

MISSION CRITICAL POWER

missioncriticalpower.uk

ISSUE 13: October 2017

08 Hyper security in a changing world: the hidden data centre taking DCIM to new depths

12 Ian Bitterlin answers the question: is PUE a flawed, inadequate metric or nearly perfect?

22 Tiers of joy: how risk reduction can save money for data centre operators



Getting the best from UPS

See page 14

www.riello-ups.com

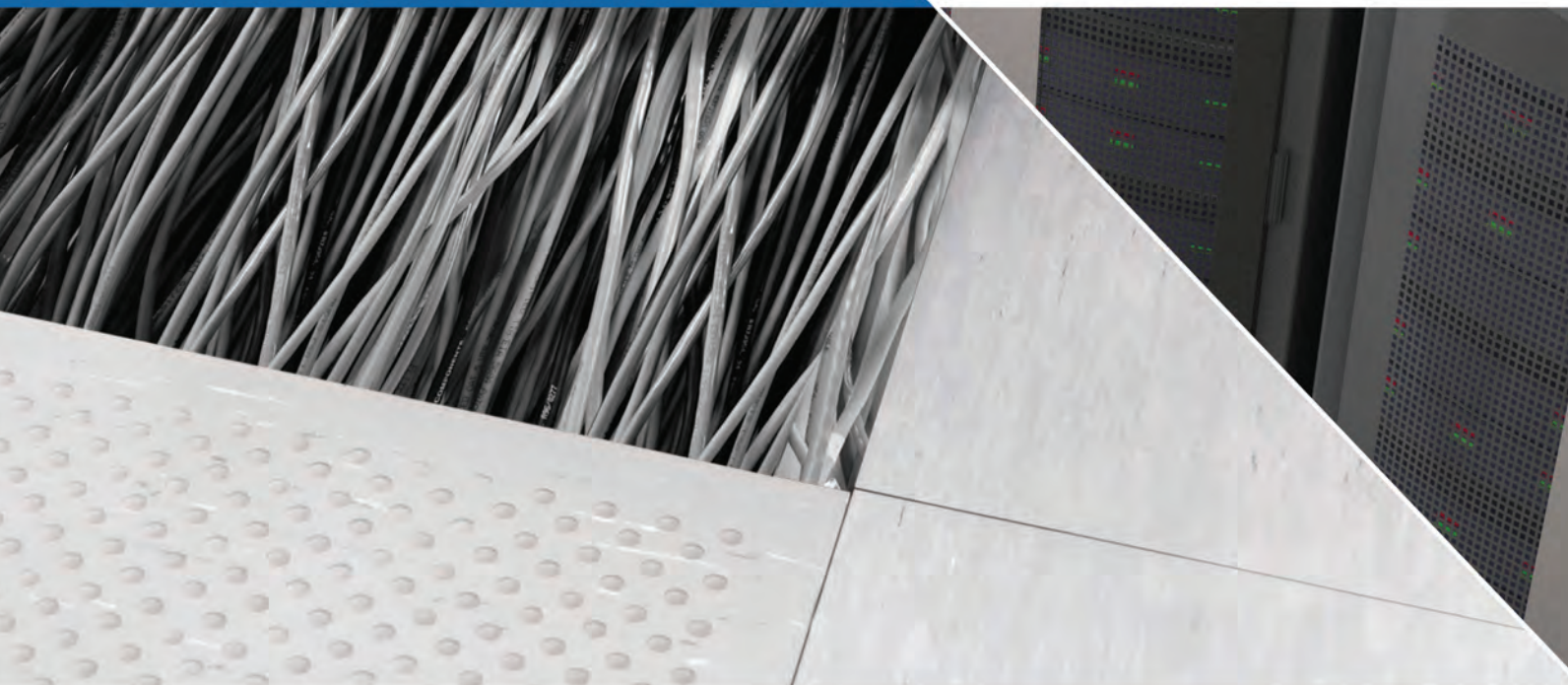
Reliable power for a sustainable world

RIELLO ELETTRONICA
riello ups



**Hundreds of
power whips.**

**Or one simple
solution.**



Increasing power density within data centres is an ongoing challenge for facilities managers. And the continual cycle of increasing power requirements has too often translated into more cables and whips under the floor. But Starline Track Busway is self-contained, customisable and flexible. So you can avoid a jungle of wires, and enjoy power expansion in minutes, not weeks. To learn more about our maintenance-free, reliable systems, visit StarlinePower.com.

STARLINE®
TRACK BUSWAY

Come see the Starline team at DataCentres Ireland booth 125.



8
Hidden data centre
Deep within a Swiss mountain is a cold war bunker that 'hides' one of the most secure facilities



12
Viewpoint
Ian Bitterlin considers: is PUE a flawed metric?



16
Managing risk
Incident reporting could help to reduce risk, but will data centres overcome their secrecy?



20
Switchgear
For the Shanghai Stock Exchange, reliability was crucial





30
Demand-side response
Are you switched on to DSR or turned off by the hassle?



38
Future of DCIM
Experts say it will be: 'remote, data-driven and cloudy'



14
Front Cover
Riello on how to get the best from your UPS

Comment	4	Backup Power	18	UPS Systems	42
News	6	Data Centre Optimisation	22	Data Centre Infrastructure	46
DCIM Solutions	8	Demand-side Response	30	Products	47
Risk Management	16	Energy Security	34	Q&A	50

To subscribe please contact: missioncriticalpower.uk/subscribe

Holes in the Swiss cheese...

The Uptime Institute's 2017 survey found that a quarter of all respondents had experienced a data centre outage in the past 12 months. Clearly, there is a need to learn from mistakes and share this learning with the sector as a whole. It is heartening, therefore, to see that the data centre sector is taking a leaf out of the healthcare and aviation industries' books, by seeking to learn from incidents.

The Data Centre Incident Reporting Network (DCIRN) has been set up to tackle this issue and will no doubt face challenges ahead to encourage a culture of shared learning and cooperation, in order to drive improvement across the sector. It is an ambitious undertaking. Overcoming secrecy, fear, blame and denial will be a difficult journey but there are some great examples of how this is being achieved in other mission critical environments.

The healthcare sector has adapted human factors engineering from the aviation industry and this would be a good methodology for data centres to adopt, to mitigate their risk of human error. Human factors

science recognises that to 'err is to be human', that people have limitations, and that the systems and processes in which they operate often set them up to fail.

Human factors science is not concerned with who is at 'fault', but identifying weakness in processes and environments that make mistakes more likely to happen. It looks

at human psychology, teamwork, tasks, equipment, working cultures and organisations. In short, it looks at the bigger picture of why people make mistakes.

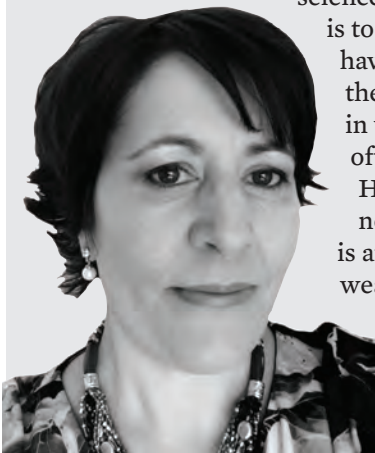
Experts in the health service talk of Reason's 'Swiss Cheese' model of accident causation. Effectively, this model demonstrates that 'when all the holes line up' the conditions allow a hazard to transition through multiple layers of defences to result in a loss or, all too often, a major incident.

A 2016 report by the Ponemon Institute found human error to be the second most common reason for data centre downtime, accounting for 22% of all incidents. However, the events leading up to these errors, the systems in place, the management decisions, training and infrastructure design are the real story behind this statistic. It takes all of the 'holes in the Swiss Cheese' to line up for human error to have a serious impact.

The British Airways data centre outage, which left 75,000 passengers stranded on a busy bank holiday weekend, was allegedly traced to 'a single engineer' who disconnected and reconnected a power supply, causing a power surge that severely damaged critical IT equipment. I pity the poor scapegoat who carried the blame. I suspect further investigation will uncover many holes in the Swiss Cheese!

Data centre operators need to be honest with themselves about the causation of incidents, learn from their mistakes, share their knowledge and install robust defences. The blame game will not solve the issues in the long run.

Louise Frampton, editor



MISSION CRITICAL POWER

Editor

Louise Frampton
louise@energystmedia.com
t: 020 34092043
m: 07824317819

Managing Editor

Tim McManan-Smith
tim@energystmedia.com

Design and production

Paul Lindsell
production@energystmedia.com
m: 07790 434813

Sales director

Steve Swaine
steve@energystmedia.com
t: 020 3714 4451
m: 07818 574300

Commercial manager

Daniel Coyne
T: 02037517863
M: 07557109476
E: daniel@energystmedia.com

Circulation enquiries

circulation@energystmedia.com



Energyst Media Ltd, PO BOX 420, Reigate, Surrey RH2 2DU

Registered in England & Wales - 8667229
Registered at Stationers Hall - ISSN 0964 8321
Printed by Warners (Midlands) plc

No part of this publication may be reproduced without the written permission of the publishers. The opinions expressed in this publication are not necessarily those of the publishers. Mission Critical Power is a controlled circulation magazine available to selected professionals interested in energy, who fall within the publishers terms of control. For those outside of these terms, annual subscriptions is £60 including postage in the UK. For all subscriptions outside the UK the annual subscription is £120 including postage.

Follow us for up-to-date news and information:



5 vital ways to maximise availability from your critical power systems



Every facility is vulnerable to the threat of an outage that can grind its operations to a debilitating halt.

The condition of the electrical power systems that supply a facility should be a top concern for every organisation where downtime is to be avoided. Power is the least visible critical element required to run your organisation, but when failure occurs, the impact is palpable.

When investing in a new electrical system or power infrastructure, early engagement with a specialist electrical engineer at the design stage should ensure that your installation has important aspects of on-going maintainability "designed in" allowing for safe and regular servicing, planned shut-downs and future modifications. But even the most strategically designed solutions should take additional safeguarding measures to ensure operators are not kept in the dark over any outage risks.

It is important to recognise that the majority of power failures that occur within high-profile facilities are, quite alarmingly, caused by human error. Fortunately, this also means that most incidences of threat are avoidable. Prism Power Group highlights the following key areas that your organisation should consider reviewing to help mitigate risk and maximise the availability of electrical power supply in your building:

1. Train staff rigorously and test your procedures

The people responsible for power system operations on a daily basis can change over time and are not those typically involved in the original design or installation. Ongoing training, particularly on systems that are less frequently operated, coupled with simple "step-through" instructions, such as Standard Operating Procedures (SOP's), are

vital for enabling all operatives to manage the equipment correctly and with confidence. Facilities should keep up-to-date and thorough procedures for any planned maintenance works and modifications on critical equipment, engaging all key departments and personnel.

2. Use intelligent monitoring tools to visualise power and diagnose underlying problems

Monitoring is a vital tool for raising any issues that would have otherwise remained unseen before the fault occurred. Both BMS and branch circuit monitoring hardware and software deliver intuitive trending data insights to highlight any significant changes, such as the rates of rise in temperatures and energy consumption, and identify where systems are performing less effectively than before. Data can indicate required maintenance work, and help operators to diagnose problems and act on the valuable early warning signs of a failure.

3. Ensure long-term reliability with full life-cycle maintenance programmes

Regular preventative maintenance and testing of systems enables engineers to find and fix electrical faults within the critical infrastructure path before they fail. Regular annual surveys coupled with a "high level" plan for the life-time of equipment, will help preserve system security throughout its life-cycle and ensure assets are delivering long-term efficiency, reliability and ultimate value.

4. Keep spares on-site to reduce repair time

Keeping recommended spare parts and consumables (such as fuses, coils, contactors, circuit breakers etc.) selected for your unique facility risk factors and circumstances can

significantly aid "first time fix" and reduce the MTTR (Mean Time To Repair) allowing operators to restore power and resilience quickly when equipment fails.

5. Audit regularly to ensure your facility is prepared now and for the future

Auditing is an integral part of every preventive maintenance regime, yet most facilities fail to do this regularly. Keeping records of critical systems, manuals and documentation, load capacities, and reviewing associated plans and procedures will give facility managers the greatest picture of their building's preparedness and capacity for modifications.

While there are several contributing factors to consider when looking to maximise power availability, these will all vary in the degree of their impact and importance according to every unique facility, its operations and objectives.

Prism Power Group is a critical power systems supplier that designs, manufactures and maintains high-availability power systems for a wide range of organisations worldwide. With a dedicated Maintenance Services division, the company offers specialist advice, training, equipment surveys, and associated services for maximising the value and security that facilities can achieve from their integral power systems.

www.prismpower.co.uk

 **Prism Power Group**
Your partner in power

Demand to override Brexit fears

The DCD Zettastructure conference and exhibition is returning to Old Billingsgate on 7-8 November and is expected to be attended by more than 1,500 data centre and cloud infrastructure professionals. Featuring topics ranging from artificial intelligence to Brexit, the venue will host topical discussion on the challenges and key trends for the sector.

George Rockett, CEO and co-founder of DCD, commented: "Colocation, cloud and managed service providers are jockeying for position in a fast changing market. They're chewing up what's left of the enterprise-owned assets and bringing a new meaning to what purpose-built means. Add GDPR and Brexit to the mix and it's explosive."

This year's conference programme is designed to help the industry practitioners look to the future as well as get to grips with present day challenges in a record breaking year for the European data centre sector.

Merima Dzanic, conference producer at DCD, said: "We're going to explore the bleeding-



DCD will discuss a range of topics, from the impact of Brexit and AI, to optimisation and data centre migration

edge of innovation from the prism of autonomous vehicles that stretches the notion of latency, the impact of AI and machine learning that's set to become mainstream, to the future of energy supply."

While the demand for digital services, big data and IoT is spurring investments in mobility, automation and cloud technologies, IT operations and facilities teams are faced with the realities of managing legacy technology portfolios.

Gunnar Menzel, chief

architect at Capgemini, who will be speaking at the event, said: "Cloud is the new norm. However, for many large-scale enterprise IT organisations, especially in the financial services sector, migrating their on premise traditional systems that have been in use for many years, is not always feasible or cost-effective; the journey towards a digital world has to consider traditional and cloud native setups."

How to optimise existing environments and to manage data centre upgrades

and migrations as hybrid computing becomes more prevalent will be a hot discussion topic at this year's conference.

CBRE's head of EMEA data centre research Mitul Patel, who will also speaking at the event, commented that the London market will be looking for a strong 2017 to follow on from its record year in 2016 where it saw 49MW of colocation take-up, against a five-year average of 22MW prior to 2016. Industry reports suggest that Brexit has had little negative impact on London. While demand for cloud services remains strong, benefitting both hyperscale and smaller cloud players, some business decisions are being delayed due to Brexit and GDPR uncertainties. However, the strong demand will most likely override these fears.

"We may get a clearer view of Brexit's impact on decision-making towards the end of this year as details become clearer," Patel commented.

For the latest information on the conference programme, visit: <http://dcd.events/conferences/zettastructure>

Warning over threat posed by 'zinc whiskers'

The issue of 'zinc whiskers' in data centres is not improving and some are still failing to recognise the dangers posed by the tiny particles in causing equipment failure and outages. This is the view of specialist data healthcare business ABM Critical Solutions after a survey of more than 30 sites across the UK in the past 12 months.

Mike Meyer, sales director at ABM Critical Solutions, commented that part of the problem is knowing how to prevent the whiskers from entering the critical space in the first place. Once present, they will grow organically and even spread. There is no known cure and ongoing

cleaning is the only solution currently outside of replacing infected components which isn't usually feasible.

"Because the whiskers are almost impossible to see with the naked eye, operators are sometimes oblivious to the problems they can cause," Meyer said.

"When zinc particles enter a data centre's hardware, they form conductive structures that cause circuit trips and electrical failures."

He added: "However, the particles disintegrate when a short circuit occurs, and unless a technician is aware of this phenomenon, it may go undetected as the source of

the issue. It is vitally important for data centres to have regular and thorough specialist cleans, air and surface quality tests and visual inspections, even though system operators may not believe there is a problem."

The company uses special scientific analysis to identify whether zinc whiskers have formed and, if so, their stage of development so that efficient and thorough cleaning can take place.

Meyer warned that these particles could ultimately lead to critical infrastructure failure, if action isn't taken to tackle the issue.

Riello names PSE Power as partner in Ireland

Riello UPS has announced a partnership with PSE Power, one of Ireland's largest independent suppliers of power protection and energy management solutions. The deal gives PSE Power exclusive reseller access to Riello UPS stocks and supplies in Ireland, and strengthens PSE's 'all-time uptime' power protection offering to leading technology companies and data centres including Google, Apple, Thomson Reuters and Interxion.

With Ireland's data centre market set for further growth and expansion, the partnership signals Riello UPS' commitment to providing its Irish clients with the highest levels of service and support for the full range of Riello UPS products. Announcing the partnership, Leo Craig, general manager of Riello

UPS, said: "We're delighted to welcome PSE Power to our expanding community of resellers. The company's specialist engineering capabilities and nationwide coverage made it the right partner for our business. We're looking forward to working together closely into the future to deliver reliable mission critical power protection systems and support to our customers in Ireland."

PSE Power's managing director, Pdraig Smith, commented: "We are very excited about this new chapter in PSE's story.

"This is a very positive development for our customers and the team at PSE, and we are very well positioned for continued success and a new level of growth with Riello UPS here in Ireland."

Riello UPS and PSE Power will be attending Data Centres Ireland.

News in brief

£10m deal for JCB diesel generators

JCB has secured a deal worth £10m which will see the company's first major entry into the gas-powered generator sector. The company will supply 34.5MW of gas-powered generator sets to leading alternative electricity generating company AGR Group – the largest deal of its kind for JCB. The generators will be installed across five sites in England and will include 2.5MW and 2MW generators supplied as both open and containerised models at 11kV and 6.6kV sites.

Power market growth

The global data centre power market is expected to reach \$10.77bn (£7.94bn) by 2025, according to a new report by Grand View Research. The global data centre power market is majorly driven by the shift of various end-users towards hyper-scale and colocation data centres. The increase of such data centre facilities is anticipated to result in an increasing demand for data centre power equipment in the coming years.

Backup generators mandated in Florida

In Florida, nursing homes across the state have been given 60 days to equip their facilities with backup generators, after the deaths of eight people. Nursing home residents are reported to have died in sweltering conditions inside the Rehabilitation Center of Hollywood Hills. Under the new rules, nursing homes must ensure their facilities have the ability to run on sufficient backup power to control temperatures inside their facilities for four days. Failure to comply could cost the home \$1,000 per day.

Frankfurt airport generators help stabilise power grid

Four emergency power generators for German transport company Fraport are now linked to E.ON's energy platform. This means that, if needed, Frankfurt Airport can feed additional energy into the power grid within seconds.

Through its virtual power plant, E.ON can directly draw on the power generation facilities of its numerous customers to stabilise the power grid when demand is too high or too low.



Fraport's emergency power generators can also be activated to supply up to 5MW of additional power

to the public grid within seconds. In the event of a power failure, the Fraport network disconnects itself from the public grid, and the emergency power generators kick in to provide the airport with an autonomous supply of power. In such an event, access to the generators by E.ON's virtual power plant is automatically interrupted and not reactivated until the power supply at the airport has stabilised.

Expert insight at Dublin conference

Data Centres Ireland is in its sixth year this year and combines both a dedicated exhibition as well as an adjacent multi-streamed conference, giving attendees access to the latest in information, best practice, products, services and solutions.

Taking place in Dublin on 20-23 November, the conference provides the opportunity to hear the latest

in ideas and case studies presented by leading industry experts and take part in facilitated discussions.

Data Centres Ireland addresses every aspect of planning, designing and operating your data centre, server room, storage facility or solution. The conference will include thought leadership and industry insights from high-profile speakers including:

Steve Hone, co-founder, Data Centre Alliance; Mark Acton, critical services director, CBRE Data Centre Solutions; Emma Fryer, associate director, cloud and data, techUK; and Pat Breen, Irish minister for trade, employment, business, EU digital single market and data protection, to name just a few.

For further information visit datacentres-ireland.com



Hyper security in a changing world: the hidden data centre

There have been some high profile power outages at data centres, political instability in the EU and suggestions that data centres could become the next target for terrorist organisations. A data centre hidden in the Swiss Alps aims to mitigate these risks, combining high security, resilience and energy efficiency. Louise Frampton reports

Hidden in a former Swiss military bunker deep within the Alps, the Deltalis data centre provides colocation services to clients with some of the most demanding requirements, and operates in the context of the world's most robust privacy laws. Built 300m deep into the mountain side, the bunker was originally designed to withstand threats from Cold War enemies, meeting the highest security standards.

"When we established Deltalis, we had three primary goals," notes Frank Harzheim,

the company's CEO. "We wanted to deliver absolute physical and digital security so that our clients could trust us without question. Switzerland has recently been ranked number three of the most suitable countries in the world to locate a data centre from a risk point of view. We also wanted to provide a facility that would be trusted within the Swiss market – one of the most demanding anywhere globally. Finally, our aim was to offer customised services, delivering a more bespoke experience than can be found

elsewhere in the market."

As a business committed to sustainability, Deltalis was keen to reuse an existing facility rather than a new build. As well as creating one of the most secure data centres, this location freed the facility from the risks associated with an urban environment such as vibrations, overloaded energy networks, civil works and construction.

Being located only 60 minutes from Zurich, it is also connected to one of Europe's thriving commercial hubs, ideal for both domestic and international accessibility.

The company serves a very broad range of international customers – many of whom are small and mid-size businesses with a core reliance on secure data housing and management. Alongside typical use cases, some clients use the facility as a backup site for disaster recovery while others are cloud service providers themselves, delivering absolute security to their own customer base.

Common to all their needs is the ability to trust in the data centre they use. Among the various factors that allow Deltalis to deliver this trust is

knows how demanding the standard is," Harzheim comments. "There is no room for ambiguity or error and it demands a systematic approach to managing sensitive company information. We had to undertake a series of risk management processes to ensure that data remains secure, and this spans people, processes and IT systems. Despite the challenges, there are significant benefits to our customers, such as improved business continuity and risk management, legal compliance and the elimination of key security threats.

"In our case, creating an optimised mission critical facility didn't mean just starting from scratch with a green field site. We needed to turn a non-custom designed site into a highly optimised and efficient data centre.

"This required smart engineering to get around physical and legacy infrastructure factors. Furthermore, we knew that we needed complete visibility and control of the performance of our data centre, and everything that is important in our service – which is why we have DCIM

of critical systems and gaining information about key assets such as alarms.

"The hardware and software combination of Trellis and its ability to consolidate alarms from heterogeneous systems was significant for us. Because we kept some of the existing infrastructure, it was important that the data centre infrastructure management systems allowed us to visualise all the critical systems and this required a system that could manage diverse systems, both old and new, with different interfaces. Trellis is exceptional at integrating different language and protocol systems in a single control panel," Harzheim explains.

The company also needs to be able to make informed decisions, particularly in relation to capacity management: "As a data centre provider we have a

maximise the value of those assets."

High levels of energy security and sustainability are important advantages of the site – the data centre uses locally produced, 100% green energy from hydroelectric power stations in the surrounding mountains and any KW that is consumed by the customer is 100% CO₂ neutral, says Harzheim.

Cooling and energy management

He further points out that these green credentials are achieved without charging customers a premium and certification can be provided for businesses that use their services; in fact, more and more businesses are demanding this as part of their corporate commitment to sustainability, he reveals.

Cooling contributes to a significant part of a data

99.999%

The uptime guaranteed by the Deltalis data centre, as part of its service level agreements

“The Trellis platform has enabled Deltalis to undertake live health checks of the data centre – examining the facility’s power consumption, the performance of critical systems and gaining information about key assets such as alarms

the ISO 27001 certification.

Data centre infrastructure management

Trellis, a data centre infrastructure management (DCIM) platform from Vertiv, has provided Deltalis with the enhanced visibility, control and planning needed to help achieve ISO 27001, as well as helping the data centre to increase energy efficiency, ensure uptime and improve thermal performance.

"Any data centre decision maker who has been through ISO 27001 certification

at the core of our operations," Harzheim states.

The customers' Service Level Agreements (SLAs) guarantee 99.999% uptime and Harzheim reveals that the data centre has exceeded this, with no outages in the past year. In such an event, the data centre's redundant systems would take over and this requires a powerful monitoring system. The Trellis platform has enabled Deltalis to undertake live health checks of the data centre – examining the facility's power consumption, the performance

conceptual perfect state of 100% utilisation of capacity. But getting anywhere close to this is challenging, and the more we use our space, the more we have to understand the impact on cooling and other operational factors," comments Harzheim. "Now, with Trellis, we have the ability to make those decisions. Equally, a major cost for our business is power, and Trellis helps us to optimise this key operational factor. With this combined visibility we can get the most from the considerable investments we have made, and

centre's energy consumption and one of the key challenges in locating the data centre in the bunker was to optimise thermal management:

"The system put in place by the Swiss military was very good but the air quality required for a data centre is different – it needed to be as dry as possible. Cooling dry air is much more energy efficient and this was one of the main challenges, so we optimised control of the air conditioning system and adapted it to the data centre requirements," Harzheim comments. »

He explains that one of the advantages of the location is the ability to access mountain water reservoirs, providing a natural resource for cooling.

“From the outset, we wanted to be more energy efficient than others and we use free cooling as much as possible. It was our target to have a PUE of 1.3 or even better. However, we look at energy consumption in its entirety.

A good DCIM system provides transparency and visibility of all the important elements required in determining PUE and managing data centre energy consumption. Trellis has a strong reporting tool which is an important feature – we offer colocation facilities, where a client may be located alongside a larger customer, as well as private, dedicated suites.

“Colocation customers may also want data on their own individual PUE, therefore,” explains Harzheim, pointing out that Trellis has the ability to provide this information.

Reporting and visibility

Harzheim adds that visibility for customers is an important

commercial differentiator for the data centre: “It will soon be possible for customers to remotely log on and see everything that we see using Trellis, anywhere, any time. Our ‘Deltalis Virtual View’ service provides access to reporting and DCIM functionality in a transparent way, allowing them to better understand their own infrastructure,” Harzheim comments.

“When coupled with our ‘Deltalis Virtual Reach’ service, using Vertiv secure remote management, they get the real-time accessibility and visibility they are looking for.

“This is especially important for our international customers who may not have a regular on-site presence. This helps with their remote IT management and their strategic decision making,” comments Harzheim.

The technology allows customers to view and manage their inventory, as well as alarms, and there are also plans to offer a feature to enable clients to understand their energy consumption.

“Even in the pre-sales stage,

we can act as a consultant to help potential customers better determine what space they need, visualise the floor plans in 3D and give them a complete picture of their considered investment, so we’re adding real value, not just the floor space alone,” adds Harzheim.

Staying one step ahead is very important to Deltalis and the organisation is currently working with 3M and Dehmel Technology on implementing innovative cooling technologies. The latest innovation being launched is based on immersion cooling, eliminating the need for conventional cooling technologies that depend on electricity. The hardware is contained in a liquid developed by 3M (Novec Engineered Fluid), which evaporates and condenses. By implementing this method, the data centre can use 100% free cooling, without compressors. It can reduce operational costs (Opex), offering >90% less energy consumption for cooling and >60% less maintenance costs, while improving operational security.

The solution is also

claimed to be better for the environment, delivering: >30% total energy savings for the data centre, a significant reduction in CO₂ footprint, with no requirement for F-gas refrigerants for active cooling. The rack and cooling system are built into a single unit and, as the solution requires up to 75% less floor space, it also improves capacity for high-density computing.

Ultimately, the Deltalis mantra states that it is “all about trust”. There have been some high profile outages at data centres, political instability in the EU and suggestions that data centres could become the next target for terrorist organisations.

Deltalis has implemented the latest technology to mitigate risk by delivering real-time visibility into critical infrastructures.

Independent from the world energy markets, protected in one of the most secure facilities, and located in one of the most politically stable countries in the world, the data centre is positioned to offer “hyper security in a changing world”. ●



A good DCIM system provides transparency and visibility of all the important elements required in determining PUE and managing data centre energy consumption



POWER DISTRIBUTION UNITS



SUSPENDED UNIT
THE RETRACTOR
AVAILABLE NOW! YOU ASKED, WE LISTENED.



Designed and
Manufactured in the UK

+44 (0)20 8905 7273 | sales@olson.co.uk | www.olson.co.uk | |





A flawed and inadequate metric, or practically perfect?

PUE has its critics but it is neither flawed nor inadequate. In fact, for what it is intended to represent, it is nearly perfect; and it would be were it not for a combination of a lack of understanding, deliberate abuse by marketing folks and the ease that it can be manipulated if the data centre operator so wishes, says Ian Bitterlin

We should all know by now (after 10 years) that PUE stands for power usage effectiveness, even though many people still slip into using the word efficiency in place of effectiveness, since all data centres are zero 'efficient' unless all you want to do is create heat.

Like all good stories let us start at the beginning and, if you are sceptical by nature, PUE had a slightly 'agenda'-based start in life. It was innovated by members of The Green Grid (TGG) for global consumption

and the concept could not have been simpler; the ratio of total data centre annual energy to the net ICT annual energy. Clearly the closer to 1.0 the better, although, at the time, the average was nearer 2.5.

In other words, if you have an ICT load that consumes 10MWh over a full 12 months and, to support that load, the facility consumes 25MWh over the same period, then the PUE is 25/10 = 2.5 – simple! The 'annualisation' took care of seasonal changes in cooling energy and averaged out the load, while the only real

definition was that PUE was a metric that should be used to chart the improvement over time in an individual facility and never be used to compare facilities.

Key issues

In that very simple definition four things are immediately obvious:

1. It should have been called EUE as it should be an 'E' (for kWh energy) metric, not a 'P' (for kW power) metric, but it is too late to change it now. So, despite being a glaring engineering error, we won't

mention it again.

2. It says precisely zero about the ICT load – the 'one' in the 'one point something' – that is considered as sacrosanct.

3. The user should be honest (with him/herself) and include all the overhead energy consumption, including the offices, plantroom small power, security, external lighting and embedded energy in other resources such as diesel fuel-oil and even potable water that is evaporated or discharged into the drains.

4. How many times have you



read an article that says that a new data centre will have a PUE of 1.30, for example? How can that be if it hasn't yet been run for a year and will almost certainly fill up with load slowly?

PUE agenda?

So, why did I say that PUE had an 'agenda' in the beginning? Well, this is a very personal view, although having aired it over the years, I haven't had anyone disagree with me: PUE describes the infrastructure effectiveness and took the world's attention away from the very thing that the ICT industry didn't want exposed – the very poor server power supply efficiency at low load and the very low average server utilisation that meant that most servers idled most of the time at a relatively high power. That explained the long-reported condition of data centre power being steady, despite how the business usage should have affected it.

Now, apart from the utilisation, things have improved

dramatically and PUE remains a valid metric that is valuable, easy to use and describes only the annualised facility energy overhead.

But let's have a think about Point 2 above... Modern servers are idle (doing no useful IT work) at anywhere between 20% and 80% power draw (with a 2017 average of around 35%) and the average utilisation (if you exclude homogenous loads like search engines and HPC clusters) around the globe is near to 10%. In other words, most servers are idle most of the time and consume an average of 35% of their 'pedal to the metal' power, although the 'worst' performers idle at nearer 80%. A facility with 60% utilisation and PUE of 2 is a lot more 'energy effective' than a facility with

10% utilisation and PUE of 1.1.

However, I do not regard that a failure in PUE as it was never intended to be a measure of goodness of the data centre – only a measure of the 'overhead' power and cooling losses, lighting and controls etc.

On point 3, some users have made up their own rules about what to include (or not) when doing the PUE calculation. In fact, a lot of people still say that 'PUE isn't well defined'. That may have been true in 2007, but once version two was published by TGG, all the holes had been plugged. Since then, PUE has been standardised in ISO/IEC 30134-2 and no one should be in any doubt. To be a little critical of the ISO process for a moment, their resulting document is probably not as 'perfect' as V2 of TGG's original document as it doesn't include a clear definition of 'partial PUE' (pPUE, useful for sub-system contribution to the overall PUE) and 'instantaneous PUE' (PUE₀, useful for describing the peak kW facility power). Having said that, no one 'has' to follow a standard (unless it is health and safety related or embodied in local legislation) and, on the condition that you consistently apply the same rules every year, your PUE improvement plan will be well founded.

Of course, if you are reporting your PUE as some part of an energy saving scheme, such as an EU CoC Participant, then a set of common rules is a good thing. Having said all that, there are many examples of 'PUE abuse', which brings us onto the fourth point. Some time ago I coined the phrase 'PUE abuse' and here are several common examples:

- PUE is an annualised energy ratio so how can any marketing department claim that their new data centre is, for example,

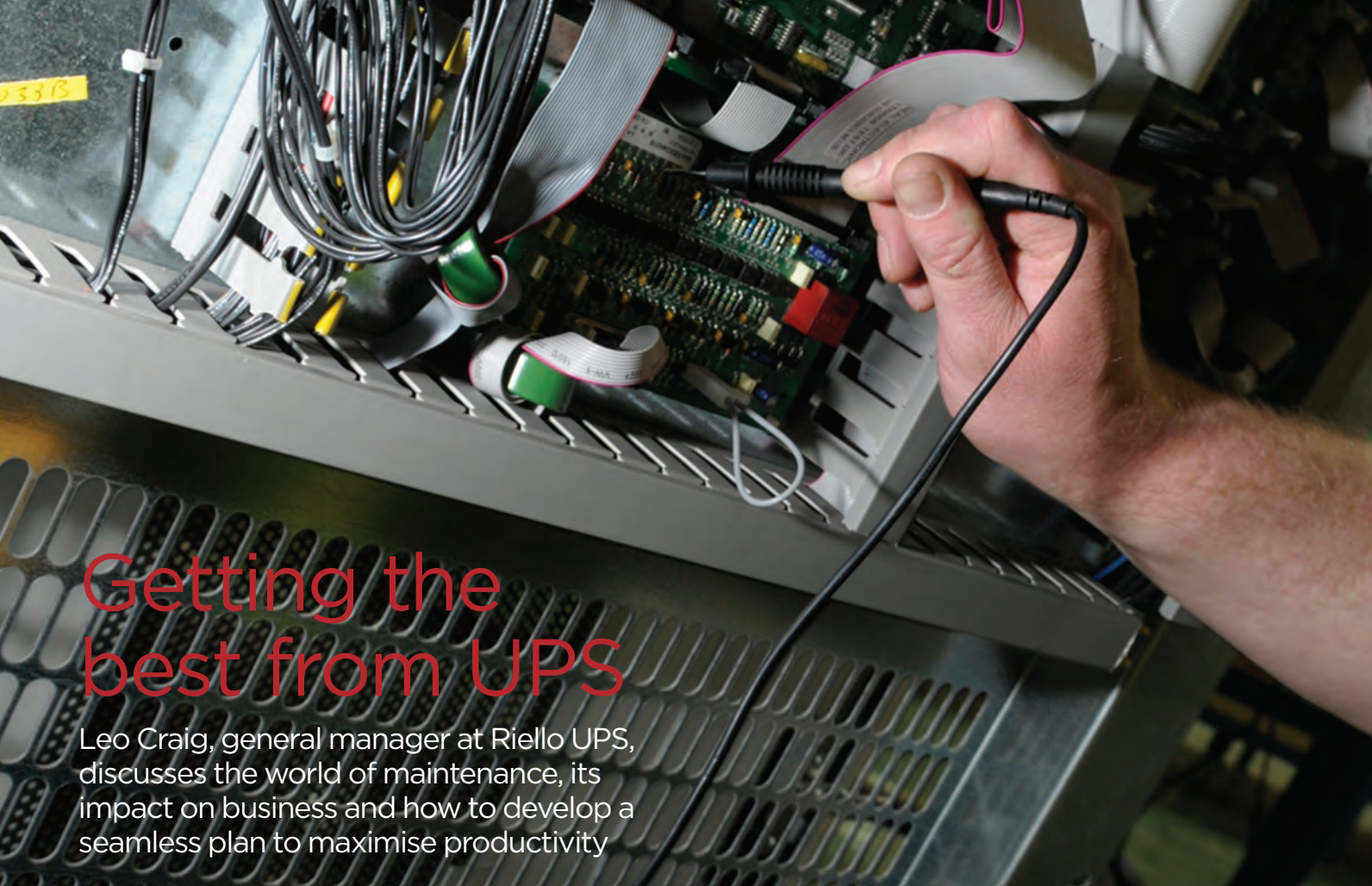
1.3? Only after running for a full seasonal year can you report your PUE

- The press release that stated (on a cold January day in Amsterdam) that their data centre had achieved a PUE of 1.09 for 'a whole 24-hour period'
- The (albeit tiny) cheat that a social-networking site uses when applying LED lighting with power-over-ethernet. It certainly saves energy and copper but conveniently allocates the lighting load to the ICT and not the overhead
- Try not to behave badly so that you can make great leaps in PUE reduction when called upon to do. I did visit a very large (>15MW) facility in Germany without any blanking plates in the cabinets and lots of bypass air – saving up an improvement if and when EU regulations came along
- The claim that someone had achieved a PUE of less than 'one'. This still happens from time to time but less frequently. The 'trick' is always the same – some form of onsite generation or consumption of gas instead of electricity that has been netted-off the facility. One of the funniest was the Californian desert facility that said it had a PUE of '0'. In reality it was a 5kW ICT load fed with 100% solar panel array and battery combination with no grid connection

All things considered, PUE is simple and useful. You should pick a set of rules, be that TGG V2 (free to download) or ISO/IEC 30134-2 (must be paid for) and then stick to it. Do not tell anyone else what your PUE is unless it is to get you energy tax relief. Use your PUE to track your improvements and remember that, regardless of the PUE number, the aim is to reduce power consumption – so get rid of those comatose servers! ●



Do not tell anyone else what your PUE is unless it is to get you energy tax relief. Use your PUE to track your improvements and remember that, regardless of the PUE number, the aim is to reduce power consumption – so get rid of those comatose servers!



Getting the best from UPS

Leo Craig, general manager at Riello UPS, discusses the world of maintenance, its impact on business and how to develop a seamless plan to maximise productivity

According to the latest statistics from Tech City UK's *Tech Nation 2017 Report*, the UK generated £6.8bn worth of investment in digital tech in 2016 alone – that is 50% higher than any other European country. Needless to say, this investment is key to economic and business growth. However, the added pressure on the UK's power supply has the potential to threaten this success and expose the industry to risk of power fluctuations and disturbances. From blackouts to voltage spikes, this can have a major impact on business productivity.

To keep these risks at bay, we need reliable and stable power in data centres generated by an uninterruptible power supply (UPS). The UPS acts as the first line of defence in this environment, but as an electronic device, it's likely to need repair at some point during its product lifecycle. It's vital, therefore, that businesses have a robust maintenance regime in place to prevent downtime and ensure efficiency remains intact.

The business case for UPS

In a data centre, two thirds of downtime events are preventable, with insufficient

maintenance being one of the major causes. IT infrastructure in this environment is vulnerable to numerous electrical anomalies, including voltage sags and spikes, and harmonic distortion. When you consider that IT equipment failure is a leading hindrance on productivity and 45 % of these failures occur due to voltage disturbances, the importance of keeping voltage stable and minimising instances of downtime become clear. A UPS can really come into its own in this situation and allow a business to maintain productivity throughout, not only protecting against power outages, but also operating as an effective power conditioning unit.

The UPS works by smoothing out spikes, sags and surges to provide a clean and stable supply, ultimately preventing damage to sensitive and expensive equipment. A UPS needs to operate in online mode to give full protection against the 'dirty' power that causes disruptions to data centre services.

Seamless maintenance

As with any other equipment within a business, it is important to consider the upkeep of a UPS to help reduce downtime

caused by malfunction. Having a robust maintenance plan in place not only gives you the peace of mind of having unlimited access to technical expertise, but saves money in the long run by maximising the lifecycle of the UPS.

Maintenance plans for UPS devices are more comprehensive than warranty cover as they offer a guaranteed emergency response time. With Riello UPS for example, there are a number of maintenance plans with

guaranteed response times to choose from – silver (12 working hours), gold (eight working hours) or platinum (same day, four clock hours).

Moreover, having a maintenance agreement like this in place, with trusted technical experts, gives you round-the-clock, 24-hour service availability and access to spaces across the UK.

Unlike many other manufacturers, Riello UPS stocks spare parts/components



“Maintenance plans for UPS devices are more comprehensive than warranty cover as they offer a guaranteed emergency response time

visits, firmware updates and fully comprehensive cover are also included in maintenance agreements, as well as remote monitoring and diagnosis. Riello UPS is one of the few companies to use thermal imaging as standard as part of all preventative maintenance visits. This technology enables engineers to identify problems that would not otherwise be picked up using traditional methods and potentially prevent an in-service failure further down the line.

Selecting the right provider

When it comes to selecting a supplier, it must be one you feel comfortable with. Here are a few top tips to consider when considering a provider:

1. Do your research – whether it is a trusted manufacturer or an approved third party supplier, reputation is key. Make sure they're fully trained – there's no room for error when it comes to repairs and getting back up and running as quickly as possible, so make sure to check that whoever maintains your equipment is fully trained.
2. Get the right cover for you – when agreeing a plan, make sure you know what it covers. Most will include regular preventative engineer visits, firmware updates and fully comprehensive cover as standard, in addition to remote monitoring and diagnosis, but always check the terms and conditions.
3. Consider provision for

spares – your provider should have a complete spare parts store as well as ex-stock holding of their current range of UPS products.

4. Get the timing right – make sure to check out the guaranteed response times of your maintenance plan, as well as the 'fix times' in your contract. It's all very well for an engineer to respond within a stated time, but it may not be fixed for another week.

5. Get the right product for the right space. The flexible nature and ability to scale power up and down to suit the load means that businesses can pick a UPS which 'grows' with the demands of the business.

The approach of rightsizing a UPS makes it possible to invest only in the functionality required for the current load requirement, minimising upfront costs for capital equipment and maximising efficiency.

With the cost associated with downtime always rising, businesses are becoming more aware of the benefits of the power protection benefits of a reliable UPS and the importance of a good maintenance plan.

Complex industrial environments, such as data centres, require exceptional levels of resilience and reliability under all operating conditions. Having the right UPS and support in place will give peace of mind that, even when the worst happens, the impact on the business can be managed. ●



Riello's Multi Power Combo was recently awarded 'Data Centre Power Product of the Year' for its outstanding capabilities, combining high power in a compact space

Riello UPS stocks all spare parts/components in strategically placed warehouses across the UK combined with a multimillion-pound stock holding at its Wrexham headquarters where UPS up to 500kVA are ready for immediate dispatch.

in warehouses strategically located across the UK, in addition to a multimillion-pound stock holding at its headquarters, where UPS units of up to 500kVA are ready for immediate dispatch within 24 hours.

This access to essential components positions Riello UPS as one of the only original equipment manufacturers (OEM) to offer guaranteed fix times with top level contracts. Regular preventative engineer

To give customers access to fully trained engineers, Riello UPS runs a Certified Engineer Programme, which clearly lists fully qualified engineers who have complete access to spare parts. To achieve this status, engineers must successfully complete thorough training on the commissioning, maintenance and servicing of Riello UPS products with regular re-assessment. You can check your engineer at riello-engineer.co.uk

www.riello-ups.com

Reliable power for a sustainable world



Promoting a culture of learning, not blame

Shared learning from data centre incidents could help reduce risk across the sector, but can the industry overcome a culture of secrecy? Louise Frampton reports

In recent years, there has been a drive to adopt a culture of learning from mistakes across a variety of mission critical industries. In healthcare, for example, staff are required to report safety incidents and alerts are subsequently shared across the sector, to warn of identified risks. The Mid Staffordshire scandal has prompted a major review of the way mistakes are dealt with and there is now a concerted effort to promote greater candour within the sector.

The airline, nuclear and oil and gas industries also have a long history of championing this approach, and have successfully developed a culture of openness and reporting of errors, with a view to reducing risk. The key to this has been a change of mind set; the culture has shifted from

one of blame to one of shared learning – so could the data centre sector learn from their example?

Simon Allen, from the UK Data Centre Interest Group, believes that sharing information on data centre incidents could help to drive improvement across the sector and prevent costly outages: “The airline industry has an enviable record of continuously improving flight safety by industry-wide sharing of accident and potential accident information. However, the same is not the case in the data centre industry where it is common practice to cover up failures or potential disasters in a misguided attempt to protect reputations,” comments Allen.

He points out that root cause investigation findings are normally secret and bound by non-disclosure agreements,

putting the data centre industry at a disadvantage.

“Learning from mistakes is an inherent and essential human ability – and denying the data centre industry from this single, most important development channel, is simply absurd,” argues Allen.

Incident reporting

The Data Centre Incident Reporting Network (DCIRN) has been set up to tackle this, issue and aims to:

- Increase awareness of data centre failure modes
- Share lessons learned from data centre failures
- Increase data centre uptime
- Reduce data centre failures

The brainchild of Ed Ansett, an industry leader in data centre reliability and risk analysis (and chairman of i3 Solutions), the Data Centre

Incident Reporting Network is being championed by the UK Data Centre Interest Group, a not-for-profit organisation.

Following a presentation by Ansett in 2015, the idea for data centre incident reporting began to gain momentum. “Don Carless, a senior technical facilities engineer from Transport for London, was in the audience and bought into the idea. He got in touch with me, recognising the positive impact sharing information on data centre incidents would have on the industry and suggested that the UK Data Centre Interest Group should get behind this. Ed Ansett was invited to speak at a UK Data Centre Interest Group event and convinced me that being more open about our problems is an industry imperative,” Allen explains.

“Although I hear a few people



“Data centres now support every aspect of the digital economy and, as we become more reliant on them, it is only a matter of time before a data centre failure will be associated with human fatalities. We need to act now

in the data centre industry complain about the challenges of changing a long-standing culture of secrecy and sweeping things under the carpet, the overwhelming majority of colleagues tell me they would happily volunteer information – particularly the multi-tenant data centres (MTDCs) – as long as it cannot be attributed to them,” he comments.

The fundamental principal of DCIRN is that incident reports will be ‘dis-identified’, so that the person, company or data centre associated with the incident remains anonymous. In fact, DCIRN is modelled on an initiative called ‘CHIRP’ set up many years ago in the aviation industry to share information on incidents (and near misses). This has delivered, and continues to deliver, significant improvements in safety.

“We are getting some good wind behind us,” comments Allen. “John Lane, one of the most respected people in the industry, recognised for unimpeachable ethics, has agreed to be the chief executive on the DCIRN secretariat. The DCIRN secretariat will ensure that any reports cannot be associated to a person, company, data centre, or even manufacturer.

“We are not about pointing the finger; we are about making data centres safer and more reliable. We are also very lucky to have Mike Lonkhurst on the Secretariat – a former airline pilot who has seen ‘first hand’, the essential contribution CHIRP has made to his industry. His experience will be invaluable. Maria Morse also sits in the DCIRN secretariat as membership secretary and is well known and respected in the data centre world.”

Once reports are ‘dis-identified’ they will be passed to a member of the advisory council who will validate the report. (The incident report template was devised by respected industry expert, Professor Ian Bitterlin.) Only then will the anonymous incident report be made public – free of charge.

Could NDAs prevent reporting?

The elephant in the room is NDAs, acknowledges Allen; people think they cannot share information because it will infringe the NDA they signed.

However, Eversheds Sutherland and other prominent and respected legal authorities, working in the data centre industry, have given their opinion: “If the information is anonymous and the underlying parties / data centre in question truly cannot be identified (and without a risk that a third party could ‘put two and two together’ and work out which data centre or parties it concerns), this would not have the necessary quality of confidence to be ‘Confidential Information’ under the terms of a typical NDA.”

“It is not the intention of DCIRN to ‘name and shame’... The guiding principal is that, if you are not sure or nervous, then don’t report – it is simple as that,” says Allen.

The DCIRN web site (dcirn.org) is now live and will be providing more advice and information on the NDA issue in the coming months. Membership is currently free of charge and all members will receive failure bulletins on a quarterly basis. In the future, it may be necessary to charge a small membership fee to cover

costs, although Allen stresses that it will be kept low enough for all to afford.

“Data centres now support every aspect of the digital economy and, as we become more reliant on them, it is only a matter of time before a data centre failure will be associated with human fatalities. We need to act now – there is no reason why this archaic secrecy should prevail,” Allen argues.

He warns that if DCIRN fails to succeed, governments will have to step in when fatalities begin to be associated with failures: “Should this happen, a whole new industry of data centre reporting auditors is likely to be created with the sole purpose of enforcing new stringent Government issued reporting guidelines,” says Allen – and this will cost the data centre industry dearly. “If the data centre industry can get behind DCIRN now we could avoid this – at no cost to the industry.”

Allen, Ansett and mission critical facilities expert Peter Gross, are putting their passion and commitment behind the project in a bid to ensure the sector catches up with other mission critical industries: “We’re finding time outside our day jobs and stealing time from our families to do this and funding everything ourselves. We have taken a leap of faith that we are doing the right thing, for the right reasons. Once DCIRN is established, we will leave it to the Secretariat to manage and operate. But we hope the data centre industry will get behind us. When critical mass is achieved, MTDCs, who do not volunteer information, could be asked a simple question by potential customers: ‘Why not?’” he concludes. ●



Learning from mistakes is an inherent and essential human ability; denying the data centre industry from this single, most important development channel, is absurd

Lovely, bubbly...

Fuel cell technology is gaining in popularity in mission critical sectors, providing backup power and clean energy in a diverse range of industries



GenCell CEO Rami Reshef believes that backup power solutions, using fuel cell technology, could overcome the “weaknesses of other clean technologies” such as solar and wind, while also addressing issues with legacy solutions based on batteries and diesel generators. In the future, hydrogen could be leveraged as one of the critical sources for generating power, fuelling mass transit, powering hospitals, telecom towers, mission-critical systems, and more.

A fuel cell is an electrochemical energy conversion device that produces electricity by combining hydrogen and oxygen into water. Like batteries, fuel cells convert potential chemical energy into electrical energy and generate heat as a by-product.

However, as the chemical energy is stored inside batteries, rather than generated, they can only operate for a limited duration until they need to be discarded or recharged. Fuel cells, on the other hand, can continuously generate electricity as long as they are supplied with fuel (hydrogen) and an oxidant.

Fuelled by hydrogen, the GenCell G5 long-duration UPS already provides backup power for telecom, healthcare and niche industrial markets. Now the technology is finding its way into the Champagne industry; GenCell recently signed a distributor agreement with Gallorema, a specialist equipment supplier to France’s finest producers. Gallorema will distribute the GenCell G5 long-duration UPS to its customers to provide backup power to Champagne and wine production lines, as well as regulating voltage to key production equipment. GenCell’s fuel cell power solutions will provide 5kW of auxiliary power to ensure uninterrupted wine production, from the harvest receiving hopper to the bottle. The fuel cell technology can be easily installed in cellars as it produces energy with no emissions, noise or vibrations

As a leading supplier for the Champagne industry, Gallorema’s CEO, Christophe Labruyère, works regularly with producers and understands their business challenges:

“Many wine producers suffer from an inconsistent supply of electricity, with voltage spikes or even power losses that reset production equipment or stop production completely,” says Labruyère. “These incidents reduce productivity and may even cause significant financial losses.

“The GenCell solution will mitigate power issues and assist Champagne and wine producers in avoiding production equipment service costs, as well as the high material costs of spoiled vintages and the even higher costs of lost future revenue.”

“

The GenCell solution will mitigate power issues and assist Champagne and wine producers in avoiding production equipment service costs

GenCell’s white paper, *The big deal with fuel cells*, explains that there are five primary types of fuel cells:

- Alkaline fuel cells (low temperature)
- Proton exchange membrane fuel cells (low temperature)
- Phosphoric acid fuel cells (medium temperature)
- Molten carbonate fuel cells (high temperature)
- Solid oxide fuel cells (high temperature)

Each type of fuel cell has its own inherent strengths and weaknesses that make them more suitable for specific markets and applications.

Fuel cell technology is already being used to generate power at leading companies such as Apple, Verizon and Coca-Cola. In fact, more than 65,000 fuel cells, totalling over 300MW, were shipped worldwide in 2016 (E4tech, *The Fuel Cell Industry Review 2016*).

Data centre sector

One area where fuel cells are gaining traction is in the data centre sector. Equinix recently announced its decision to install the largest deployment of fuel cells for the colocation data centre industry.

The global interconnection and data centre company signed a 15-year Power Purchase Agreement with a subsidiary of Southern Company for the supply of Bloom Energy fuel cells, to be installed at 12 data centres in the US. Bloom Energy fuel cells use a proprietary solid oxide technology to generate electricity through a clean electrochemical process using air and fuel and resulting in only water and a small amount of carbon dioxide as by-products.

Over the lifetime of the project, Equinix estimates it will avoid 660,000 tons of carbon emissions and save 87 billion gallons of water that would have been used by natural gas or coal-fired utility generation. As the demand for backup power and off-grid power solutions increases in the future, fuel cells could offer a significant contribution, helping mission critical sectors ensure both resilience and sustainability. ●

ULTIMATE FLEXIBILITY FOR CRITICAL POWER NEEDS



ProtectPLUS M400 – the latest addition to the family of modular uninterruptible power supplies of AEG Power Solutions, is based around a 10 kVA power module and can be scaled up to 40 kVA.

Up to four frames can be operated in parallel achieving power capacity of 160 kVA. ProtectPLUS M400 has one of the lowest Total Cost of Ownership (TCO) factors in its class. You can trust AEG PS

to protect your mission critical business, IT and data center systems. Our uninterruptible power supplies are world-class and backed by engineering experience developed over the last 100 years.

www.aegps.com | +44 1992 719200 | uk.sales@aegps.com

In the future how much power will you need?

MODULYS GP protecting you from the unpredictable



MODULYS GP
Modular UPS
from 25 to 600 kW
Green Power 2.0 range



Modular UPS solution guaranteeing service continuity, scalability and optimized costs. A flexible response for meeting unpredictable changes in power demand.

For further information please call 01285 86 33 00 or email info.uk@socomec.com



Fully modular system



Totally redundant design



Enhanced serviceability performance



'Forever Young' service concept



www.socomec.com



SOCOMECC - Units 7A-9A Lakeside Business Park · Broadway Lane, South Cerney · Cirencester · GL7 5XL UK



Taking stock of power security

ABB's robust low-voltage switchgear is providing high reliability for the Shanghai Stock Exchange. Mission critical applications, such as these, are increasingly looking for digital solutions with built-in intelligence, to enable remote operation and monitoring

The Shanghai Stock Exchange (SSE) is the world's fifth largest by market capitalisation. The fallout of a loss of power to keep the information flowing would cause financial shockwaves around the globe. This is why the SSE Jinqiao Technology Centre project required a robust switchgear solution to guarantee power security and minimise downtime.

To support the safe, efficient and reliable operation of the data centre, ABB is providing more than 1,500 units of MNS low-voltage switchgear. This is the equivalent of 900 metres of switchgear, when placed end to end. In an electric power system, switchgear is the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate

electrical equipment. The ABB MNS low-voltage switchgear will provide high security and reliability features for the project.

With a modular design, the product allows for the easy replacement of functional units without outage, ensuring the minimum possible downtime and impact. To enable easy replacement, the MNS is designed to ensure that the isolator handle and interlocking mechanism are combined. Modules are withdrawable and, in case of disturbance or disruption, can be easily replaced on site. The modules can be exchanged without the use of tools, to ensure that any downtime is minimised.

The MNS arc-resistant design and material also ensures the highest levels of operator safety and meets

the anti-seismic and anti-impact requirements of the installation. With this type of electrical switchgear, there is always a remote possibility that an arc could occur, which could be attributed to site conditions, human error and/or incorrect maintenance procedures.

However, ABB's MNS system has been designed to ensure that the possibility of an arc occurring within the switchgear is remote. Since 1979, MNS has also been extensively tested to ensure that, in the event of an arc occurring, the arc is limited to the area of ignition and is contained within the switchgear.

This is achieved through the use of gas tight seals and constructional designs that severely limit arc propagation, thus providing the highest level of safety to operational

30%

The operating cost saving claimed to be offered through MNS Digital with Ability condition monitoring

personnel. A flexible and compact solution, with rear cable access, the design enables the customer to optimise the layout of the installation and save valuable space. The solution will help ensure the stable operation of China's capital market and promote the growth of Shanghai's international financial centre.

"We are honoured to support SSE's data centre," said James Zhao, lead division manager, electrification products, China.

"In the future, we will vigorously promote the ABB

Building confidence in microgrids

“When switchgear is empowered with data capabilities, it gives the beating heart of any electrical system a mind and a voice. Powered by big data, it can predict problems before they happen

Ability digital solutions and our strength in technical innovation, helping customers create more value and providing intelligent green power for the data centre industry.”

Intelligent switchgear

Since the first digital switchgear, MNS iS was launched more than a decade ago, ABB has continued to innovate in this area. Its recently launched MNS Digital makes use of the latest generation of intelligent devices and cloud technology, powered by ABB Ability.

This will pave the way for connected solutions and interpretation of big data to enable higher availability and reduced operational expenditures. ABB claims to enable operating cost savings of up to 30% through MNS Digital with ABB Ability condition monitoring.

This latest solution was recently unveiled at ABB Customer World at the Hangzhou International Expo Centre, China. Building on a decade's worth of experience in pioneering the digitalisation of switchgear with MNS iS, ABB has added the latest advances in smart electronics, edge computing and cloud technology to create a digital low-voltage switchgear solution with built-in intelligent functions, enabling remote operation, monitoring and condition-based maintenance.

MNS Digital can connect to the ABB Ability cloud platform, a local Scada (supervisory control and data acquisition) or ECMS (electrical control

and monitoring system), to extended Automation System 800xA or other types of distributed process control systems (DCSs). By leveraging ABB Ability, MNS Digital offers data centre professionals insights into their operation, by making data and information available to any connected device or plant.

Powered by big data

Ralf Heinemeyer, managing director of ABB's Electrification Solutions business unit, explains: “When switchgear is empowered with data capabilities, it gives the beating heart of any electrical system a mind and a voice. Powered by big data, it can predict problems before they happen, and opportunities not considered before.

“MNS Digital provides a complete real-time solution, with integrated data connectivity and optimised reporting to assist and enable operators to make informed choices on the maintenance, operation and performance of their platform.”

MNS Digital with ABB Ability will allow operators to make use of additional functionality such as energy management, to report on power consumption and enable cost reductions.

Ultimately, stable power supply is crucial to ensure safe and reliable operation for the financial sector and this switchgear technology will carry out condition monitoring for reduced downtime, avoiding unplanned outages, and lowering operational expenses through optimised maintenance cycles. ●

The microgrid at the Energy Centre is a UK first



Peter Jones, ABB technology strategy manager, believes that regulation and demonstration are critical factors in the creation of the UK's future microgrid applications.

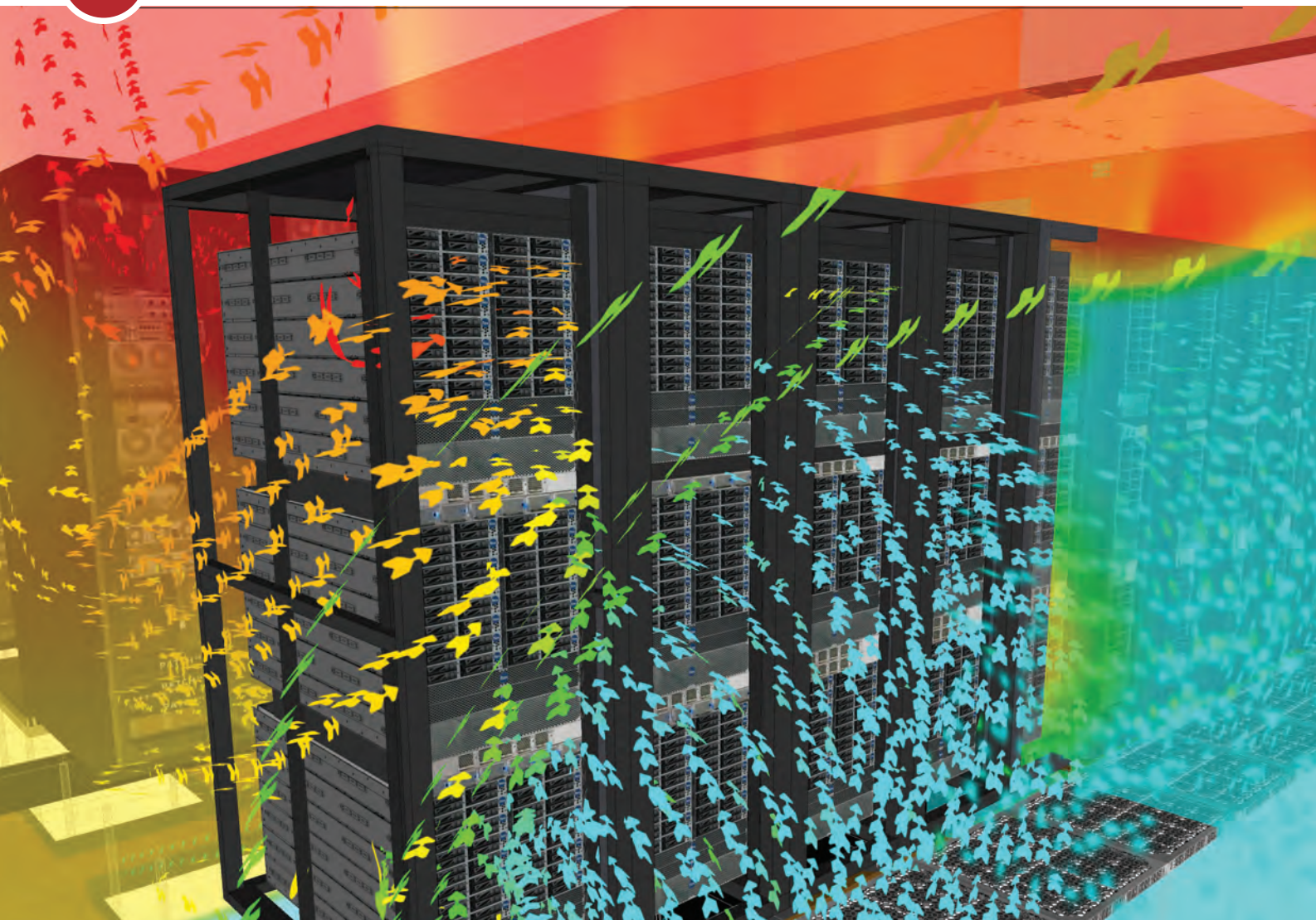
Until recently, the quest for distribution grid reliability and security has been seen as the main driver for microgrids. Globally, that's why hospitals, military bases and other vital facilities have been the early adopters. Because, when a natural or man-made event disrupts the main grid, their microgrid can switch seamlessly to islanded mode and use local distributed generation - diesel gensets, microturbines, wind, solar, hydro, or battery power - to keep the lights on and to power essential services.

However, there is a new driver emerging for microgrids in the UK, and that is the potential for substantial cost savings. With network charging costs set to increase and technology costs continuing to fall, scope exists for reducing energy costs for large and medium sized energy users. This, coupled with the potential access to new ancillary service revenue streams, makes the embedded application of microgrids in highly congested distribution systems a very attractive proposition.

Microgrids could also provide an efficient and cost-effective alternative that will enable customers to maintain their security of supply while isolating themselves from these escalating

costs. But, for that to happen we must ensure that there is a supportive regulatory framework covering three main issues. First, greater clarity on the question of ownership, since a microgrid integrates generation, distribution, and supply of electricity that are currently required to be separate. Second, the ability of DNOs to operate their networks to allow the creation of islanded areas. Third, we need to build confidence in the off-grid industry, that is seen by some customers as a new technology when in fact it has many years of reference operation.

Critical to building confidence will be successful demonstration projects. That is why ABB is working with the University of Chester to deploy a state-of-the-art microgrid control system for the new Energy Centre at its Thornton Science Park in Cheshire. The microgrid, the first of its kind at a UK university campus, will comprise a CHP unit, diesel generation, solar photovoltaic (PV) plant, a new energy storage facility and a load bank. The aim is to demonstrate how distributed energy resources can work together to minimise fuel costs and emissions within a grid. The microgrid controller will also manage the Energy Centre's connection to the campus network - and ultimately the connection to the local grid. This will show the microgrid's capability to connect or disconnect seamlessly from the main grid and operate in islanded mode, ensuring total continuity of supply.



Adapting infrastructure following legislative change

From the IP Act and Brexit, to a new Green Grid performance metric, Future Facilities' Jon Leppard discusses the potential impact on data centre infrastructure and how to ensure you are prepared



So far this year, organisations across the UK and Europe have been faced with negotiating a series of legislative and political milestones that could require them to examine and re-evaluate how their data is stored – the implementation of the Investigatory Powers Act (IP Act), and the prospect of Brexit looming on the horizon being the two key factors.

The IP Act grants intelligence agencies an

increased ability to access and monitor bulk sets of personal data. But regardless of the controversy that surrounds it, adherence to the Investigatory Powers Act is now a legal requirement for businesses.

Much of the IP Act legislation is concerned with storage and access to data, so any organisation that holds data in the UK will need to revise its strategy in order to comply (and must do so with Brexit front of mind). In particular, businesses that

store private data for other companies or individuals, such as colocation providers and ISPs, are likely to require an update to operational strategy. Therefore, it is more important than ever for them to be prepared to react to change, and to react quickly.

The practicalities

So, what does this mean on a practical level? The first consideration that legislative shift creates for businesses and colocation providers

is a potentially significant increase in storage capacity requirements within data centres, to accommodate all the extra data that must be retained for compliance. This requirement for extra space may well eat into reserves, causing the facility to run at a capacity level that an organisation's existing infrastructure cannot safely support.

To combat this, one option would, of course, be to invest in the construction of new data

centres but this could prove to be prohibitively expensive for many businesses. Also, the need for additional capacity is immediate – the IP Act has already become law, and building new facilities takes time.

Upgrading and making changes to existing infrastructure may be the only option. But this only increases uncertainty and risk for the resilience of the data centre and the energy required to power it.

Businesses are faced with a potentially expensive dilemma – how can they adhere to current legislation, allow for future changes to this legislation and maintain an efficient and resilient facility?

Performance indicators

This is where computational fluid dynamics and engineering simulation can play an important role.

The launch of The Green Grid's performance indicator last year provided unprecedented insight into the complete workings of the data centre. Building on the success of PUE, the new PI adds two additional dimensions to infrastructure efficiency, measuring how well a data centre's cooling system does its job under normal circumstances and how well it is designed to withstand failure – key elements that are invaluable when faced with making quick changes to your existing infrastructure to respond to legislation.

Future Facilities worked closely with The Green Grid to develop this new metric, which focuses on three main elements. The first, PUE, focuses on energy efficiency, looking at how effectively the facility is operating in relation to defined energy efficiency ratings. PUE remains a key component in the new tool, allowing facilities to demonstrate their green credentials.

The second, IT thermal conformance, examines how much of the data centre's

“ There are four levels of performance indicator, ranging from the basic measured assessment of the current state of the data centre, to the advanced measured assessment of current state and future potential

IT equipment is operating at recommended inlet air temperatures during normal operation. The ratio helps understand the percentage of IT equipment that is operating at its optimal temperature.

Finally, IT thermal resilience measures the equipment at risk of overheating in the case of a cooling failure or during planned maintenance. It is this final metric that allows facilities managers to understand how their data centre will behave when there is temperature change. This can be done either through measurement, when cooling systems are off or under maintenance, or more effectively and safely through simulation software.

Engineering simulation

There are four levels of PI, ranging from the basic measured assessment of the current state of the data centre, to the advanced measured

assessment of current state and future potential.

Even the most basic deployment of the performance indicator allows for a visualisation of the balance between its three metrics. It empowers organisations with different goals, for those who must prioritise delivering resilience at the expense of efficiency or computing power at the expense of resilience, to quickly identify how they perform against their targets and track performance over time. When simulation is introduced in the third and fourth levels, comparing alternative configurations and predicting how changes will impact each metric becomes a reality. These predictions are only possible thanks to the growing sophistication of computational fluid dynamics pioneered by Future Facilities.

At its most advanced, PI provides a framework to assess

the effects of changes before they are implemented, whether from IT deployments or the installation of containment. This gives the ability to understand how safe any IT expansion will be, how to utilise 100% design capacity or run through 'what if' scenarios to develop strategies for managing issues before they arise.

Through using PI in conjunction with engineering simulation technology, data centre owner-operators can reclaim unused capacity without increasing risk, and test any potential change to the data centre in a safe, offline environment before it is actioned in a live facility. Doing so means they can generate the extra capacity that legislative changes such as the IP Act (and potentially Brexit) will demand, with the fewest possible negative consequences.

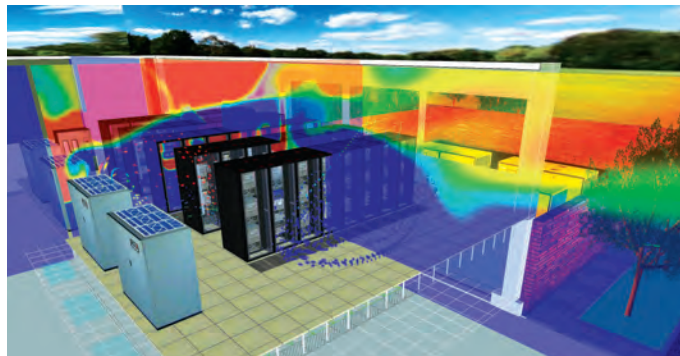
Overarching strategy

While capacity planning and any practical alterations to infrastructure will fall under the remit of facilities management, it is likely that the IT department will also play a role in formulating the overarching strategy for legislative compliance.

To achieve the smoothest transition possible with minimum disruption, clear interdepartmental communication is required.

For instance, when identifying and purchasing the relevant hardware to improve capacity, it would be mutually beneficial for IT to discuss this with facilities, so that consultancy can be provided in terms of how operational efficiency (and budget) are likely to be effected.

It seems fitting that joined-up thinking, can provide reassurance in the face of an uncertain future. ●



PI in conjunction with engineering simulation allows potential changes to be tested in a safe environment



Tiers of joy: how risk reduction can save data centres money

A survey of data centre operators showed that one quarter experienced a data centre outage in the past 12 months. However, Tier certification can help mitigate risk and reduce costs, not only for large data centres but also for the latest modular installations

The Uptime Institute has reported that Tier certifications have more than tripled in the past five years. The organisation, which issued its 1,000th certification in June this year, is experiencing substantial growth in all geographies worldwide. This growth reflects the global industry demand for predictable levels of performance. According to the Uptime Institute, this can only be achieved through an impartial assessment of the design, construction, overall efficiency, and operational reliability of business-critical infrastructure.

The Uptime Institute's Tier Standard is designed to be flexible in approach and adaptable to the latest technologies and economics.

According to Uptime Institute president Lee Kirby: "The data centre industry has changed dramatically over the past few years. As the world becomes increasingly digital-centric, organisations want to treat data centres as a utility with guaranteed levels of performance and capacity.

"The Tier Standard continues to be the most recognised and adopted standard for assessing mission critical infrastructure. Its focus on price vs. performance enables organisations to align their IT costs structures with their business service delivery strategies. Our Tier Standards and the associated Operating Standards enable organisations to directly support their business growth through better design,

construction, maintenance and optimisation of their data centre facilities"

Reduced premiums

Fortrust, a Denver-based data centre solutions provider, operates a colocation facility that holds a Tier III Certification of Constructed Facility and has achieved Tier III Gold Certification of Operational Sustainability.

Fortrust chief operating officer Robert McClary says: "We've experienced firsthand how Uptime Institute's Tier Standards and operational assessments can be a major competitive differentiator for us, increasing the value of our services for our customers and reducing our costs to deliver them.

"The certification process and risk mitigation work we've undertaken has dramatically improved our facility's performance, efficiency and reliability. In fact, we even lowered the risks associated with downtime so significantly that our insurance provider reduced our policy premiums by more than 10%."

As McClary points out, the Uptime Institute's standards are building a case for driving down costs through reduced premiums. CNA, the eighth largest commercial insurance writer in the US, is just one of the companies offering more competitive insurance policy terms and pricing, in recognition that following Tier Standards can mitigate risk, reduce



incidents and improve the performance of business-critical infrastructure.

Savings are dependent on a number of factors but the Uptime Institute claims that customers are seeing between 10-25% lower premiums on average. Furthermore, reductions in insurance costs are being seen across all major regions around the world.

As part of the Tier Standards procedures, experts from the Uptime Institute work directly with operators to review

processes and determine what improvements can be made to run data centres more efficiently and reduce risk.

Tackling outages

It is imperative that data centre infrastructures are engineered and managed in accordance with strict guidelines and methodology to meet business continuity goals.

The Uptime Institute 2017 survey of more than 1,000 data centre operators showed that one quarter of all respondents experienced a data centre outage in the past 12 months. Data centres with Uptime Institute's Tier Certification experienced half as many instances.

In fact, the Uptime Institute has found that 70% of data centre projects fail the Tier Certification assessment during the first round of demonstrations, requiring the owner to invest more time and money to alleviate the problem. This serves to demonstrate the complexity of these mission critical systems and highlights the difference between design and actual construction.

Tier standards

The Uptime Institute is now introducing a new review programme focused on the assessment and validation of specific designs from prefabricated and modular data centre manufacturers.

Modular data centres that carry 'Tier-Ready' status will demonstrate the same high level

10%+

The savings to insurance premiums achieved through the Tier Certification process

of performance once installed and certified at their intended deployment site. The programme enables manufacturers to work with Uptime Institute to validate the specific designs of their pre-built solutions. Customers of these solutions will enjoy reduced time and cost for a certified data centre. Tier-Ready solutions are available from a wide variety of manufacturers, including Schneider Electric, Compass Data Centres and Huawei, with many other manufacturers already in the process for design review.

"Prefabricated and modular data centres have been on a growth trajectory for the past several years as organisations strive to bring business services closer to their constituents. As distributed technologies such as IoT and edge-computing become commonplace, these services must be delivered without incurring the traditional risk associated with remote infrastructures," says Kirby.

Compass CEO Chris Crosby further highlights the importance of third-party validation, commenting: "The Tier-Ready award makes sense for Compass Datacentres as it helps to assure

the resiliency and mission critical suitability for each 1.2MW block that we provide to our customers."

Kevin Brown, chief technology officer and SVP innovation, Schneider Electric, adds: "Modular data centre solutions for remote and distributed infrastructure are an essential component of delivering modern applications and, in many cases, are deployed in unique operating conditions.

"This programme provides customers with a streamlined process to benchmark and validate the resiliency of their architecture."

The new programme is also welcomed by Bob He, general manager, Datacentre Facility Business, Huawei: "By working with Uptime Institute to review our modular solutions, our customers can be more efficiently certified for their data centres and distribute their computing, without risk or the need to give up any expected performance and resiliency," he comments.

Ultimately, the Uptime Institute's Tier Certification continues to help reduce risk in mission critical data centres and is well recognised throughout the data centre sector. This latest programme will help to simplify and speed the Tier certification process, enabling customers who are in the market for modular data centres to enjoy the same level of reliability and resiliency that they get in larger data centres. ●

New research organisation

The Uptime Institute has announced the launch of Uptime Institute Research, a new research organisation aimed at bringing practical and forward-looking information and insights to global data centre professionals and stakeholders. Uptime Institute Research will be introducing research services to help both management and operations staff improve the practice and design of their infrastructure and allow executives to assess opportunities, develop strategies and better manage operational teams. The new group will also leverage expertise from globally recognised sister company 451 Research in areas such as vendor strategies, software, analytics, cloud services and networking.

"Uptime Institute became the de facto standard for assuring the operation of the business-critical elements within data centres. We are now in a position to advise our clients on managing the fabric of connected components, from the edge to the core, from the power plant up to the application," says Uptime Institute president Lee Kirby.

"The complex hybrid infrastructures now forming in most companies must be able to provide the required levels of business services, regardless of where those services are derived. Everywhere you turn, new innovations emerge, including cloud computing, automation, hyper-converged infrastructure, IoT as well as unique power generation or distribution and advanced cooling designs.

"These advancements require the kind of practical, level-headed and big-picture assessment that is the hallmark of Uptime Institute and our newly formed Uptime Institute Research group."

Specialist loadbank manufacturer and rental company Crestchic has provided the Southeast Alaska Power Agency (Seapa) with a containerised 5MW capacity loadbank for its Swan Lake Reservoir expansion project to increase its capacity.

The total cost of the project was £10m and the 25% increase in active water storage will eliminate 18 million lbs of CO₂ from being emitted into the atmosphere annually.

Crestchic's loadbank was used to safeguard the project by preventing spillage onto the construction site.

Seapa is a not-for-profit joint agency of the state of Alaska that supplies utility wholesale power. The Swan Lake plant, a 22MW hydroelectrical facility, is part of an isolated electrical system connecting the communities of Petersburg, Wrangell, and Ketchikan.

When the organisation planned to expand the plant's spillway, from about 86,000 acre-feet to 111,800 acre-feet, it identified the need to rent a loadbank to ensure electrical load was available during the project to control water levels.

Normally, during times of high inflows and low electrical loads, excess water, an average of 35,000 acre-feet,

is released over the spillway. During construction, when the spillway would be out of use, water levels needed to be managed to avoid spill. The loadbank was to be used to ensure that at least one, and usually two, generating units could consume water and prevent spill.

The area receives a high level of rainfall, an average of 153 inches per year, falling more heavily in autumn and winter. Due to the wet climate, timing was of particular importance for this project to avoid these peak months.

The loadbank was needed from May to October, and it was imperative the project was completed on time. This meant logistics, installation and commissioning was key to ensuring this project's success.

The organisation sent out a request for a containerised 5MW loadbank that could operate continuously up to the required capacity outdoors in an often damp and rainy atmosphere.

Crestchic was one of three companies to bid for the work and was selected because of its ability to meet the exact requirements and provide installation and commissioning support. The containerised



Swan Lake: power to prevent spill

A 5MW capacity loadbank, from Crestchic, is safeguarding a reservoir expansion project in the harsh Alaskan environment



Rittal – The System.

Faster – better – everywhere.

TS IT - Network Rack

Make IT fastMake IT simpleMake IT adaptable

....Make IT easy

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL



The loadbank from Crestchic protects the Swan Lake reservoir expansion project

loadbank provided by Crestchic combats some of the challenges that can arise working in these conditions.

Crestchic's rain-resistant loadbanks are designed with the transformer inside to step down the voltage to a safe level. Traditionally, most resistors cannot work in wet conditions and can require elaborate protection, which can be costly.

Crestchic worked with the organisation to ensure the loadbank was delivered to the

remote location on schedule and supported onsite with the installation and commissioning. The company also provided training for Seapa employees and was on hand to support the team for the duration of the project.

Trey Acteson, CEO of Seapa, commented: "Crestchic has been vital in the success of this project. It not only delivered a product that was suitable to the application, but also went above and beyond

to ensure the equipment was successfully installed and commissioned; and workers onsite where fully trained in its operation. Without their expert knowledge and experience, this project simply would not have been completed on time."

Damien Raspe, general manager at Crestchic, commented: "This was an extremely interesting project to be a part of, helping the organisation to not only overcome logistical challenges with the remote location but also operational challenges with the extremely rainy climate." ●

Fact file

- The project equates to a reduction of 3,636,872 litres of diesel fuel annually
- Expansion will provide up to 12,000MWh of additional energy
- The cost to complete the final design, construction engineering, project management and construction is approximately £10m

able
nsy



IT INFRASTRUCTURE

SOFTWARE & SERVICES

www.rittal.co.uk





UPS energy efficiency: the real cost to the NHS

MPower UPS managing director Michael Brooks examines the key considerations to ensure efficient and resilient power for mission critical applications such as hospitals

Availability of power is essential to critical environments such as the NHS. An ageing power infrastructure, severe weather, cyber attacks on the UK power grid, accidental damage and human error are all potential threats that could result in profound consequences for patients if the lights go out.

However, it is not just the lights going out. Power outages can cause physical damage to IT or essential medical equipment. Data can become corrupted or inaccessible leading to delays in treatment leaving patients in our NHS vulnerable.

Power outages are on the increase. In 2014, 537 UK power outages were reported.

In 2015, this had risen to 640. In the past year, outages have been experienced in healthcare environments across the UK including: Birmingham Trust headquarters in January 2016; Royal Stoke University Hospital in July; the Welsh Ambulance Service in June; and Kingston Hospital in November.

UPS systems mitigate the risks. However, correct system design is essential to ensure

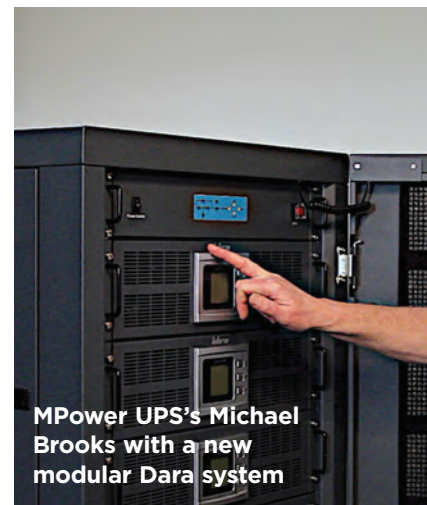
640

Power outages were reported in healthcare settings, in one year alone

organisations are not left literally powerless.

There are three basic UPS configurations: standalone; Parallel N+1; and Modular N+1 systems. A leap forward in the modular design is Distributed Active Redundant Architecture (Dara). This is where each power module contains all elements of a UPS: rectifier, inverter, control logic, control panel and static switch. (The static switch is an electronic switch that connects the load to the inverter in normal operation or to bypass mains if there is a fault.)

Any failure in any one module does not affect the load – the remaining modules are independent and stay online. Another important



MPower UPS's Michael Brooks with a new modular Dara system

“

Check the inverter reaches peak efficiency between 40-60% of load. Many efficiency figures are based on full load



feature of Dara is the parallel redundant communication between modules, so no single component fault can cause a total system failure.

Similarly, battery strings can be connected in parallel to retain full run time in a mains failure, even with one power module offline. A final key benefit is that the system is scalable. Power can be increased as the load changes over time. If there are spare bays in the UPS frame, additional power modules can be slotted in.

We recently looked at a system of two UPS units installed in a critical environment about eight years ago. Capacitors, fans and batteries were all due for replacement. The system was originally designed to support 180kVA.

Two 200kVA UPS were in parallel, so one could be off for maintenance or in fault, leaving the remaining unit supporting the load. This gave redundancy. To provide 10 minutes run time at 180kVA, to give you an idea of size, that requires about 2 tonnes of batteries per UPS.

The site eventually ran at 120kVA. With both UPS sharing load, that was 60kVA on each – approximately 30% load. This was a good system for its age, and even at this low load was still 91% efficient. Older transformer-based systems are only 75-80% efficient at this point.

However, there were about 6KWh of losses, primarily heat. To remove this, nearly 1.5KWh of air conditioning was required. This equates to about 89p per hour, per UPS x 24 hours – and there are two UPS. Suddenly, it is not 89p any more; it is an astonishing £15,592 per year. If that is not concerning enough, these losses alone equate to 3.23kg CO₂e per hour or 8,713Kg per UPS per year; a fairly big carbon footprint in anyone's book.

So, with a system already at 91% efficiency, what can be improved? The first obvious step is to find a system with even higher efficiency.

However, beware of eco mode systems that offer a striking 98% efficiency. Eco or green mode simply means most of the time the load is on raw mains. The inverter only starts when there is a mains fail – the load is not fully protected. Look for a system with efficiency figures for online operation.

Second, check the inverter reaches peak efficiency between 40-60% of load. Many efficiency figures are based on full load. Nobody runs their system at 100% load all the time.

In the above example, in order to keep redundancy, the load can never be greater than 50% on each unit, otherwise if one unit goes off, the other will be overloaded, leaving the system vulnerable (we see this often).

Third, aim for a technology that offers a flatter efficiency curve across a wide load range, which makes it easier to keep the load level in the high efficiency zone.

With a new modular Dara system with eight 20kVA modules installed, each module would be at 75%, well into the high efficiency zone. If one is

lost to maintenance, the rest continue to support the load at 85% capacity. You only lose or gain little bites with each one. And at this load we are about 96.5% efficient.

With this system, losses are only 4.35kWh, so only 1kWh of aircon is required – about 65p per hour for the whole system or £5,718 per year.

Over five years, this is a saving of £49,370. Ongoing maintenance costs are also minimised, reducing the total cost of ownership and crucially there are no single points of failure. The risk is removed and patient safety is maintained. ●

“ With a new modular DARA system with eight 20kVA modules installed, each module would be at 75%, well into the high efficiency zone



Are you switched on to DSR or turned off by the hassle?

The experience of getting demand-side response projects off the ground can be ‘frustrating’ at times. However, once these hurdles have been overcome, the revenues can be significant. So is it worth the hassle? This was recently debated at the Energyst Media DSR Event, held at the Banking hall, London



The energy system is changing dramatically. In the coming years, those who can respond to sharpening price signals at any given time of day will cut costs and generate revenue – those that do not will pay more. At a recent DSR event, hosted by Energyst Media, leading experts highlighted the significant revenue opportunities that can be achieved. At the same time, participation in DSR is not without its challenges; finding solutions to these key issues will be the key to unlocking potential within mission critical sectors.

Kate Dapre, head of engineering, energy and sustainability at NHS National Services Scotland, gave a candid account of the hurdles experienced by healthcare providers in attempting to take projects forward.

The NHS should, in theory,

be a major player in DSR as many sites have generation assets and the health sector is under financial pressure.

Although NHS Scotland has been attempting to participate in DSR, the journey, according to Dapre, has been “frustrating” at times. NHS Scotland comprises 22 boards and has an energy bill of about £100m per annum. The viable capacity for DSR is estimated to be more than 80MW.

This could generate significant revenue, in the region of “seven-figures”, but NHS Scotland does not yet have an operational DSR project; two are described as being “nearly over the line”, but it has been a lengthy process. So why has it taken so long?

Funding has presented a major hurdle, explains Dapre: “You are often told there is no cost of entry but there is a

cost associated with updating equipment.

“The reality, for some sites, is that they require at least a six-figure sum to get the necessary network upgrades and switchgear, and it is quite a challenge to sell this to directors of finance. Although you are generating revenue savings, you are not really saving carbon, which has a higher profile [on the NHS agenda], so it can be a difficult ‘sell’.”

Some site’s assets are also ageing and the gen sets were not installed with DSR in mind.

“We would need to spend a lot of money on technology to

get it into a state where DSR would be appropriate,” says Dapre. She further points out that there have been delays in obtaining approvals from DNOs for a G59 connection and the cost is typically high.

“Quite a lot needs to happen with the DNOs to deliver changes,” she observes.

Conflicting legislation has also made participation difficult to navigate. The latest policy, which has implications for DSR and hospital sites, refers to pollution prevention control. The policy says that generators should only be switched on for emergency power and routine maintenance.

“The reality, for some NHS sites, is that they require at least a six-figure sum to get the necessary network upgrades and switchgear

However, she believes that when one or two sites implement DSR, others will follow suit. She highlights the importance of raising awareness and sharing case studies in the future.

Andrew Heygate-Brown, senior energy innovation analyst at Dwr Cymru Welsh Water, also outlined the firm's DSR strategy, its outcomes and Welsh Water's plans for a significant push into frequency response. After labour, energy is Welsh Water's highest cost, which provides a strong incentive to maximise the value of flexibility. The firm's primary DSR activity is Triad and peak tariff avoidance.

Heygate-Brown highlights what is possible with some perseverance: "For Triad avoidance we reduced our demand by about 50% without the use of any diesel generators in parallel with the grid."

In fact, the company has managed to reduce peak demand from 40MW to about 17-18MW net after export benefit – a significant saving.

However, removal of Triad export payments will reduce those savings and the company is dismayed that renewable technology will feel the consequences of policy intended to curb diesel.

"We have 15.6MW of renewable hydro assets that can maximise exports during Triad periods to reduce our net Triad



78%

The percentage of participants in demand-side response that said they are 'satisfied'

costs. We are going to be hit massively by the reduction in export benefit," says Heygate-Brown.

Welsh Water is now planning a major firm frequency response (FFR) rollout and is looking beyond frequency to broader markets.

Heygate-Brown comments that dynamic FFR is more attractive to Welsh Water as it means that it does not have to commit upfront. This is an important consideration – Welsh Water only participates when the conditions are right, thereby safeguarding its environmental responsibilities.

"We want to declare our availability based on operational circumstance, at a given site, at a given time. Our principle activity is to provide safe, potable water for our customers, and also sewage services. We aim to do this at the lowest cost possible, but, first and foremost, our priority is compliance. The 'Habitats Directive' dictates how we extract from rivers; if we extract too much the river levels will go down and expose fish eggs, which could lead to predation or they may dry up.

"It can also lead to fish becoming confused and migrating to their breeding grounds. We strive to ensure that our pumping activities do not harm the environment... If we draw too heavily from the reservoirs, it can lead to algal »

"Some sites have gone back to the Scottish Environment Protection Agency to obtain individual derogations. But why are they having to do this? Why doesn't the agency just give a blanket statement on DSR and the duration that generators can be run for, instead of having to go to them for every site?" Dapre comments.

Other hurdles have included tackling concerns over the noise of diesel generators and the perceived implications for patient care, as well as having to negotiate staff shift changes with the unions.

Dapre comments that public sector inertia and bureaucracy makes it extremely difficult to push projects forward and it can take years to make any progress. While the savings are good, the process can be "exasperating".

DSR report: key findings

Energyst Media's DSR Report was also launched at the event. This major survey provided an insight into organisations' views on DSR, their current and planned participation, as well as sharing experiences from end users.

The *Demand-side response: Shifting the balance of power* report shows that the majority of those that participate in DSR are satisfied (78%), while most of those that do not provide DSR would be interested in doing so if it did not affect core business (77%).

The report finds that key barriers to participation are a lack of awareness, knowledge and understanding, combined with a perception that equipment and processes are not suitable and that rewards may not be worth the effort.

Of those that do provide DSR, almost half say they could provide significantly more flexibility without affecting operations.

The survey suggests strong interest and potential appetite for battery storage. awareness of storage opportunities is perhaps underlined by the fact that enhanced frequency response (EFR) was the most 'heard of' product cited by DSR providers, despite being the newest of all contracted products and very few firms actually providing it. More than half of respondents (54%) are considering investment in storage, across all sizes of companies and consumption profiles.



blooms. Waste entering the water can also kill the fish," Heygate-Brown explains.

"We are working with universities to ensure that when we do DSR, we don't cause algal blooms or cause issues for the fish and the rivers," he continues.

Heygate-Brown says he would prefer to participate directly with the National Grid. Dealing with middlemen reduces the benefit to Welsh Water and its customers, he points out. However, barriers to entry are a major issue, in terms of technology and market access.

"The power has shifted to the aggregators. They can really charge what they like and the amount that we get paid is a lot less than it used to be," he argues. "If we owned the technology ourselves, we could participate in the most suitable schemes, at the most suitable times, while meeting compliance and keeping customer bills down as much as possible."

Kam Singh, director of energy, global workplace solutions, CBRE, tackled the question of whether high value

services equate to 'higher hassle'. Risk aversion in the finance sector is the main challenge when seeking to introduce frequency schemes, according to Singh.

However, this can be overcome. "We completed the first frequency control demand management scheme in the banking sector around three-and-a-half years ago. If you have a diesel rotary UPS that has a frequency switch on it, it is 'money for old rope'," says Singh.

"You are doing it already. When the mains frequency drops to a certain set point, your diesel rotaries kick-in anyway. Purely demonstrating that availability, should be able to earn you a decent £30K-£40K per MW.

"In this case, it was a 3MW installation. Despite the numbers stacking up and it seeming exceptionally straightforward, it took around 15 months to get the project over the line," Singh explains.

"The first challenge we encountered was going through four different aggregators. It was the fourth aggregator that stood

The water industry must protect the environment when participating in DSR

“

It now works like a dream. If we can do it with a client that is so risk adverse, in such a mission critical environment, it can be done in 90% of other locations

up and said: 'We can do this project.' As operators of the site, we knew it made perfect sense."

The site in question has a £5m per year energy bill and is a major broking house, typically trading trillions pounds worth through its buildings.

While the principle had been 'sold' to client, the aggregators did not necessarily understand the criticality of the asset, proposing to add a relay on the 'other side of the bank's infrastructure', which of course was unacceptable to the bank. The fourth aggregator found a solution to overcome this issue.

"It now works like a dream," says Singh, adding that the bank has seen significant rewards in terms of revenue.

"If we can do it with a client that is so risk adverse, in such a mission critical environment, it can be done in 90% of other locations," comments Singh.

Panellists advised delegates that involving an expert is crucial, as DSR can be complicated. It is also important to limit Capex exposure as the market is fluid, while persistence is needed when starting out and embarking on DSR for the first time. Ultimately, the most value can be obtained by 'stacking' different revenues, across different assets.

Organised by Energyst Media, the DSR event was attended by delegates from a diverse range of industry sectors – from government, NHS trusts and water authorities, to utilities, local councils and universities.

Other headline speakers included Asheya Patten, flexibility workstream lead, National Grid; Ed Nelson, senior policy advisor, smart energy, BEIS; and Louise van Rensburg, senior economist, Ofgem.

Event partners included: National Grid, British Independent Utilities (BIU), E.ON, EnerNOC, ENGIE, G59 Professional Services, REstore, Total Gas & Power, UK Power Reserve, *The Energyst* and *Mission Critical Power* magazines. ●

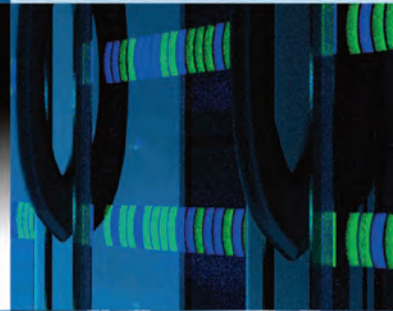


Weatherite

AIR CONDITIONING LIMITED

Cooling Solutions...

from the Data Centre Experts



With over 45 years experience and a reputation for delivering exactly the right cooling solution for each individual Data Centre, we understand the importance of keeping critical IT technology at optimum temperature - 24 hours a day, every day.

www.datacentre-cooling.com

For further information call: +44 (0)121 665 2266, e-mail: sales@weatheritegroup.com or visit the website: www.datacentre-cooling.com

Part of the Weatherite Group of Companies.

Going local: powering a sustainable future

Globalisation has led to a need for continual uptime in many businesses and banks, while services such as hospitals continue to require 24-hour energy resources. With this increasing need, we must consider the pressure on an antiquated energy grid system. Rolton Group's Chris Evans discusses how low carbon technologies could help meet growing energy demands



As the UK takes further steps towards leaving the European Union, the government has reiterated its commitment to investing in infrastructure to support economic growth. Boosting the productivity of UK businesses remains a priority in order for the country to maintain its competitive advantage on an international stage.

Companies that are stepping up to the challenge are experiencing a growing need for constant uptime as globalisation demands a 24-hour service, and this is resulting in increased energy demands to carry out their operations. In general terms, the National Grid's capacity to provide the necessary increase

in power supply can be facilitated in the short term.

However, if we take a look at local energy provisions, growing demand along with a lack of infrastructure investment has the potential to create imminent and significant local level challenges.

As such, the National Grid requires urgent improvement and investment to combat the fact that it is constantly being stretched to its limits and being expected to do more and more as the consumer demand for

increased power shows no signs of abating.

A look at the UK's energy landscape in recent years is grim viewing for UK businesses where energy supply is critical.

The grid's spare capacity, the difference between available supply and expected peak demand, for last winter was a mere 1.2%, the lowest level since 2005-6.

Companies were asked again to be ready to reduce their energy usage to help meet demand at peak times.

This has become a worrying trend in the past few years and has a huge impact on businesses, who are not only at risk of having to reduce their operations, but may also be forced to suspend plans for expansion. This poses a serious question: if UK businesses are being hindered by an outdated energy infrastructure, how will they be able to compete with other major players located in countries that have no such limitations on energy supply?

Businesses facing this

dilemma are increasingly exploring localised energy options to give them independence from the National Grid and avoid potential brownouts.

The opportunity for onsite power generation is a significant factor in enabling companies to benefit from greater security of supply and to have more control over their operations. This means that growth is not impeded by national restrictions, the financial drain of escalating energy bills or a lack of available energy to power critical 24-hour operations.

The growing importance of sustainability and environmental targets is also playing a huge part in many businesses taking the decision to consider low carbon onsite energy options. With Brexit on the horizon, it is likely the UK will not be bound by EU-driven targets in future but the government remains committed to energy



Where power supply is critical to ongoing operations, companies are increasingly having to seek energy security independent from the National Grid

targets unrelated to EU membership, including the Paris climate agreement. These commitments will continue to ensure UK businesses, and the nation as a whole, do not lose their motivation to continue pursuing a low carbon agenda.

Looking at the current UK energy landscape, most of the UK's 33GW renewable capacity consists of wind and solar schemes, technologies known for their intermittent energy generation, relying entirely on the weather.

In order to ensure a more consistent energy supply, a broader mix of renewable energy generation technologies

should be implemented, such as energy from waste and wave/tidal power, as well as the encouragement of investment in energy storage.

Rolton Group is helping businesses that are major energy users by providing strategic advice on energy security and ways in which their energy usage can be more efficient. This includes guidance on renewable technologies both on and off site, as well as education on web-based energy management tools.

Localised, low carbon energy options can be used not only to provide UK businesses with

a more reliable power source, but also can bring a multitude of financial advantages. Lower overall energy costs as the risk of potentially high peak energy prices is reduced and environmental tax relief schemes for businesses are just two of the more obvious examples of this. An additional benefit is an end to volatility in energy costs, providing greater certainty for business planning.

Ensuring that the UK is fully prepared for rising energy demands is key. Where power supply is critical to ongoing operations, companies are increasingly having to seek energy security independent from the National Grid, as pressure on them increases to do more with less.

If the UK is to flourish in a post-Brexit landscape, collaboration between government, businesses and the energy industry will be vital to develop a robust energy infrastructure to meet our future needs. ●

Power and accuracy when you need it most



Just like basketball stars, our UPS solutions utilise everything at their disposal to deliver amongst the highest power densities on the market and class-leading efficiency of up to 98%, while still offering you the flexibility and control you need to achieve your financial and business objectives.



To find out more call or email us today: 01256 386700 and sales@upspower.co.uk
www.upspower.co.uk

Uninterruptible
Power
Supplies Ltd 
A KOHLER COMPANY

Critical infrastructure specialist Sudlows has been awarded the contract to deliver a new state-of-the-art data centre for digital firm Indectron that will provide highly secure colocation for a range of organisations.

Following a competitive tender, Sudlows was appointed to design and build the new 3MW power capacity data centre in Gloucester.

The centre will be used as a protected environment for data and critical systems connected with a wide range of networks and cloud service providers.

Indectron's Shield House (GCR1) is positioned directly on the UK's arterial fibre routes in an area that is fast developing into the cyber-security hub of the UK. When complete, it will house three new data halls with a total IT load of 1.5 MVA, and will be capable of supporting high IT power densities and a variety of IT rack and cooling configurations.

The facility is designed to meet high resiliency applications, operating on an N+N power topology and incorporating a fully maintainable design without impact to operation.

Certification to BS EN 50600 will be sought post completion with a target Class 3 installation.

Efficiency has been at the heart of the design process and equipment has been selected based on its ability to provide not only the highest level of reliability and resilience, but to do this with the minimum energy consumption.

Modularity has been employed throughout the design to ensure that the main infrastructure is able to operate at optimum efficiencies from part load through to full capacity.

"Indectron has set out a high specification. While they are experienced data centre providers, this is their first data centre build project and



Protecting critical systems at the heart of UK's cyber security hub

One of the most resilient and connected data centres in the UK is being constructed in Gloucester, by Indectron. Louise Frampton speaks to Sudlows' Zac Potts to discover how Shield House will deliver maximum efficiency and uptime

they have undertaken a lot of detailed research into exactly what they want to offer the market; modularity has been identified as important (so they can grow the facility with the load), as well as green credentials," explains Sudlows' Zac Potts.

Indectron's aim is to get PUE (Power Usage Effectiveness) below 1.2; high

on the agenda is the need to maximise efficiency for power and cooling, therefore.

Energy efficient cooling
The cooling systems employed are sized and designed for operation during the highest peak weather conditions for the region but incorporate the ability for full free cooling during the cooler months to

enhance the efficiency of the facility.

Every aspect of the mechanical systems incorporates an element of variable or modulating operation that, along with state-of-the-art controls, allows the cooling systems to match cooling to demand at an unparalleled level which further enhances the ability of



Shield House will feature three new data halls with a total IT load of 1.5 MVA

the system to operate under partial free cooling during a significant proportion of the year.

The system is designed with redundancy and resiliency in mind and, at the most granular level, free cooling and traditional DX circuits have been separated entirely ensuring that individual critical circuits have the highest possible uptime.

Combined with the ability of the system as a whole to tolerate a number of failures without affecting the critical space, the cooling system is one of the most resilient designs available.

“One of the benefits is that, during cold weather, the system produces most of the cooling for the data centre from ambient air. It is an indirect system, so no outside air is brought into the data centre hall,” Potts explains. He adds that the compressors, fans and controls for the system are all

designed around the latest EC technology.

“This enables the system to run the exact amount of free cooling and the exact amount of refrigeration required for the bulk of the year, when the system is in a partial free cooling mode. The combination of variable speed systems and the controls allow the cooling system to operate at industry leading efficiencies,” Potts continues. This is achieved without adding additional complexity, he explains.

Power: security and efficiency

The whole facility has a high availability N+N power system complete with dual incoming HV feeds, each with a dedicated RMU and Transformer, and ultimately supported by two HV Primaries to provide one of the highest levels of power security.

In addition to this, the



Zac Potts: ‘It made sense to look at modular power solutions’

“At the most granular level, free cooling and traditional DX circuits have been separated entirely ensuring that individual critical circuits have the highest possible uptime

facility benefits from full onsite standby power generation with fuel reserves and delivery management capable of supporting the facility indefinitely. Upstream power to the critical IT systems is protected on both paths by dedicated IT UPS systems.

“The data halls will be populated over time, so it made sense to look at modular power solutions. Initially, we looked at using a number of larger UPSs, in the region of 600 KVA units, but after careful consideration we decided to specify modular units from Huawei,” comments Potts.

Each individual module is 100KVA and can be scaled up as the load grows, which ensures the UPSs operate at peak efficiency throughout the life of the facility. This is achieved without compromising either resilience or maximum capacity.

Connectivity to the site is designed to the same high level of resiliency, with multiple carriers available on site, with dual redundant and diverse incoming network routes, and dual redundant on site ‘meet-me’ communications rooms.

“We have put a lot of time and effort into evaluating

a variety of technologies, assessing around 10 different combinations of cooling and five to six different UPS systems. As data centre designers, we go the extra mile when it comes to investigating suppliers’ technologies to ensure they are the optimum solutions for the client, but we also have significant experience of installation and can provide on-going maintenance services. This means that we can provide effective coordination from the start of the project, right the way through the installation and beyond,” says Potts.

“At the end of the project, it is our hope to offer planned/preventive maintenance for the site [subject to tender], for the cooling, generator and UPS systems. It makes sense to have a company that has specific experience of data centres to look after the facility, so they can be appropriately responsive.

“Sudlows will be able to have someone on site in just a few hours to quickly resolve any problems and can also offer remote monitoring if required. Having quick access to someone who really knows the installation is invaluable.” ●

The future of DCIM: remote, data-driven and Cloudy

Experts at 451 Research point out that the value of data centre infrastructure management data multiplies when integrated, shared and analysed at scale. DCIM-based cloud services or DMaaS solutions are emerging but could artificial intelligence hold the key to unlocking even greater potential? Louise Frampton reports

New Cloud services for data centre infrastructure management are transforming traditional on-premises approaches. By applying Internet of Things technology, DCIM-based Cloud services can deliver the benefits of DCIM without the deployment costs and, over time, “promise value beyond what is possible on-premises”.

This is according to experts from technology research and advisory company 451 Research and the Uptime Institute, who recently provided industry insight as part of a webinar on ‘the evolution of DCIM’.

Mark Harris, senior vice-president of marketing for the Uptime Institute, comments:

“When expectations are set properly, DCIM can be very successful. Data centres have become more complicated over time and more difficult to manage in ‘someone’s head’; we are moving away from best case ‘folklore’ and ‘tribal knowledge’ towards a requirement to have proper systems, processes and policies in place that can handle this complexity.”

Quoting Joe Kava, Google’s vice-president of data centre operations, Rhonda Ascierio from 451 Research points out: “It is impossible for mere mortals to visualise how best to optimise the data centre in real time. However, it’s fairly trivial for computers.”

She adds that the best-run, most-efficient data centres

– from hyperscale to micro data centre, Cloud and colo to enterprise – are increasingly data driven.

“People have been saying to me for a few years now that you only need a few simple monitoring points to understand your data centre and to get the most of it. But I haven’t seen that bear out; I don’t think it’s true. Data centres are going to get more and more complex, particularly as workloads change,” comments Ascierio. “I’ve worked with and talked to a lot of people who have implemented DCIM with varying degrees of success and it is clear that DCIM is as much – if not more – a management approach as it is a set of tools.”

The most successful DCIM projects, according to Ascierio, are realised when the business requirement has been carefully considered at the outset. She points out that there is a lot of data obtained within data centres but this tends to be siloed, inconsistent and in different formats so it is hard to compare and integrate into a single dashboard. DCIM overcomes these challenges by aggregating and normalising this data. The traditional DCIM-only approach comprises a number of core components: monitoring; asset management; and analytics, predictive modelling or forecasting.

“The benefits include increased efficiency and reduced costs, and lowering

of redundancy, the ability to analyse ‘what if’ scenarios to avoid errors, and forecast/anticipate capacity issues that may impact power use and hot spots.

“DCIM is the foundation layer of what is termed the ‘data driven data centre’,” says Ascierio. She explains that the more forward-thinking data centres that are further down the road with DCIM, use the data centre service optimisation approach (DCSO), which integrates DCIM with IT systems and business systems.

These are analysed together, which allows organisations to better match the supply of physical resources at the facilities layer with demand from IT.

“Once this integration has been performed, this paves the way for automation. This is usually the fourth or fifth step of the deployment. So why

40%

The percentage by which Google was able to cut power for cooling by using machine learning at its data centres

precision load placement.

“The data that you integrate will depend on your business need. Colocation providers, for example, are integrating DCIM with CRM data, in relation to power consumption, so they can bill for use of assets,” says Ascierio.

A major, new trend in the future, according to Ascierio, could be the use of DCIM to support participation in demand response schemes. “There are calls for data centres to use generators more and/or to use less power at peak times. And of course you can trade on

have a problem. It went well for them but, of course, it does carry risks, so they are in the process of putting in a DCIM system and integrating it with data about their workloads through DCSO. This means when the utility asks them to participate in demand response, they can look at what workloads are running and where. If certain workloads are running, they can decide not to participate in demand response. In addition, if they are on high alert from the utility, they can shift workloads. They are not making a lot of money out of this and do not expect to, but their business reason for doing this is about reducing risk,” Ascierio comments.

The benefits of integrating DCIM data are the ability to better match supply with demand from IT, the provision of end-to-end visibility of what is going on in the facility at any given time, as well as greater



Data centres have become more complicated over time and more difficult to manage in ‘someone’s head’; we are moving away from best case ‘folklore’ and ‘tribal knowledge’ towards a requirement to have proper systems, processes and policies in place that can handle this complexity

risk of IT disruption. Increased efficiency is about driving up utilisation, for example by identifying stranded power/cooling and avoiding over provisioning. Forecasting is another significant driver,” says Ascierio.

451 Research has conducted its own studies on DCIM and return on investment (ROI). Most of the savings are realised through reduced operator time and resources; and being able to perform on-demand audits.

However, a benefit that 451 Research is hearing more about is the ability to provide power usage data for tech refreshes. Other important benefits include improved fault detection, root cause analysis of failures, real-time visibility

do this? It all comes down to lowering risk of IT disruption,” says Ascierio.

She explains that the benefits of the DCSO approach include the ability to map the workloads to the assets, including the supporting critical infrastructure; ensuring the physical resource is available and running at the performance that the application requires; real-time load shifting, including pre-emptively when the DCIM flags up an issue – so it can move load away from the area; while traceable work orders also mean you can reduce errors on the floor. It also enables increased efficiency and agility, so that you can load shed, load cap and perform

that,” she explains.

She highlights the example of a large enterprise data centre in the US allowed to run its generator for 100 hours per year. “The truth is, it doesn’t need to run it at all, except for testing, so the mission critical data centre has signed up for demand response. The utility can remotely switch on the generators when the data centre operator gives them the green light to do so.

“They performed a cost analysis and they broke even. They didn’t make money but what was valuable to them was the business insight; when the utility asked them to switch to demand response, it put them on high alert... they knew when the power was most likely to

insight into the criticality of the workload. It also offers the ability to enable improved operational and new business approaches, but it does require ‘orchestration’, notes Ascierio.

Ascierio points out that a major new development is the emergence of DCIM-based Cloud services or DMaaS. Monitored data about equipment is encrypted and sent to a service provider’s Cloud. Initially developed as mobile systems, full feature systems are now evolving. While some of the data remains completely private, a proportion of the data is anonymised and pooled with data from hundreds of thousands of other facilities; this can then be analysed and shared. »

Artificial intelligence could integrate with DCIM-based Cloud services



“The reason this is a big deal is that it enables big data analytics,” explains Ascierio. The statistical analysis of large pools of data means that outcomes can be better predicted, which is a major difference. It is currently tied into on-premises’ traditional field services – but more services will be driven/triggered by big-data analysis in the future.

Short-term capabilities include power and environmental monitoring and alarming, and predictive maintenance. Some progress has already been achieved by suppliers in terms of delivering this capability; Eaton, for example, offers this though

a DMaaS service for its UPS. Another supplier offering DMaaS is Schneider – which is covering all data centre equipment, not just UPS.

“Schneider is not yet offering predictive maintenance but that is certainly where it is heading,” says Ascierio.

“We know others will enter [the DMaaS market]: ABB has announced an alliance with Azure cloud... Vertiv has announced DMaaS intentions that will almost certainly lead to Cloud-based services... and there will probably be others,” continues Ascierio.

In the future, the goal will be for DCIM to offer industry benchmarking through DMaaS, which will enable

data centres to gain an insight into how their performance compares with others. The aim will also be to provide benefits such as facility risk mitigation, budget impact analysis and recommended actions – not just in terms of infrastructure and equipment but also taking into account data on weather and power. Remote troubleshooting will also be offered in the long-term, along with outcome based services (for example, guaranteeing a certain cost per kW or PUE.)

“There are some things that DCIM does locally that you may want to keep local – for resiliency reasons, in case you lose the network; or

you may be legally obliged to keep data on site,” Ascierio acknowledges.

“Furthermore, if you are trying to catch a failure in real time, such as an electrical fault, do you want to go to the Cloud and back?”

Together, DCIM and DMaaS could provide a powerful combination but there is even greater potential on the horizon: artificial intelligence is another important trend that could integrate with DMaaS services.

As Ascierio points out, machine learning in Google’s data centres successfully cut power for cooling by 40%. This problem solving was achieved without involvement of any human being.

“What if this became available to everyone? This is the big hope and promise of DMaaS,” Ascierio concludes. ●

“ The benefits of integrating DCIM data are the ability to better match supply with demand from IT, the provision of end-to-end visibility of what is going on in the facility at any given time, as well as greater insight into the criticality of the workload. It also offers the ability to enable improved operational and new business approaches

To view the webinar in full, visit the ‘resources’ section via The Uptime Institute website: <https://uptimeinstitute.com>

Maximise your uptime with CyberHub

A new 3D visualisation tool assists with the planning and optimisation of room layouts, as well as mapping of temperature profiles

Data centres are becoming increasingly complex and the latest 3D software allows operators to monitor and manage their assets efficiently, while maximising uptime. Fully understanding the effects of room layout on air flow, when making changes or during capacity expansion, gives operators the confidence they need that cooling performance is assured.

Launched by Digitronic Software, a joint venture between Stulz and Digitronic Automationsanlagen (a company specialising in software development and control systems), CyberHub ECO.DC enables 3D visualisation to assist with planning and optimisation of room layout, as well as mapping of temperature profiles – essential for effective thermal management, protection of critical IT infrastructure and enhancing energy efficiency.



A wide range of data can be collected via an easy-to-use operator interface

missioncriticalpower.uk

Other critical features include alarm management, with integrated escalation management, and individual status reports.

Monitoring and managing critical equipment is vital for ensuring business continuity and a wide range of data can be collected via an easy-to-use operator interface – from air conditioning systems, temperature and pressure sensors, UPS systems and PDUs. Rapid access to crucial information enables operators to be responsive to events and avert potential problems before they become an issue – helping to avoid risk of outages, which can result in substantial financial loss and reputational damage.

The DCIM solution is simple to implement and has a clearly set out interface. This means users can install and set up the software on their own in just a few hours. It is available in a fully autonomous local server (VM compatible) version, or as a globally available SaaS (software as a service) from the Cloud. The software has built-in compatibility with a range of protocols that are common in the data centre sector, as well as building management system – such as Modbus, MBus and SNMP.

Ultimately, the DCIM solution will provide users with a holistic view of their data centre's performance so that energy, equipment and floor space are used as efficiently as possible – crucial in managing operating expenditure (Opex) and operational reliability. ●

Datacentre ready genset **LOADBANKS**



The **Hillstone** auto-load shedder

- Increases reliability
- Protects Fuel Integrity
- Prevents wet stacking
- Ensures SLA compliance

Tel: +44(0) 161 763 3100

sales@hillstone.co.uk

www.hillstone.co.uk



For all your Data Centre cabling requirements

01942 840 200

www.cable-world.co.uk

sales@cable-world.co.uk

DATA centres
Ireland
Exhibition & Conference



22-23 November
2017
RDS, Dublin
Come and see us on Stand 238



CableWORLD LTD

Distributors of Electrical Cables & Accessories

Warning signals



Some UPSs need just simple communications capability to warn their critical load of an impending failure. Larger, more complex or widely distributed systems benefit in many ways from more sophisticated, network-based communications solutions. Uninterruptible Power Supplies director Alan Luscombe looks at the options

The UPS's primary role within a data centre or ICT room is to provide instant battery backup if the mains power fails. Sometimes, this backup resource is designed to support the load for extended periods. More usually, though, its purpose is to buy time for the load to shut down gracefully, or for a generator, if available, to start up and come online.

Clearly, the UPS must communicate some type of warning signal to trigger either strategy as soon as the mains fails; otherwise, if a blackout exceeds the battery autonomy time, a system crash is merely delayed rather than prevented.

This is one fairly obvious scenario yet there are other ways in which not only the critical load but also other services such as building management systems and remote monitoring terminals can benefit from visibility of the UPS and incoming mains supply status, together with an ability to control the UPS if necessary.

However, there is no point in investing in a communications capability beyond the realistic needs of an application; accordingly, this article looks at the various options available. At the simplest level, 'true/not true' information can be obtained from volt-free contacts that can communicate UPS status and alarms to other equipment on the same site as the UPS. Windows, Mac, Linux, Unix and other PC or network operating system variants support software that can detect these alarms and react

by initiating an orderly system shutdown automatically. Figure 1 shows some typical volt-free UPS status signals.

A more sophisticated communications strategy can be implemented using the RS-232 connection available on many UPSs. This allows more detailed information to be transmitted, including data generated by UPS self-diagnostic activities. Examples of analogue values that can be measured and transmitted include:

- Inverter output voltage, frequency, current, kVA and kW
- Bypass voltage, frequency, current, kVA and kW
- Battery voltage, charge/discharge current and remaining battery time
- Statistics regarding mains failures and UPS operation

The RS-232 serial connection allows the UPS to be monitored in real time as a remote computer can continuously poll it for updates. In normal practice, however, only critical alarms are continuously monitored, while operational status data is requested as needed by system administrators. The exact information profile obtained in this way from a UPS depends on the individual UPS supplier, and the software they provide to handle the serial data stream.

The RS-232 protocol is also manufacturer-dependent, as no European Standard for UPS RS-232 protocol exists.

The monitoring software is



Contact	Signal	Function
	Alarm	Mains Failure
		Mains Present
		Common
	Message	Load On Inverter
		Common
		Battery Low
	Alarm	Battery OK
		Common
		Load On Mains
	Message	Common
		Common Alarm
		No Alarm Condition
	Alarm	Common

Volt-free contacts are typically rated for 60VAC max. and 500mA max.

Figure 1: Volt-free contacts



available for most operating systems, and its facilities may include:

- A graphical display of UPS status, voltage, current, load, battery voltage and frequency and more
- Configurable responses to certain alarms, which can include broadcasts to users
- Scheduled diagnostic checks and data logging

RS-485 or full-duplex RS-422 communications can be used for longer distances, and modern UPS equipment also provides a USB port. Modbus, an application-layer serial communications protocol that operates over either RS-485 or IP links, can also be used to communicate with up to 240 devices across a common network.

Network-based solutions

Larger systems, spread over wide areas across sites that may be hundreds or even thousands

of miles apart, present monitoring, management and maintenance challenges that can only be addressed with a full IP-based Wide Area Network (WAN) solution.

This is especially true if some of the sites within the network are unmanned or without a network manager. Any problems they experience could cause irreparable damage to system hardware and software without a means for rapid resolution.

The solution is to equip devices like UPSs with Simple Network Management Protocol (SNMP) capabilities, as this allows monitoring and control of every device on a WAN from a central location. SNMP is a standard protocol and part of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite which allows all network devices to transmit management variables across enterprise-wide networks. SNMP is vendor- and platform-independent, and establishes

battery usage, alert managers to low battery problems and track power level history. Through SNMP, this information is available across the network for immediate analysis and to detect potential problems before they cause downtime or damage.

SNMP-based networking can also be expanded to encompass multiple UPSs for optimum efficiency in load management. Information can be collected from, say, several dozen UPSs into a central network console to allow an integrated, large-scale control strategy.

Well-managed UPS vendors typically use networking and communications to provide a remote UPS monitoring service for their customers. UPS Ltd's PowerReporter, for example, runs on a customer's network, continuously monitoring status and automatically detecting any error or alarm messages. If one occurs, PowerReporter emails UPS Ltd's Service Centre with

“ All UPSs need some type of communications capability, to warn their critical load of a power failure. For some simple systems, that's all that's necessary but larger, distributed and multi-site systems can benefit from more sophisticated network solutions

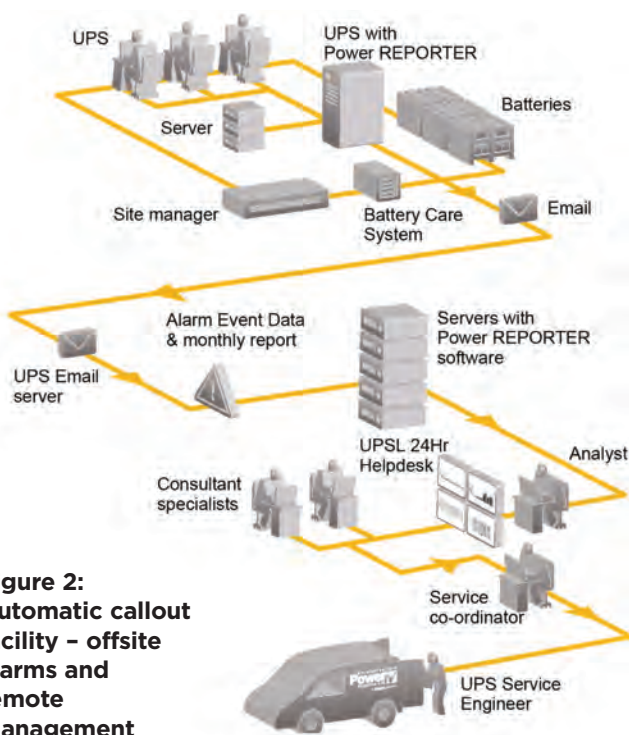


Figure 2:
Automatic callout
facility – offsite
alarms and
remote
management

guidelines for how information is collected and managed.

Network devices gather information into a management information base (MIB), from where it can be accessed by SNMP management software running within the user's operating system.

An SNMP-enabled UPS is an intelligent device that can log events, continuously monitor power quality, report on battery status, load and temperature, and perform self-diagnostics – but this built-in intelligence creates other management opportunities as well. The UPS can handle incoming commands to control the individual devices it supplies; for example, to isolate sections of a system for security purposes, shut down some devices to save power, and manage redundancy.

Predictive maintenance also becomes possible. The UPS can log power disturbances, track

status data, any related details, and device identification (see figure 2). This allows the company to brief an appropriate field service technician, who can perform remote diagnostics, followed, if necessary, by a site visit to rectify the fault - all within any contractually agreed time frame.

All UPSs need some type of communications capability to warn their critical load of a power failure. For some simple systems, that's all that's necessary but larger, distributed and multi-site systems can benefit from more sophisticated network solutions.

As well as immediate warnings, these allow predictive maintenance, strategic analysis, early intervention from remote or third-party specialists, and advanced, centralised control strategies of large, multi-UPS systems from centralised management consoles. ●

Optimising data centre assets for maximum efficiency

Paul Rivett, group operations director, CNet Training, identifies common poor practices and offers an overview of the key factors that need to be considered to ensure efficient, resilient data centre operations



The cost of energy required by high-density power and cooling systems that support mission-critical compute makes energy consumption a key business consideration for the operation of data centres. Striving for energy efficiency is easier said than done when balancing operational effectiveness with energy use, and with governments and regulatory bodies taking a greater interest in the energy consumption of the data centre sector, this adds further emphasis to energy efficiency endeavours.

Contributions to sustainability through energy efficiency can be achieved by fully optimising current data centre assets; ensuring they are operated efficiently and effectively and by maximising the use of their capabilities; idle time is usually not effective or efficient. Achieving this requires a structured

dialogue to fully understand the business needs, facilitating an evaluation of the data centre and therefore, for the assets to be deployed usefully.

A comprehensive audit of the data centre is the best way to validate the operational capabilities against the business expectations. With the critical components of the data centre having dependencies upon one another it is essential that the audit does not have an impact on normal operations, so an audit plan should be created.

Given that the power and cooling infrastructures are subservient to the IT assets, this is the logical starting point for an audit, the results of which can facilitate asset optimisation. All too often, the IT systems are not paid the level of attention required to guarantee service provision while effectively utilising the power and cooling infrastructures. This leads to

common poor practices:

- Failure to adopt a blanking plate policy for IT equipment cabinets
- Failure to remove redundant IT hardware which is often left powered up
- Poor cable management in the rear of cabinets reducing the removal of heat
- Blockages in raised access floors restricting or even preventing air flow
- Failure to understand the operating parameters of the IT hardware and its potential

These issues have a significant impact on effectiveness and efficiency.

Many data centres continually struggle to effectively provide cooling for increasing compute demands, but before considering actions such as adjusting flow rates or changing operating environments, the effectiveness of airflow management needs to be clarified. Poor airflow

brings us back to the actual primary purpose of the cooling system in a data centre, and that is the removal of heat. An efficient cooling system should be able to remove heat from the data centre or recycle it. To optimise the cooling system, it is essential that the following are regularly monitored:

- Cabinet supply and return air temperatures
- Floor plenum pressure if a raised floor is in use
- Relative humidity and dew point
- CRAC airflow rates
- Delta T across the IT equipment
- Thermal quantification (TQ) testing following any major operational changes

The use of computational fluid dynamic (CFD) applications has become an integral planning component enabling data centre operators to map, evaluate and adjust its thermal footprint.

After reviewing and aligning IT and cooling, a better understanding of the power demands should be revealed and the potential energy savings become more apparent.

Historically, many data centres have been designed with unnecessarily high levels of resilience and redundant components to cover all potential incidents. However, surveys suggest that 80% of data centres fail to exceed 60% of their original design specification, usually due to under-utilisation and a general acceptance of transmission losses. As data centres attempt to become more energy efficient and to optimise their capabilities, these transmission losses need to be controlled.

It is essential to understand what energy capacity you currently have and how it is distributed. A baseline needs to be established and this is where a simple metric such as power usage effectiveness (PUE) comes into play. There are varying opinions on PUE and how it should be applied but that aside, it does provide a simple equation of the total facility power divided

80%

of data centres fail to exceed 60% of their original design specification

by the IT equipment power. That simple comparison exposes how much power actually reaches the IT equipment and how much is therefore used or lost elsewhere. A measuring and monitoring strategy should be implemented across the components in the power distribution path, identifying areas of power losses and inefficiency such as:

- Transmission losses along the electrical distribution system
- Conversion losses across electrical components
- UPS input versus output (load capacity)
- Generator heater block demands
- Excessive or under-utilised electrical components

- Identify primary areas of concern
- Identify under-utilised components
- Determine key areas of improvement
- Understand what is achievable
- Understand potential costs, resource demands and timelines

The next step is to get the buy-in of both senior management and key stakeholders. This is essential to assess any perceived risk and to set priorities for what is both acceptable and achievable. In many data centres, actions based on the pursuit of energy efficiency are treated with a sceptical mind-set as the belief is they will inevitably lead to more unforeseen cost to implement. It can take a concerted effort and drive to optimise what already exists and to fully utilise its capability, but it is worth it?

Once the status of the data centre environment is properly understood, it is essential that



All too often, the IT systems are not paid the level of attention required to guarantee service provision while effectively utilising the power and cooling infrastructures

With the power distribution consumption known, it is not simply a matter of just reducing energy consumption. There are many factors that can have an unforeseen impact on the operational capability. An accurate baseline provides an opportunity to revisit the business needs and to re-evaluate what is required. Commonly known as 'continuous commissioning', this is where the sequence of operations is revisited. In many cases the business may have changed but the operational capabilities have not. This information can be used to establish an energy efficiency strategy to optimise energy distribution across the data centre.

Examples of actions are:

the processes, procedures and working practices are also reviewed to ensure that they are aligned to the data centres operational requirements.

This will present an opportunity to improve in-house awareness and communication between business and operational management teams. It can also identify any specialist education that may be necessary to improve the operational sustainability of energy use.

Businesses must be prepared to invest in effective measuring and monitoring assets to ensure they have access to real-time data to show, with confidence, the on-going optimisation of energy use. Remember, if you cannot measure it, how can you manage it? ●

management is a significant consumer of energy but is relatively easy to correct. Failing to maximise the supply and return air temperature cycles leads to unnecessary energy consumption and can cause bypass and recirculation of cool and hot air, simply wasting the capability of the cooling system.

The priority is to maximise the supply air temperature, so that the conditioned air effectively reaches the air intakes of the IT equipment. IT and facilities management need to work together to understand the operating parameters of the IT environment and adjust the supply air temperature accordingly.

This is especially relevant with modern IT equipment now being able to operate at up to 35°C (95°F). This provides an opportunity to raise the operating temperature, which in turn reduces energy consumption.

The return air temperature

Gaining the edge: calculating the cost of micro data centres

A new white paper examines the cost benefits of edge micro data centre deployments and concludes that the approach offers considerable savings

Small data centres deployed at the Edge of networks are growing in importance as the demand for digital services continues to surge. Many infrastructure vendors have responded with the development of self-contained prefabricated and highly integrated pods that allow small data centres to be deployed quickly, reliably and cost effectively.

An added benefit of prefabricated micro data centre infrastructure is that it can be combined to form the larger IT facilities many organisations require as their needs grow, but who cannot afford the larger up front costs of building a new traditional, or purpose-built data centre.

42%

Savings reported to be achieved for micro data centres compared with a centralised data centre

A new white paper from Schneider Electric explains how data centres can be deployed using prefabricated micro data centres. *Cost Benefit Analysis of Edge Micro Data Center Deployments* examines why micro data centres are best suited to support edge computing over other alternatives such as server rooms and traditional builds.

The paper explains the drivers that favour the adoption of small prefabricated and

integrated, micro data centres. These are: scalability (the need to match increasing IT capacity more closely to expected load); speed of deployment to respond rapidly to changing requirements; reliability; and the desire to outsource applications to the cloud or colocation facilities. The latter is a growing trend but one that is frequently accompanied by a desire to keep certain legacy or mission critical applications hosted on infrastructure in house.

Key technology drivers enabling the miniaturisation of data centres include compaction of IT equipment, led by ever more powerful and smaller silicon chips. All IT components, from processing elements and networking equipment to storage arrays, are becoming smaller. Other drivers are hyperconvergence (which allows several subsystems, including processor elements, networking technology, disks and solid-state mass storage to be integrated into a single enclosure); and virtualisation which allows a single element to run many different applications simultaneously.

The paper proposes a future micro data centre architecture that could replace traditional enterprise data centres for certain applications. A study carried out by Schneider Electric, using its own 'Data Centre Capital Cost Calculator' Trade Off Tool, examines the cost effectiveness of a single traditional data centre of 1MW capacity compared with a cluster of 200 micro data centres each of 5kW capacity.



Micro data centre Xpress



The paper proposes a future micro data centre architecture that could replace traditional enterprise data centres for certain applications

The study finds that so long as network latency is not a vital factor, the micro data centre approach offers considerable savings in capital expenditure by eliminating the need to build an entirely new facility.

The paper concludes that capital expense for building a single centralised data centre rated for 1MW of IT load is \$6.98m or \$6.98/watt. The capital expense of 200 5kW micro data centres is \$4.05 million or \$4.05/watt. Micro data centres represent a 42% saving over a centralised data centre, therefore.

Standardising these micro data centres could also result in further benefits including reduced deployment time, simplified management, and lower maintenance costs.

If some of the 200 micro data centres are geographically located away from the others, network latency might be affected, however, and there may be some instances when the purpose built approach, with all the IT in the same location may be preferable. ●

Download the white paper at: apc.com/wp?wp=223

Suspended power distribution units with retractable option

Olson Electronics has introduced the Retractor option to its range of suspended power distribution units (PDUs).

The Retractor is ideal for industrial applications where a suspended, strong and compact unit is required. It allows the suspended unit to be lowered to the required working position, locked in place and then retracted back up when it is no longer in use.

Olson is also offering a 'spring' cable option to go with the Retractor unit to connect the suspended unit to a ceiling mounted power

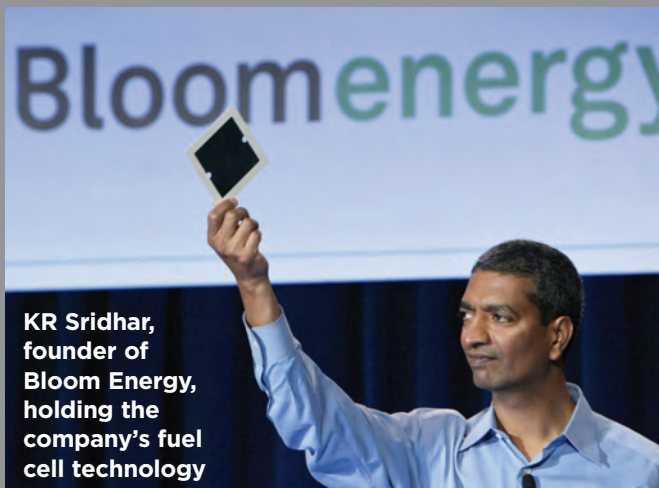


point. The suspended PDUs have a variety of sockets available, including standard UK 13 amp (BS 1363) sockets, which are often

fitted with USB ports. Also offered are 16 amp (IEC 60309/BS 4343) and 32 amp (IEC 60309/BS 4343), available in 110V or 230V.

Marissa Maxwell of Olson Electronics commented on the company's core strengths: "We are one of the remaining few British manufacturers and we pride ourselves on our in-house design and production capabilities. Our focus has always been on quality and reliability and we can provide a fast delivery service [generally next day on most items]".

Fuel cells for data centres



KR Sridhar, founder of Bloom Energy, holding the company's fuel cell technology

Bloom Energy has developed a simpler way to generate power for data centres and mission critical systems. Bloom's modular, always-on energy architecture simultaneously addresses the key challenges of traditional data centre design: reliability; energy efficiency; reduced operational cost; phased use of capital; and air and water sustainability.

Bloom Energy generates a continuous source of UPS-quality power. Modular energy architecture enables operators to specify the level of availability and N+M configurations to suit multiple needs. Bloom draws fuel from the highly reliable natural gas grid, and utilises the electric grid as backup.

This is claimed by the company to deliver increased reliability at lower lifetime costs.

A data centre powered by Bloom Energy eliminates the need for traditional backup equipment like diesel generators, UPS, batteries and complex switchgear. Bloom Energy Servers generate power at high efficiencies.

Furthermore, by generating data centre power onsite, they avoid 7% to 15% losses from transmission across the grid, and also avoid similar additional losses from duplicative UPS systems.

Bloom can run on 100% renewable biogas, and consumes no water during normal operation.

Resilient power solution for industrial applications

GE has introduced its new power supplies for general purpose industrial applications, the Resilient 3000.

The 3,000W power supplies are engineered to provide the high reliability and ruggedness needed in today's demanding industrial segment in a simple, cost-effective solution.

The user-friendly design of the Resilient 3000 (officially known as GE's EP3000AC48IN) eases the implementation process for all users, regardless of experience level or design sophistication, enabling a broad range of users to deploy and operate the units in their unique applications.

While the modules are designed with simplicity in mind, they also maintain the performance, efficiency and ability to offer robust communications that users require.

The power supply's rugged design, which includes a conformal-coated interior circuit board to protect against dust and high humidity, and an oversized fan that enables the unit to operate in extreme

temperatures, make it an ideal fit for demanding applications.

Additionally, the Resilient 3000's robust design can withstand poor grid conditions and line surges, allowing for global deployment in a wide range of industrial applications.

The single-phase Resilient 3000 power supplies enable a constant 3,000W output power with an output voltage of 48V, which offers plug-and-play connectivity and operating efficiencies of up to 95%.

The units are scalable and can be paralleled for load sharing, providing added flexibility for industrial customers looking for a solution to their unique power challenges.

"Our critical power line of rectifiers has earned a reputation within the telecom and datacom industries as highly reliable and efficient, and we aim to establish the same presence in the industrial segment with our rugged Resilient 3000 power supplies," comments GE senior product manager Jim Montgomery,

Modular, transformerless UPS system offers high efficiency

AEG Power Solutions has announced the completion of its range of modular UPS with the launch of Protect Plus M400.

The new UPS has one of the lowest total cost of ownership (TCO) factors in its class. Combined with its compact footprint and ultimate flexibility, Protect Plus M400 is ideally designed to meet the power protection requirements of server racks, small-to-medium-sized data centres, transportation, retail and other critical applications where power reliability, space and operating efficiency are at stake.

The 20 and 40kVA frames can be used as stand-alone units (on casters) or installed inside a 19" rack cabinet or, alternatively, inside Frame plus, which provides a self-contained solution, with space for a 20 kVA or 40 kVA frame and internal battery shelves. The new system is a modular, online, transformerless UPS system. It



combines high operating efficiency values, with a compact footprint and modular architecture. The operating efficiency in online mode is up to 95% and up to 98% in Eco Mode. The UPS delivers up to unity-power factor and the system can be configured for 1/1, 3/1 or 3/3 input/output

connections at installation.

The UPS is based around a 2U high 10kVA power module and can be scaled up to 40kVA capacity or 30kVA with integrated N+1 redundancy. The modules are hot-swappable and up to four frames can be operated in parallel to achieve a total power capacity of 160kVA. This architecture also minimises mean time to repair (MTTR). The power modules can be accessed from the front of the frame for easy removal, which can be handled by a single person.

AEG Power Solutions product manager Alessandro Nalbon said: "After the launch of Protect Plus M60 and of our new standalone system, Protect Plus S500, at the beginning of this year, we can now provide our customers the protection they need from 10 to 4000kVA with a range of state-of-the-art technology, flexible and efficient systems."

Busbar supporting system

Rittal has developed a new busbar supporting system for air circuit breakers. The system has been developed to enable 4 x 120mm x 10mm coppers to be secured safely to the top and bottom of the air circuit breaker. It has been carefully designed to ensure ease of use, maximum convenience and faster fitting for system integrators.

The support, which is suitable for 600 and 800mm-wide enclosures, is quick to install within Rittal's Ri4Power modular switchgear

systems, speeding up the time needed for installing air circuit-breakers in Ri4Power. With only the part number required to order, it simplifies the ordering process and reduces stocking levels for the panel builder.

Installation instructions are straightforward and there is clear guidance on the spacing of the support enabling verification up to 100kA Icw for one second. The system has been tested in line with IEC 61439 and can be used with all leading circuit breaker manufacturers' products.



Battery-free standby power

Piller has announced its latest innovation in battery-free standby power: one of the world's largest, commercially available kinetic energy storage devices for UPS applications.

Powerbridge PB60+ is a highly compact, efficient and practical replacement for conventional batteries. The unit can deliver power above 3MW and provide 1MW of electrical power for more than 60 seconds. Following the addition of the PB60+, the existing range of Piller kinetic energy storage systems extends from 3.6MJ to 60MJ+.

Piller Group managing director Andrew Dyke commented: "With, for example, 1MW of power available for over a minute, the PB60+ can easily take the place of batteries to ride through a power outage while multiple standby generators come on line. This means guaranteed power when you most need it, no need for regular battery testing

and no expensive battery replacement part way through a data centre's life."

According to the company, kinetic energy storage has the advantages of lower operating costs and, with a smaller footprint of up to 90%, air-conditioned battery rooms can be avoided with no environmental disposal issue to manage in the future. Significantly, energy can be absorbed at the same rate as it can dissipate and can do so on an indefinite basis.

This capability acts as a cushion for the engine so as to provide exceptional frequency stability under dynamic load conditions. Magnetic-lift technology significantly reduces forces on the main bearings, resulting in extremely high efficiency. This also serves to extend the bearing life ensuring many years of continuous operation.

Piller Group is a division of the UK engineering and industrial group, Langley Holdings plc.

Contact sales@energystmedia.com

BATTERY MANAGEMENT



BCL POWER

GAIN AN ADVANTAGE

BCL POWER ARE THE UK PARTNERS OF MIDTRONICS STATIONARY POWER.

MIDTRONICS STATIONARY POWER SET THE STANDARD FOR BATTERY STATE-OF-HEALTH MANAGEMENT WORLDWIDE.

CELLTRON ADVANTAGE
MODULAR BATTERY ANALYSIS SYSTEM

CELLGUARD
BATTERY MONITORING SOLUTION

CELLTRAQ
BATTERY ASSET MANAGEMENT

MANAGED SERVICES
PEACE OF MIND 24/7/365

01908 607548
info@bclpower.co.uk
www.bclpower.co.uk



FLOW METERING



Clamp-on flow & heat/energy metering solution from Micronics.

www.micronicsflowmeters.com
or call **+44 (0) 1628 810456**




MADE IN BRITAIN



micronics
Through measurement comes control

GENSET CONTROLLERS




DSE Genset®

DSE8610 MKII

SHAPING THE FUTURE OF SYNCHRONISING.

AVAILABLE NOW



- REDUNDANT MSC
- EXTENDED PLC FUNCTIONALITY
- ENHANCED COMMUNICATIONS

TO LEARN HOW DSE SYNCHRONISING SOLUTIONS WILL ENHANCE YOUR MULTI-SET APPLICATIONS VISIT WWW.DEEPSEAELC.COM

DSE DEEP SEA ELECTRONICS T +44 (0) 1723 890099 E sales@deepseapl.com

POWERING MONITORING


www.janitza.com

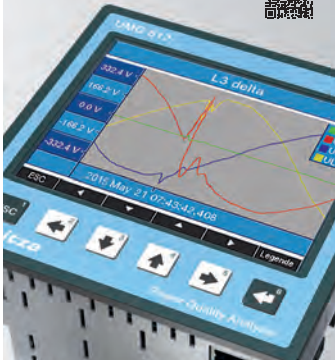
Janitza®

3in1 Monitoring System

Reliable and efficient power supply

- EnMS – Energy Management (ISO 50001)
- PQ – Power Quality (EN 50160)
- RCM – Residual Current Monitoring

Video 



UPS


AEG POWER SOLUTIONS



DECADES OF EXPERTISE AT THE CORE OF CRITICAL POWER SUPPLY

Now introducing ProtectPlus S500
A transformer-less UPS, from 30 to 200 kVA, that combines high efficiency values with a compact footprint and flexible configurations.


www.aegps.com | +44 (0) 1992 719200 | uk.sales@aegps.com



GE Critical Power

Find another gear.

See how a multi-mode UPS delivers quality, reliable power with 99% efficiency



For further information, contact us on 0845 602 9471 or sales-ups.uk@ge.com



Premium Power Protection for Data Centres



Reliable power for a sustainable world

Call: 0800 269 394
www.riello-ups.co.uk

To feature your company's products or services on this page contact sales@energystmedia.com

Gerard Thibault

KAO Data's chief technical officer discusses Queens of Stone Age, shaping the modern industrial revolution and four and a half hours of pure heaven



Who would you least like to share a lift with?

I'd prefer to take the stairs – there's no point wasting time waiting for a lift... and the exercise is an added bonus.

You're God for the day.

What's the first thing you do? In the technical world at KAO, I am (lol)! The first thing I would do is make sure the team is focused and clear on what they are doing – and then make sure that we are bringing value to KAO's business.

If you could travel back in time to a period in history, what would it be and why?

I guess the most intriguing era for an engineer would be the Victorian age. While by today's standards some of the technology was primitive, the ingenuity that emerged really set the direction of the modern industrial age. Having spent the past 19 years working in the data centre sector, it feels like I have been helping to shape the modern industrial revolution, so seeing how those pioneers dealt with challenges at first hand would be extremely interesting.

Who or what are you enjoying listening to? I'm a Led Zeppelin and Genesis fan with large helpings of Pink Floyd. Recently, due to my 17-year-old son and the fact he plays it loud on the Bose mini-speaker, I have got into the Foo Fighters and Queens of Stone Age.

What unsolved mystery would you like the answers to? Did they really walk on the

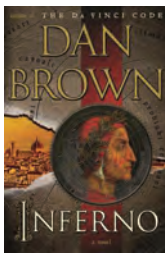
moon in '69 from Apollo 11, or was it really a 'Capricorn One'-type spoof!?

What would you take to a desert island and why?

If it was who, then without doubt, my wife! As it's 'what', then I guess it would be a pad and pencil to write down the eccentric ideas I have and ensure that I've not thought of it before, as I lose my ability to remember.

What's your favourite film (or book) and why?

Dan Brown's *Inferno* – a fabulous self-indulgent read, but posing a serious question about the dilemma that faces this planet and how ethics needs to be considered before addressing the solution.



If you could perpetuate a myth about yourself, what would it be? That I am a legend in the data centre world... I did not start it but certain people have repeated it. It's a bit embarrassing and I'm not sure



It feels like I have been helping to shape the modern industrial revolution



where it was started but it's quite an accolade!

What would your super power be and why?

To solve worldwide poverty and human-made injustice – it wouldn't be necessary if greed wasn't such a large part of human nature.

What would you do with a million pounds? Personally, or professionally? Professionally, like all the other millions of pounds that I have spent in the past 19 years of my data centre career, I would ensure that it is spent wisely and efficiently – providing a good return for our investors. Personally, I would divide it up sensibly between family and caring about the charities that mean the most to me.

What's your greatest extravagance?

A nine-course tasting menu at N0.9 Church St. in Stratford upon Avon, paired with the chef's selected 'flight of wines' – four and a half hours of pure heaven, irrespective of damage to the credit card.

If you were blessed with any talent, what would your dream job be and why? I am – and I'm in it! I believe the talent of listening to customers and understanding their needs, but then have sufficient

'translation' skills to turn that need in to a simple, efficient and robust engineering solution – being chief technology office of KAO Data allows me to put that mission in to practice.

What is the best piece of advice ever been given? Quit while you're ahead.

What irritates you the most in life? Data centre metrics – wavering from classic definitions of things like PUE, Kw/MSQ etc. We should all use standard metrics to avoid 'creative selling'.

What should energy users be doing to help themselves in the current climate? They should plan to reduce consumption, by thinking about how to structure their products and not waste power resources. Then seek feedback on the useful work and actively operate their platform. Finally, they should ensure that their supply chain uses the most practical and efficient equipment to run their hosting environment.

What's the best thing – work wise – that you did recently? I started working with KAO Data. Its enthusiasm to deliver market leading facilities, in a young and nimble company able to respond to customer needs, is both classic and fulfilling. ●

DATA centres

Ireland

22-23 November 2017

Industries Hall 4. RDS, Dublin

INFRASTRUCTURE. SERVICES. SOLUTIONS.

DataCentres Ireland combines a dedicated exhibition and multi-streamed conference to address every aspect of planning, designing and operating your Datacentre, Server/Comms room and Digital storage solution - Whether internally, outsourced or in the Cloud.

DataCentres Ireland is where you can get the latest in information, best practice, products, services and solutions that can help your business become more effective and efficient, whilst remaining secure and resilient.

DataCentres Ireland is FREE TO ATTEND and the largest and most complete event in the country.

Don't Take our word for it

"StepEx is to be congratulated for its commitment to the fast-growing data centre industry in Ireland, by holding its DataCentres Ireland forum in Dublin in each of the past 5 years.

In providing the comprehensive annual conference program and associated exhibition, this annual forum provides an ideal occasion for those of us involved with data centres, both directly and indirectly, to keep up to date with what is going on and to meet informally with like-minded professionals.

I have been a regular attendee and participant in DataCentres Ireland and look forward to the many networking opportunities that will arise during this year's 2-day event in November"

*Barry Rhodes,
Chief Executive of INEX
Ireland's Internet Exchange*



Sample of Speakers



Shane Nolan - IDA



Mark Acton



Dennis Jennings



Jerry Sweeney



Emma Fryer



Aoife Sexton



Tommy Fitzpatrick



Tanya Duncan



Gary Watson



Paul Besley



Conal Henry

For the full list of speakers visit: www.datacentres-ireland.com/speakers/

Supporting Organisations:

datacentrealliance
The Data Centre Industry Association



ASHRAE Ireland Section

iMPR
iMiller Public Relations



IDA
Ireland

the green grid
+ gpi committed, low carbon IT

Datacenter
People

DataCenterPOST

CloudPOST

Media partners:

BUSINESS SOLUTIONS
DATA CENTRES | SERVER ROOMS | MANAGED SERVICES | CLOUD



CONSTRUCTION
NETWORK
IRELAND

Construction

The Sunday
Business Post

For the latest Information and to secure your Complementary Delegate Pass

Register Online @ datacentres-ireland.com



IS MANAGING CRITICAL SYSTEMS YOUR DAILY CHALLENGE? THAT'S WHERE WE COME IN.

With its enhanced design, Liebert® EXL S1 provides optimal efficiency and grants maximised energy savings to keep your critical systems up and running.

Liebert EXL S1, built on a heritage of engineering experience, is the first transformer-free monolithic UPS to provide up to 9.6 MW of power in a parallel system. This highly-efficient UPS delivers secure power with first-class load protection and maximises energy savings. It's how we create value for our customers – by making your critical mission our own.

Learn more at VertivCo.com/EXLS1-uk



YOUR VISION, OUR PASSION

TECH SPECS

The Liebert EXL S1 meets medium-to-large power requirements with extreme installation flexibility and high power density in a compact footprint.

- Extraordinary VFI efficiency of up to 97% and intelligent ECO mode above 99% significantly reduce overall TCO and provide rapid payback
- Compact footprint adapts to the most diverse installation requirements
- Configurations from 100 kVA to 9.6 MW grant installation flexibility for any power requirement
- Intelligent paralleling feature optimizes efficiency at partial load and minimises operational costs

