable

Jones Engineering Group

Engineering Contractors

Irish Sprinkler

Patrick Lynch

H A O'Neil

O'Sheas

Douglas

Microsoft Data Centre

Digital Reality

IBM Data Centre

www.joneseng.com

Energy Europe Campaign as a best practice example of innovative environmental sustainability design and is 50% more energy efficient than comparable data centres built just three years ago.

In addition to the almost exclusive use of free air cooling, boosted by Ireland's low ambient air temperature (a key selling point in Ireland Inc.'s bid to attract related inward investment, Roe feels), the design also facilitates improved hardware utilisation, reduced water and electricity usage and lower waste material production.

Innovative systems to boost sustainability

"Data centre energy consumption is traditionally divided equally between server power and building cooling systems. However, industry studies indicate that up to 76%

of existing facilities are actually overcooled and are, therefore, energy-inefficient, so the scope for major savings through the innovative use of air and water cooling at the correct temperatures and good system design and equipment selection to drive Power Utilisation Effectiveness (PUE), boost sustainability and reduce costs is significant," Roe points out adding "It is important that owners of these existing facilities correct this overcooling and that owners and designers do not repeat this mistake of overcooling in new facilities"

Key considerations in carrying of the value engineering and cost benefit analyses and selecting the best engineering solutions from a total cost of ownership viewpoint are of course the availability and

cost of utilities such as electricity, gas and water.

"All of the relevant factors must be part of the value engineering assessment, if the best solutions are to be selected and project is to be successful," Roe says. "With data centre capacity requirements increasing all the time, the need to maximise energy efficiency to reduce costs is already high up the corporate agenda. As these facilities are generally 24x7x365 day operation, even a small increase in efficiency can result in major savings in running costs.

For further information:

Brendan Roe, Head of Advanced Technology, PM Group
T: +353 1 404 0700 E: brendan.roe@pmg.ie