DCS DATACENTRE SOLUTIONS

DEVELOPING DIGITAL INFRASTRUCTURE IN A HYBRID WORLD

ISSUE II 2022

HTTPS://DATACENTRE.SOLUTIONS

ESG and data centres

Schneider Electric

AI + Automation | Architecture + Connectivity | Cloud + Managed Services | Colocation + Hosting
Design + Infrastructure | Energy Optimisation | Management + Maintenance | Physical Security |
Power + Cooling

AN ANGEL BUSINESS COMMUNICATIONS PUBLICATION

Hospital Trust leans on EcoStruxure™ IT Expert for continuous uptime.

Discover how Birmingham Women's and Children's NHS Foundation Trust leveraged EcoStruxure™ IT Expert to enhance it's reliability and continuous uptime.

Read the case study

Life Is On | Schneider Electric

Editor's view

By Phil Alsop

Digital doomsday?

TO THOSE AGE OLD CERTAINTIES, death and taxes, we can add one more, exacerbated by our digital age: disruption. Yes, wars, famines, other natural disasters and pandemics, have been an ever present since Noah, alerted to the possibility of some wet weather, built his ark. What has changed is the digital-enabled globalisation which, in simple terms, means that the interdependence which we have taken for granted as a strength (ie a country keeps in control of what it does well and/or cheaply and subcontracts everything else to other countries to supply) is also a potential weakness. Or, in the current scenario, a definite, resounding weakness. Suddenly, the idea that the UK, for example, is a long way from being self-sufficient when it comes to food and fuel, doesn't look so clever. Many other countries are in a similar position – relying on Eastern European resources which are fast disappearing thanks to the current Russia/Ukraine conflict.

Add in the many, ongoing supply chain issues caused by the pandemic, the fairly serious global commitment to NetZero and some serious political instability in many countries where such issues were never imagined, and the future looks somewhat challenging.

And that's before we've factored in the energy price crisis, which is already having a major impact across the world but, so far as I can see, is yet to work its way through the data centre sector. The data centre sector on which almost every industry and individual business has come to rely. Data centre owners and operators are already well on their journey towards renewables and Net Zero, and are extremely skilled at buying their power supplies a long time ahead of when it's actually needed, but, at some stage, the current, massive spike in the cost of gas and electricity has to have an impact on anyone who uses an IT device. In other words, everyone!

In the glass half full corner are those who believe that this temporary chaos will soon return to normality, so panicking makes no sense. Those with half empty glasses are not so convinced. Although they would see the silver lining of the price-induced accelerated transition from fossil fuels to renewables and cleaner energy (nuclear is a tricky one!). While predicting what might happen tomorrow, let alone in a few weeks' or months' time, is a thankless task, I would be surprised if more and more organisations don't start to re-evaluate how, where and when they access their IT resources, with cost very much the driving factor. Of course, cost has to be balanced alongside risk – the critical nature of the IT infrastructure on which we all rely – but, right now, I think they are many folks paying more than they need to because they have not done the cost v risk sum, but just gone along with what seemed easiest at the time.

As the cost of living crisis impacts so many over the coming months, prudent housekeeping is the way forward. And business owners would do well to understand the true cost of data centres and IT infrastructure to their activities.

DCS DATACENTRE SOLUTIONS

Editor
Philip Alsop +44 (0)7786 084559 philip.alsop@angelbc.com

Sales and Marketing Manager
Shehzad Munshi +44 (0)1923 690215 shehzad.munshi@angelbc.com

Sales Manager
Peter Davies +44 (0)2476 718970 peter.davies@angelbc.com

Sales Executive
Jessica Harrison +44 (0)2476 718970 jessica.harrison@angelbc.com

Director of Logistics
Sharon Cowley +44 (0)1923 690200 sharon.cowley@angelbc.com

Design & Production Manager
Mitch Gaynor +44 (0)1923 690214 mitch.gaynor@angelbc.com

Publisher
Jackie Cannon +44 (0)1923 690215 jackie.cannon@angelbc.com

Circulation & Subscriptions
+44 (0)2476 718970 circ@angelbc.com

Directors
Stephen Whitehurst: Chairman
Sukhi Bhadal: Chief Executive Officer
Scott Adams: Chief Technical Officer

Published by:
Angel Business Communications Ltd
6 Bow Court, Burnsall Road, Coventry CV5 6SP. UK
T: +44 (0)2476 718970
E: info@angelbc.com

Datacentre Solutions is published 4 times a year on a controlled circulation basis in Europe, Middle East and Africa only. Subscription rates on request. All information herein is believed to be correct at time of going to press. The publisher does not accept responsibility for any errors and omissions. The views expressed in this publication are not necessarily those of the publisher. Every effort has been made to obtain copyright permission for the material contained in this publication. Angel Business Communications Ltd will be happy to acknowledge any copyright oversights in a subsequent issue of the publication. The paper used within this magazine is produced by chain of custody certified manufacturers, guaranteeing sustainable sourcing. ISSN 2756-1143 (Online)

CONTENTS

VOL. 28 ISSUE II 2022

DCS DATACENTRE SOLUTIONS

The data centre trade association

DCA News

Research uncovers edge computing challenges

Responses from more than 1,000 global IT professionals and decision-makers reveal drivers of edge computing deployments, challenges, and solutions for maintaining resilience, connectivity and supporting digital first connected operations, that are secure, reliable, resilient, and sustainable.

RESPONSES from more than 1,000 global IT professionals and decision-makers reveal drivers of edge computing deployments, challenges, and solutions for maintaining resilience, connectivity and supporting digital first connected operations, that are secure, reliable, resilient, and sustainable.

Schneider Electric has unveiled findings from a newly commissioned IDC White Paper entitled, Succeeding at Digital First Connected Operations, that highlights the power of edge computing in enabling the shift to a digital-first world. The white paper details responses from over 1,000 IT and operations professionals across industrial, healthcare, education, and other verticals as well as a series of in-depth interviews with industrial enterprises.

Respondents were global, representing firms in the United States, China, Japan, Germany, The United Kingdom, India, and Ireland. The organisations ranged in size from 100 to more than 1,000 employees. Responses provided insights about the factors driving edge investments, the challenges firms faced while deploying to the edge, obstacles to continued investment, and strategic recommendations to future-proof edge capabilities. “As organisations seek to create new or improved experiences for customers and to become more operationally efficient, improve safety and security, and become more sustainable, they are leaning more on digital technologies. The white paper examines the crucial role that edge computing and edge deployments play in enabling digital-first, connected operations,” says Chris Hanley, SVP, Commercial Operations & Global Channels, leading edge commercial strategy, Schneider Electric. “It highlights strategies that IT professional and decision makers can adopt to future proof their edge computing capabilities to support remote, connected, secure, reliable, resilient, and sustainable operations.”

Edge computing is one of the major enablers of a digital-first paradigm. In fact, the most common use cases of edge infrastructure include cybersecurity systems to monitor the operational network locally as well as storing and processing operational data to bring it to the cloud.

Further, when organisations were asked why they were investing in edge computing to support these workloads, respondents cited, “improve cybersecurity” (50%) and “systems resiliency and reliability” (44%). Yet, there are various challenges that organisations must overcome to ensure their edge infrastructure, and thus, their connected operations, are resilient and reliable.

Despite the promise of the edge, many organisations report connectivity and power outage concerns. In fact, 32% of respondents have experienced a “lack of connectivity or slow connectivity” with their edge deployments.

Further, 31% have experienced a “utility power outage or power surge lasting more than 60 seconds.”

Challenges to overcome when transitioning to digital-first connected operations

1) Security. Physical and cybersecurity concerns are high when connecting operations. This concern will require systems and processes that are tailored for this new paradigm. Yet, once connected to the cloud, the power of operational data can be harnessed to drive a host of new and enhanced use cases. Such data can enhance collaboration in the enterprise and enable remote operations capabilities that result in labor efficiencies while ensuring companies have resilient, remote operations capabilities.

2) Skills. The workforce needs to have the right skills to execute across technology settings and to be able to build alignment internally to drive change. This focus will require companies to engage with new ecosystem partners inside and outside of their organisation.

3) Reliability. As more of the local operations capabilities are directly supported remotely through the connected edge, reliability is a critical concern.

“Resilient edge resources are the foundation for shifting to digital-first, connected operations,” said Jennifer Cooke, Research Director, Edge Strategies, IDC. “Organisations will become vulnerable if and when their technology fails. To future proof edge deployments, leaders must develop a strategy that addresses concerns, such as cybersecurity and connectivity issues, and ensures access to the skills required to maintain resilient edge infrastructures.”

Technology is now critical to achieving business sustainability

More than 60% of businesses are now considering how IT can help them be more sustainable, according to new industry research.

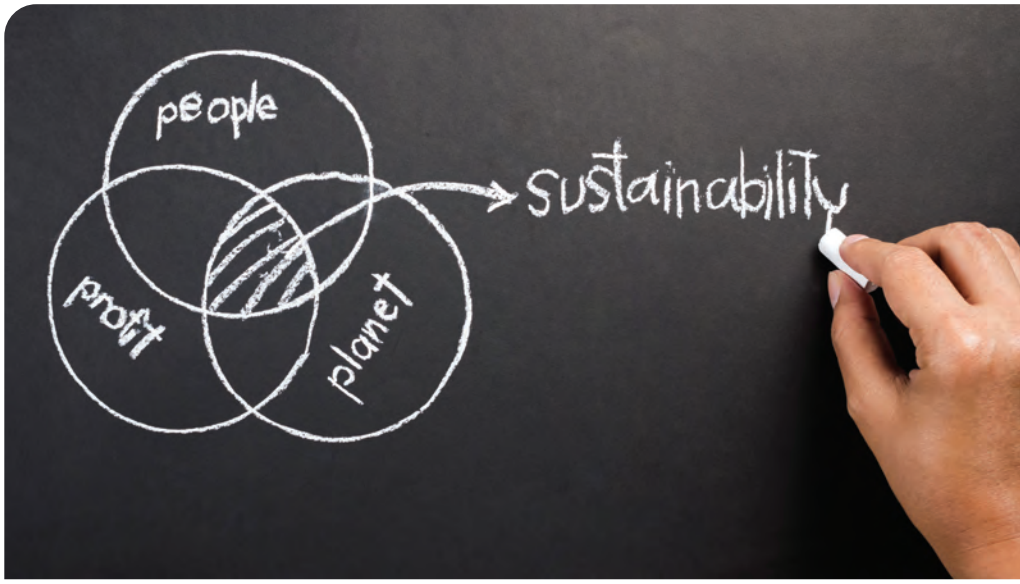
TECHNOLOGY is now critical to achieving business sustainability More than 60% of businesses are now considering how IT can help them be more sustainable, according to new industry research.

The research, which was carried out by leading IT provider, Digital Space, surveyed over 1,000 representatives across 10 different industries, to highlight the valuable role IT has in reducing corporate environmental impact.

The findings found that 57% of organisations had already considered the correlation between sustainable IT and scalable business growth, while 64% considered how IT providers can help their organisation become more sustainable.

Public cloud, for instance, is 80% more carbon and energy efficient than running infrastructure in a data centre, while SD-WAN promotes re-use and remanufactured laptops can provide cheaper and greener options for users.

However, despite the recognised benefits of sustainable IT, there is a reluctance to take swift action. 59% of respondents stated that sustainable changes around their IT infrastructure would not be enacted for at least another year while 36% stated that a 5% increase in cost would be enough to deter them. Tim Lancaster, Managing Director of Cloud at Digital Space, said: "While our sustainability report has shown that IT professionals want to be more sustainable and believe that IT can reduce carbon emissions, it has also demonstrated some reluctance to take sustainable action.



"Despite recognising the importance of technology in achieving company-wide sustainable targets, IT professionals have been deterred by associated costs with only 7% revealing that cost was not an important factor. Our advice here would be to look at the long-term savings and goals. When considering pay-as-you go tariffs, re-use and employee productivity, especially from cloud technologies, organisations will benefit from cost savings as well as increased sustainability."

Other key takeaways from the report included:

- 8 out of 10 organisations have either reduced their carbon footprint already or have defined plans to do so. These organisations expect that IT will be part of this.
- 51.5% of organisations believe regulation or an industry code of conduct is pushing them to become more sustainable, with 53.6% revealing Board/Employee support of sustainability as the driving force, 45.4% customer expectations and 19.7% marketing/ branding.
- 2/3 of respondents see sustainability increasing business growth and profit.
- 60% of respondents report a lack of immediacy regarding impact to their IT usage, given that over 80% reported either full remote working or a hybrid working arrangement.

Despite recognising the importance of technology in achieving company-wide sustainable targets, IT professionals have been deterred by associated costs with only 7% revealing that cost was not an important factor

Business leaders are re-evaluating IT suppliers as a result of increased energy prices

Data centre provider ServerChoice has released new research, highlighting the widespread impact of the cost of energy increase and how it is leading businesses to re-evaluate their IT suppliers.

DATA CENTRE provider ServerChoice has released new research, highlighting the widespread impact of the cost of energy increase and how it is leading businesses to re-evaluate their IT suppliers.

The research, which surveyed over 1,000 UK business leaders found that 77% of businesses are experiencing price increases from their suppliers, with 84% worried about how the rise will impact their bottom line. Despite this concern, over a third (36%) of business leaders have not begun contingency planning to alleviate the pressures of the growing cost of energy. However, of those who have begun contingency planning, 35% are currently re-evaluating their providers in an effort to help offset the growing cost of energy. Those most likely to be evaluated are utility providers, with 63% stating this, followed by IT suppliers, with 32% stating this. This market exploration comes at a time when businesses are growing increasingly dependent on data storage, with 75% envisaging a need to increase their capacity over the next five years.

Adam Bradshaw, Commercial Director at ServerChoice, said, “For data centres, where the cost of energy continues to be the largest financial expenditure for the business, providers will have to think laterally about how to offer competitively priced services to help underpin the demand for data storage.”

The research also found that the largest deciding factor when determining a new supplier is competitive pricing, with 91% of business leaders stating it would be fundamental in their selection process. 63% stated service offering would also be a highly influential concern and a further 40% of leaders stated flexible contracts were amongst their top priorities. Adam added, “The coming months look set to be a period of upheaval. Providers that are always

seeking new ways to improve energy efficiency will be able to offer the most competitive pricing as the cost of energy increases across the board.

“Our research also found that a strong majority of decision-makers greatly prioritise valuable service offerings. Data centres that offer tailored data storage packages suited to individual businesses’ requirements, whether that includes hybrid infrastructure options, assistance when moving provider or even negotiable contract periods, will be best positioned to aid the decision-makers looking for new suppliers.”

Data centre physical infrastructure market shows good growth

ACCORDING to a recently published report from Dell’Oro Group, data center physical infrastructure revenues grew 11 percent in 2021, despite supply chain constraints limiting growth in the second half of the year. As those supply chain constraints are forecast to remain throughout 2022, unit growth is forecast to be limited, with rising ASPs supporting revenue growth in 2022.

“Data center physical infrastructure vendor’s backlogs continued to grow in 4Q 2021, with many vendors touting record levels,” said Lucas Beran, Principal Analyst at Dell’Oro Group. “This highlights the complex dynamics of the data center physical infrastructure market right now – historically high levels of demand, with the most significant supply chain challenges the industry has ever faced. However, this creates a significant opportunity in the market for vendors that can navigate the challenges better than others, leading to potential long-term changes in the market’s competitive landscape,” explained Beran.

Additional highlights from the 4Q 2021 Data Center Physical Infrastructure Quarterly Report:
Schneider Electric, Vertiv, and Eaton were the top three data center physical infrastructure vendors, accounting for 45 percent of revenues in 2021.

The fastest-growing data center physical infrastructure market segment in 2021 was thermal management, with revenue increasing 14 percent, led by direct liquid and immersion cooling technologies. Worldwide data center physical infrastructure revenues are forecast to grow 8 percent in 2022, exceeding $23 billion.

Sustainability top of the agenda for business leaders but IT lags behind

More than two thirds (67%) state that events such as COP26 and the Climate Red report have changed their thinking on how their brand tackles sustainability.

MORE THAN TWO THIRDS of (67%) retail and fashion business leaders have revealed that significant sustainability focused events such as COP26 and the Climate Red report have changed their thinking on tackling sustainability, according to the latest research from retail fashion technology leader, K3. Despite this shift in thinking, only three in 10 have placed environmental sustainability in their top two IT budget priorities.

These findings are revealed in K3's The Sustainability Conundrum: Why Supply Chain Traceability is Key report conducted with Sapio Research, which surveyed 402 retail and fashion business decision makers in the UK and the US. The research reveals the disconnect between attitudes and actions when it comes to sustainability. It also highlights the need for action; retail and fashion sectors must embrace new technology, streamline supply chains and protect our planet.

Sustainability is now a priority, but IT needs to get on board

Major sustainability events such as COP26 have lit a fire under the move towards more sustainable practices. However, less than half use IT resources to manage CSR or company sustainability objectives.

The good news is that three in five have implemented some technology or IT solutions for managing their sustainability efforts and have specific allocations for this in their 2022 budget. However, actions are not following ambitions; Fewer than a quarter have fully implemented these solutions. In fact, UK respondents were less likely to have fully implemented IT solutions for sustainability than US respondents.

Casey Potenzone, Chief Commercial & Strategy Officer at K3 says: "It is clear from the research there is a disconnect between retail and fashion leaders attitudes and their actions when it comes to sustainability practices and protecting our planet.

While constrained by budgets, pandemics and a struggle to survive, retailers have to look beyond the next weeks or months, embrace new technology and put in solutions now that will reduce waste, water consumption and carbon emissions, without compromising the user experience – this begins with the supply chain."

Supply chain transparency – the lynchpin to sustainability

Almost two thirds of retail and fashion leaders say supply chain transparency is a focus for their sustainability efforts. But, only 29%, say they have all the supply chain technology they need to be more ethical and sustainable across their supply chain, including less than a quarter of UK respondents. This needs to change for businesses to reach the targets that are being demanded by both consumers and governments across the globe. Furthermore, two in five BDMs say their supply chain technology could be improved and 17% that it needs to be improved. 14% don't know if their current supply chain technology can manage their supply chain more sustainably.

Potenzone continues, "Investing in the supply chain is no longer a nice to have, but a requirement for any retailer or fashion business. Whilst our research reveals that BDMs are committing to sustainability, this needs to be transferred into action, with bigger budgets and more transparency in the supply chain. Only by using technology to have full visibility over their supply chain, will retailers be able to adapt quickly, and create processes and products that don't compromise our natural resources. It's time for retail and fashion BDMs to put the planet before profits and commit to a world with technology and sustainability at its core."

Steady growth for the IT and business services markets

Worldwide IT and business services revenue is expected to grow by 5.6% (in constant currency) in 2022, according to the International Data Corporation (IDC) Worldwide Semiannual Services Tracker. In nominal dollar denominated revenue based on today's exchange rate, the market will grow by 4.2% year over year, due to FX fluctuation.

K 2022 market growth represents an increase of 160 basis points from IDC's October 2021 forecast. The improved market view reflects robust 2021 bookings and pipelines by several large services providers, an improved economic outlook (compared to the previous forecast cycle), and inflationary impact on the services market, offset slightly by the negative impact of the Ukraine/Russia conflict.

IDC believes that the market will continue to expand throughout the next few years at a rate of 4-5%, representing an overall increase of 40 to 80 basis points each year, pushing the market's long-term growth rate to 4.6%, up slightly from the previous forecast of 4.3%.

Share the image

The Americas services market is forecast to grow by 5.3% in 2022, up 150 basis points from the October 2021 forecast (in constant currency.) This is attributed to a faster economic rebound and the impact of inflation. IDC believes that the trend will continue in the short-term: 2022 and 2023 growth rates were adjusted up by 150 and 100 basis points, or around 4% year-over-year growth for the next five years.

Our mid- to long-term growth prospects for Canada and Latin America improved marginally. Both regions will continue to see recovery well into 2022 and 2023. Latin America's near-term growth outlook

is further lifted by the commodity price rally since March.

The outlook for the U.S. market has also been also adjusted up by 160 and 80 basis points for 2022 and 2023, respectively. The adjustments were made across all markets. The improved economic outlook and vendors' strong bookings and pipelines in the world's largest services market partially drove this upward change, while the rest can be attributed to our inflation impact assumptions, especially in project-oriented markets. The long-term U.S. growth prospect remains largely unchanged.
Our 2022 growth forecast for EMEA (Europe, Middle East, and Africa) was raised by more than 220 basis points.

While Europe is the most impacted region by the ongoing Ukraine/Russia conflict, we remain sanguine on the region. IDC has reduced the Central & Eastern Europe (CEE) forecast significantly due to the conflict in the Ukraine. We expect the CEE services market to grow only by 5.5% and 7.3% in 2022 and 2023, respectively, down from our previous forecast of 9-10% growth. Russian and Ukraine markets will shrink significantly this year.

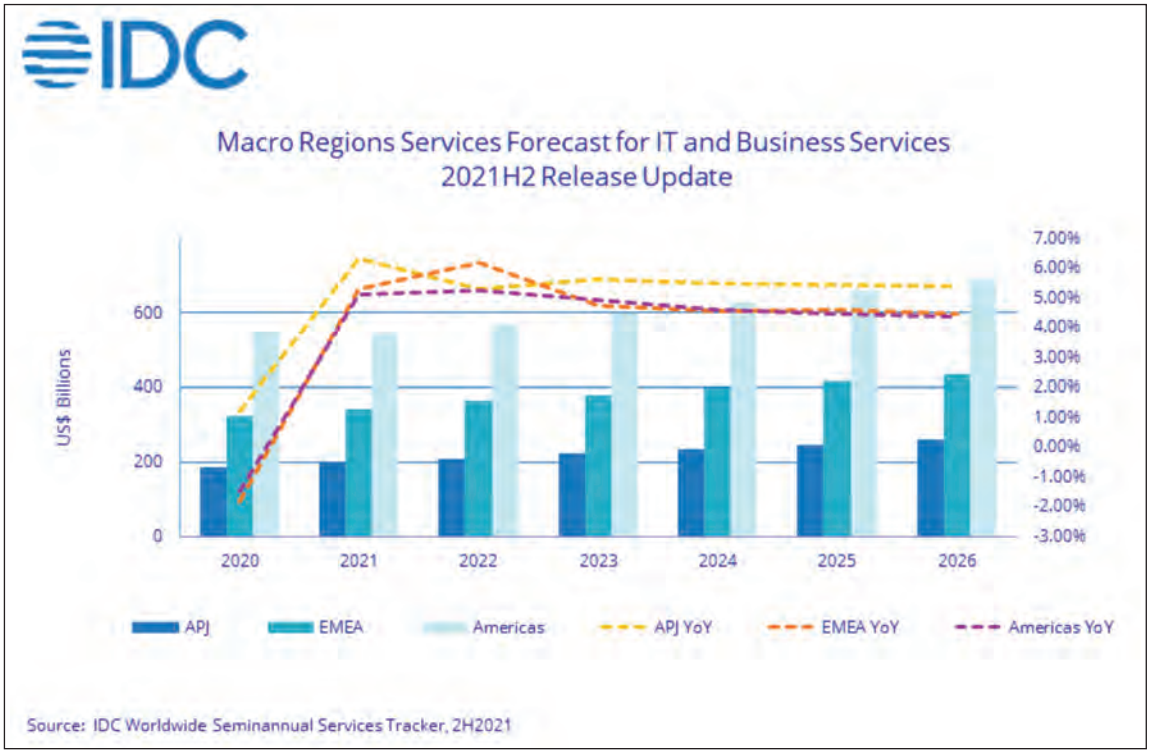
Western Europe's near-term growth forecast has been adjusted up: IDC now forecasts the region to grow by more than 6% in 2022, up by 280 basis points from our last forecast. The improved outlook is largely due to the EU's revised 2022 GDP outlook at the end of the end of 2021 (prior to the Ukraine/Russian crisis). IDC continues to see EU-funded investments driving services spending. Inflation also contributed to nominal growth, although to a smaller degree.

This was partially offset by the Ukraine/Russia conflict. Based on IDC's March assumptions about the crisis, which assumed a more neutral scenario (limited military escalation and disruption to the global supply chain), IDC believes that the crisis will dampen Western Europe's mid-term market growth but will be offset by other drivers. Of course, because the situation is ever evolving, its actual impact to the EU economy may be more severe than expected.

The Middle East & Africa's (MEA) growth prospects for 2022 and 2023 have also been raised by 250 and 100 basis points, respectively. Due to a strong rebound from the pandemic and economic malaise, particularly in previously beleaguered markets such as Turkey, as well as rapid IT infrastructure spending, including hyperscaler buildouts, we are more bullish on the MEA market. We also believe that the negative impact of the Ukraine/Russia crisis on the region will be only marginal.

Asia/Pacific's growth outlook improved by 0.9 percentage points in 2022, largely due to PRC (China) and other developed Asian markets (i.e., Australia, Japan, Singapore, Korea, etc.). Japan's growth rate was lifted by 0.2 to 0.6 percentage points per year for the next five years while Australia, New Zealand, Korea, and Singapore all saw adjustments of 100+ basis points in 2022 and 2023 growth rates.

The forecast for China's market growth has been adjusted up to 6.4% and 8% for 2022 and 2023. While China's GDP growth is expected to cool down, IDC believes that digital transformation remains central to the country's long-term "new



infrastructure" initiatives, which will further drive services spending in both the public sector and strategic industries such as BFSI, manufacturing, and energy. Within the IT and business services markets and across all regions, cloud-related services spending has been the main growth accelerator since 2020. IDC forecasts it to continue to grow close to 20% year over year in 2022 and between 15% to 20% over the next three years.

IDC is also seeing more services providers crossing over from IT and business services to operational technology (OT) services, based on figures from IDC's new Tracker for services spending on the OT side (also defined by IDC as Digital Engineering & Operational Technology Services (or DEOTS)). Even after accounting for the supply-side disruption caused by the Ukraine/Russia crisis, we still forecast the product engineering & operational technology engineering services and operational technology services markets to grow twice as fast as IT and business markets.

Overall, while inflation may artificially boost market size in the short-term, this is largely offset by demand instability and rising labor costs. "In this forecast cycle, IDC services analysts have looked at short-term impacts, such as pent-up demand and the Ukraine/Russia conflict, as well as more structural ones, such as adoption of public cloud, the talent crunch, inflation, data security/residency/sovereignty, and more," said Xiao-Fei Zhang, program director, IDC Worldwide Services Tracker program. "Based on our analysis, we adjusted our outlook accordingly at the market level."

"However, at the individual vendor level, services providers will need to brace for more volatility," Zhang continued. "On the heels of a global pandemic, enterprise buyers face another black swan event in 2022, which will accelerate large global trends, such as remaking the global supply chain and value chain and exacerbating the talent crunch by changing demographics. We should expect more of 'the unexpected' in the years to come. During the last two years, the services providers who succeeded were the ones who have proven to be resilient partners helping their clients thrive in change. This has always been the constant force to drive growth in the services market."

Edge solutions continue to receive strong investment

The edge journey is well underway for many organizations as they seek to connect with customers in new ways, improve operational efficiency, and adopt digital technologies to support innovation. The EdgeView 2022 survey from International Data Corporation (IDC) found that three quarters of organizations plan to increase their edge spending over the next two years with an average increase of 37%. A combination of factors is driving this increased spending at the edge. The performance requirements of expanding workloads and new use cases that leverage artificial intelligence (AI) and machine learning (ML) demand greater compute capacity at the edge. In addition, the amount of data being stored in edge locations is rapidly expanding, and organizations plan to keep this data longer. As a result, the number of physical servers being deployed at the edge is rising. Most of this investment prioritizes the modernization of existing infrastructure in edge locations as opposed to building out new infrastructure. The survey also found that enterprises deploying edge are highly focused on building scalable businesses with investments that can contribute quickly to the bottom line. The top objectives for edge deployment are increased revenue, improved products and services, and reduced costs. But edge deployments also present important opportunities to fill a niche market or disrupt an existing market.

"Enterprises are signaling that they want the benefits of a cloud operating model with the freedom to deploy anywhere," said Dave McCarthy, research vice president, Cloud and Edge Infrastructure Services at IDC. "This creates tremendous opportunities for technology suppliers that can reduce complexity and maintain consistency in these distributed environments." "Edge infrastructure deployments are shifting IT back to a more strategic, influential role within the organization," said Jennifer Cooke, research director, Edge Strategies. "The IT organization is both driving and supporting critical digital-first efforts within the broader organization."

Other key findings from the EdgeView 2022 survey include the following:

- Organizations rank the ability to integrate edge solutions with legacy infrastructure as a key selection criterion and consider it just as important as price in edge decisions. However, edge management strategies are not tightly integrated with cloud and core, suggesting that organizations may need to revise their management strategy as they seek to leverage core, cloud, and edge resources as a cohesive set of flexible resources.
- Organizations will continue to deploy and support many different compute, storage, and network architectures at the edge. Being able to deploy in multiple environments is also a key selection criterion, underscoring an organization's continued plan to extend compute resources into many different types of environments, including in cloud and core datacenters as well as in the field.
- Out of necessity and because of the need to leverage cloud resources, edge will continue to be a broad mix of cloud, colocation, field locations, and company-owned datacenters. In the next two years, two thirds of organizations are expected to shift more toward public cloud resources. But overall, all edge types will increase.

Regarding equipment ownership, the majority indicated that their organizations prefer to retain ownership of infrastructure. This will fuel greater demand for flexible consumption models that have the opex benefits of cloud with greater infrastructure ownership and control.

Russia-Ukraine War to adversely impact Europe ICT spending

European ICT spending is expected to shrink by 1.7% in 2022 due to the Russia-Ukraine War and other factors, according to International Data Corporation (IDC). A new update to IDC's Worldwide Black Book Live Edition reports that European ICT spending is expected to slow to 2.0% growth in constant currency terms, reaching $1,052.01 billion. This is compared to a pre-war growth forecast of 3.7%. In addition to the war in Ukraine, spending will be slowed by the spike in energy prices and rising inflation due to ongoing supply chain disruptions, according to IDC.

The Russian and Ukrainian markets will see particularly strong contractions. The Russian market will be impacted by currency fluctuations as well as international sanctions imposed over Moscow's February 24 invasion of Ukraine.

In the event of a short war, IDC projects that the ICT market in Europe will see a recovery in 2023, posting a year-on-year spending increase of up to 4.7%.

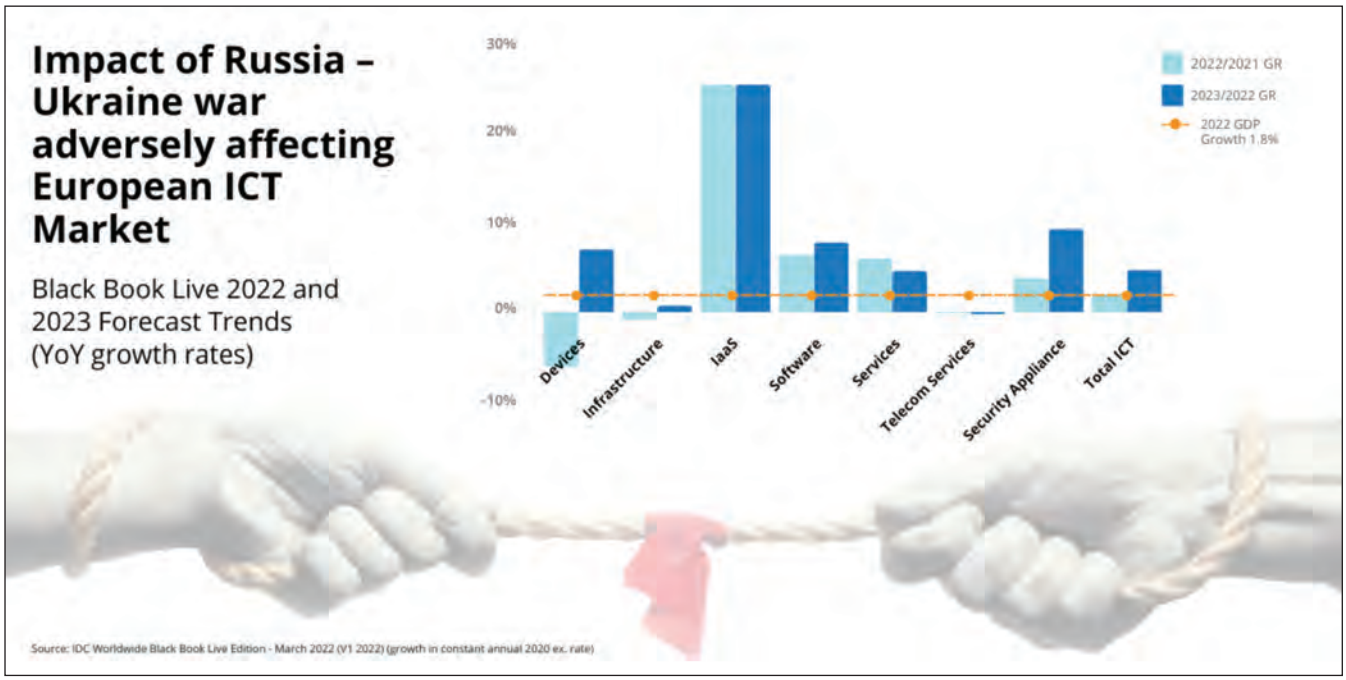
In this uncertain environment, OPEX will continue to be a driving force, with organizations pushing forward with the shift from on-prem to cloud deployments. The exception is most device markets, including PCs and mobile phones, which are together expected to decline by 6.1% year on year. Many organizations decide to reduce capital spending during times of economic and business uncertainty.

"Sooner or later, the ICT market will find a way to stabilize," said Ivana Slaharova, senior research manager for IDC Customer Insights & Analysis. "Most likely, it will be a supply chain global redirection. Organizations will boost their self-sufficiency and diversify their portfolios of partners." Semiconductor shortages will continue to impact the European infrastructure (server/storage) market in 2022. However, this market is expected to remain relatively stable as companies continue to modernize infrastructure as part of digital transformation initiatives.

Overall software spending in Europe is also expected to remain relatively stable in both the short and long term. Demand will focus mainly on security, data protection, and supply chain management. Services markets are expected to contract somewhat in 2022 but will remain growth drivers as companies pursue projects requiring consulting and support services. IDC expects the European security appliance market to stay relatively stable in 2022 and possibly accelerate in 2023.

"A cyberwar escalation would drive governments and large enterprises to improve their security postures by investing in cybersecurity and the protection of datacenters," said Lubomir Dimitrov, senior research analyst for IDC Customer Insights & Analysis. "The acceleration of migrations to cloud will indirectly trigger security hardware adoption by services providers and telecom operators." Spending on telecom services in is expected to record a fractional decline in 2022 and 2023, according to IDC.

➤ Despite the slowdown in spending, IDC expects most European technology markets to remain relatively robust in 2022.



ESG and data centres

How standardisation and transparency can empower the industry

BY MARK GARNER, VP, SECURE POWER DIVISION,
SCHNEIDER ELECTRIC UK & IRELAND

GROWING CONCERN about the effects of climate change has placed much pressure on the data centre and digital infrastructure sectors. Forces influencing the move toward sustainable data centres include a combination of government regulations, the demands of customers and investors, as well as a growing understanding that by leading on sustainability it is interlinked by our desire to grow. For example, in 2021, Schneider Electric and 451 Research surveyed over 800 global colocation organisations and found that 97% of providers' customers were asking for contractual sustainability commitments.

While sustainability and environmental, social and governance (ESG) reporting have grown in importance, practices are lagging and recent research from the Uptime Institute found most organisations, still, are not closely tracking their environmental footprint. To support the efforts of operators, Schneider Electric has created a first-of-its-kind 'Environmental Sustainability Metric Framework', empowering the sector to take control of its sustainability goals.

The framework includes 23 key metrics for operators who are in the Beginning, Advanced and Leading stages of their sustainability journey, which helps the industry to standardise the way it measures and reports its environmental impact. It also proposes five key categories, which include energy use, GHG emissions, water, waste and land use and biodiversity.

Key metrics

Energy is the first category to monitor and measure. As the single most expensive operating cost associated with a data centre, and one that is subject to major price fluctuations due to the geopolitical nature of fossil fuels and

renewable energy production, maximising energy efficiency makes both commercial and long-term environmental sense.

Second, are greenhouse gas (GHG) emissions. Carbon emissions resulting from the generation of gases such as CO2 (carbon dioxide), CH4 (methane), PFCs (perfluorinated chemicals) and HFCs (hydrofluorocarbons) are a major contributor to climate change and efforts to minimise such gases are ongoing across all areas of business. SF6, for example, is a greenhouse gas over 23,000 times stronger than CO2 and is found in most existing medium-voltage switchgear, so operators such as Schneider Electric have developed SF6-free technologies to directly address this.

Water use is another key to address with a 15-megawatt data centre typically consuming up to 360,000 gallons of water a day. Cooling towers and other evaporative cooling techniques are popular methods of heat rejection because of their high efficiency and large cooling capacity. However, the evaporation requires the consumption of significant amounts of water. Typically, a 1-megawatt data centre with traditional cooling methods can use about 25m litres of water a year.

Inevitably, data centres generate waste, both during their construction and operation, which often includes hazardous materials that must be disposed of properly. Circular economy design methodologies, Green Premium™ technologies and better processes can support sustainable improvements - as can recycling of end-of-life products including uninterruptible power supply (UPS) batteries.

The potentially harmful effects of data centre construction on land and biodiversity must also be kept to a minimum. This is especially true when extra demands on real estate are made, not just by the facility itself but by the associated renewable energy infrastructure such as wind turbines and solar panels.

When selecting metrics for each of the above categories, it is essential that they should lead to actionable outcomes that can drive significant improvements in sustainability, and, where possible, be applicable across all geographies.

Energy-based metrics

For example, dealing with energy-related issues requires data centre operators to first measure the total energy consumption of their facilities, calculate the PUE and measure the amount of energy utilised from renewable sources. Renewables could be located on site, bought from energy companies by purchasing renewable energy credits or through longer-term power purchase agreements (PPAs). From those measurements a renewable energy factor (REF) metric can be calculated as the ratio of

renewable energy to total energy consumed at a site. An REF of 1 indicates that all the data centres power is renewable. Another key metric is energy reuse factor (ERF), the calculation of which is defined under the standard ISO/IEC 30134-6.

Together these metrics can encourage operators to improve their overall energy efficiency, increase use of renewable sources and promote circular economy initiatives such as heat re-use.

GHG metrics

The control of carbon emissions is of major global geo-political importance. As such, there are numerous internationally recognised protocols. Many of these are complex calculations encompassing emissions from multiple sources, but they form the basis for the calculation of other metrics such as carbon intensity and carbon usage effectiveness (CUE).

The potentially harmful effects of data centre construction on land and biodiversity must also be kept to a minimum. This is especially true when extra demands on real estate are made, not just by the facility itself but by the associated renewable energy infrastructure such as wind turbines and solar panels

CUE is related to the IT load and allows comparisons of carbon emissions across data centres and other industries. It can be used in the site selection, planning and design phase as well as during operations to measure the effectiveness of continuous improvement programs.

Carbon offsetting and carbon credits, provide a means of encouraging businesses which have more scope to reduce carbon operations to do so, by paying them and deducting the amount of carbon saved from one's own carbon emissions. Lastly, hour by hour supply and consumption matching will measure the extent to which renewable energy generation matches the energy consumption by an operator.

Waste, water land and biodiversity

Measuring total site water usage is also another key metric to include, and should cover all water consumed - fresh and reclaimed – within a facilities operation. Total source energy water usage measures the water used to produce the energy consumed by a data centre and can be used to optimise the water usage related to energy consumption.

For example, water used by an evaporative cooling system will add to the total water usage but will reduce energy consumption in the cooling effort. This saves water usage at the power plant, and provides a holistic view, enabling better management of all water associated with the plant operations.

With regards to waste, key metrics include the total weight of material waste generated at a data centre, from construction right through to operation; the weight of waste sent to landfill sites; the weight of waste diverted from landfills through circular economy efforts including re-use, manufacturing, and recycling; and waste diversion rate, which is the weight of waste recycled, divided by the weight of total waste generated. This metric creates a ratio that can be compared across data centres, so can be used to benchmark continuous improvements in waste reduction.

Although there is a general appreciation that the development of land for data centres should not adversely impact biodiversity, including animal habitats, plant life and even micro-organisms, metrics to compare efforts are in their infancy and not yet standardised. This, we hope, will change in future.

Application of said metrics

Once an organisation commits to gathering and processing sustainability metrics, they can be applied across a range of functions to deliver genuine improvements in data centre sustainability. The most obvious is target setting: aiming to improve the performance of a data centre or the overall organisation, whether by aiming to achieve a particularly ambitious PUE, CUE or WUE target, or aiming to reduce the amount of waste generated over a set period of time.

Metrics must also enable businesses to report accurately and communicate their progress towards achieving sustainability in a transparent and measurable way, thereby offering the possibility of certifying their efforts against accepted standards.

With the demands placed on the sector accelerating, and the need for resilience becoming greater, data centre operators must consider how their business choices impact the environment and prioritise standardised, sustainability practices within their organisations. For further information, please see our latest White Paper #67, a 'Guide to Environmental Sustainability Metrics for Data Centres'.

https://blog.apc.com/uk/en/2021/05/26/birmingham-womens-childrens-nhs-hospital-trust-leans-on-ecostruxure-it-expert-for-continuous-uptime/

Coming soon...

Europe's most connected data centre campus

Step into your connected future with Telehouse South

Interconnected to the main Docklands campus via a diverse Dark Fibre network

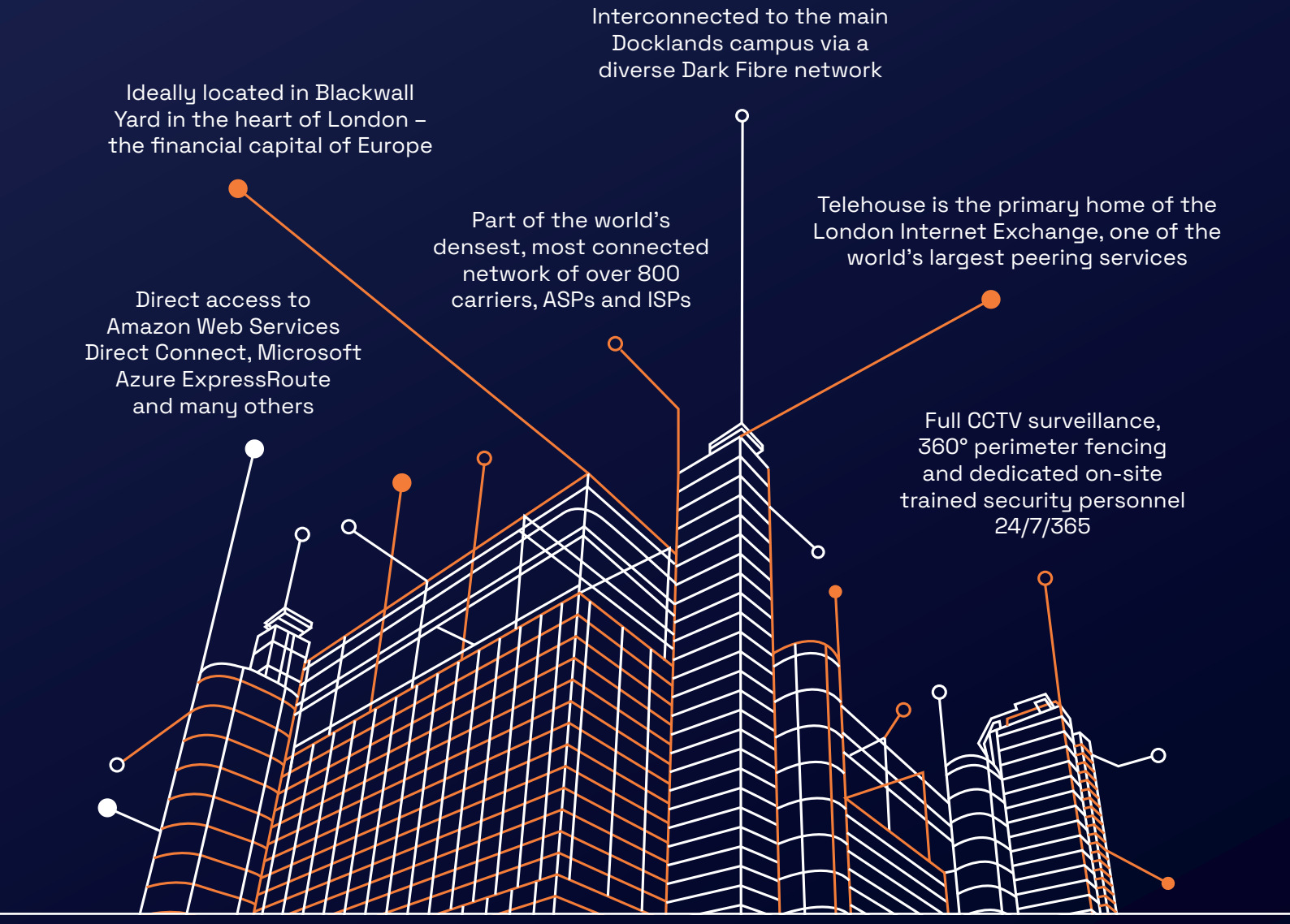
Ideally located in Blackwall Yard in the heart of London – the financial capital of Europe

Part of the world's densest, most connected network of over 800 carriers, ASPs and ISPs

Telehouse is the primary home of the London Internet Exchange, one of the world's largest peering services

Direct access to Amazon Web Services Direct Connect, Microsoft Azure ExpressRoute and many others

Full CCTV surveillance, 360° perimeter fencing and dedicated on-site trained security personnel 24/7/365



Reserve your space today:

telehouse.net/telehouse-south
+44 (0) 207 512 0550
webenquiries@uk.telehouse.net

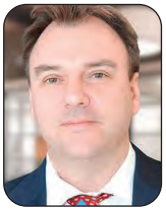
DCS AWARDS 2021 WINNER

TELEHOUSE

Identifying and evaluating the real embodied carbon cost of a data centre

Global emissions from new build projects are at record levels. Consequently, construction is moving further away from, not closer to net zero buildings. With the current focus very much on the carbon footprint of facility operations, a new white paper presents the case for taking a Whole Life Carbon approach when assessing data centre carbon impact.

BY ED ANSETT, FOUNDER AND CHAIRMAN OF I3 SOLUTIONS GROUP



ACCORDING TO THE United Nations Environment Programme (UNEP) the carbon cost of building is rising. The UNEP Global Alliance for Buildings and Construction (GlobalABC) global status report highlighted two concerning trends: Firstly that, "CO2 emissions from the building sector are the highest ever recorded…" and secondly, "new GlobalABC tracker finds sector is losing momentum toward decarbonisation."

Embodied carbon costs are mainly incurred at the construction stage of any building project. However, these costs can go further than simply the carbon price of materials including concrete and steel, and their use. And while it is true that not all buildings are the same in embodied carbon terms, in almost all cases these emissions created at the beginning of the building lifecycle simply cannot be reduced over time.

Since this is often and, in some cases, especially true in data centres, it is incumbent to consider the best ways for the sector to identify, consider and evaluate the real embodied carbon cost of

infrastructure-dense and energy-intensive buildings. Technical environments and energy intensive buildings such as data centres differ greatly from other forms of commercial real estate, such as offices, warehouses and retail developments.

Focusing on the data centre, let's take for example a new build 50MW facility, it is clear that in order to meet its design objective it's going to require a great deal more power and cooling infrastructure plant and equipment to function in comparison with other forms of buildings.

Embodied carbon in data centres

Embodied carbon in a data centre comprises all those emissions not attributed to operations as well as the use of energy and water in its day to day running. It's a long list which includes emissions associated with resource extraction, manufacturing, and transportation, as well as those created during the installation of materials and components used to construct the built environment.

Embodied carbon also includes the lifecycle emissions from ongoing use of all of the above, from maintenance, repair and replacements to end-of-life activities such as deconstruction and demolition, transportation, waste processing and disposal. These lifecycle emissions must be considered when accounting for the total carbon cost.

The complexity of mission critical facilities makes it more important than ever to have a comprehensive process to consider and address all sources of embodied carbon emissions early in design and equipment procurement. Only by early and detailed assessment can operators inform best actions which can contribute to immediate embodied carbon reductions.

Calculating whole life carbon

Boundaries to measure the embodied carbon and emissions of a building at different points in the construction and operating lifecycle are Cradle to Gate; Cradle to Site; Cradle to Use and Cradle to Grave carbon calculations, where "Cradle" is referenced as the earth or ground from which raw materials are extracted.

For data centres these higher levels of infrastructure are equipment-related, additional, and important considerations because in embodied carbon terms they will be categorised under Scope 3 of the GHG Protocol Standards - also referred to as Value-Chain emissions.

Much of the Scope 3 emissions will be produced by upstream activities that include and cover materials for construction. However, especially important for data centres is that they also include the carbon cost for ongoing maintenance and replacement of the facility plant and equipment.

That brings us to whole of life calculations which will combine embodied and operational carbon. Combining embodied and operational emissions to analyse the entire lifecycle of a building throughout its useful life and beyond is the Whole Life Carbon approach. It ensures that the embodied carbon (CO_2e emissions) together with embodied carbon of materials, components and construction activities are calculated and available to allow comparisons between different design and construction approaches.

Data centre sustainability is more than simply operational efficiency

The great efforts to improve efficiency and reduce energy use – as measured through improvements in PUE – have slowed operational carbon emissions even as demand and the scale of facilities has surged. But reducing operational energy of the facility is measured over time and such reductions are not accounted for until 5, 10, 30 years into the future.

The complexity of mission critical facilities makes it more important than ever to have a comprehensive process to consider and address all sources of embodied carbon emissions early in design and equipment procurement. Only by early and detailed assessment can operators inform best actions which can contribute to immediate embodied carbon reductions

However, embodied carbon is mostly spent up-front as the building is constructed; there is, therefore a compelling reason to include embodied carbon within all analyses and data centre design decisions. A 'Whole Life' carbon approach that considers the Embodied and the Operational emissions, provides the opportunity to contribute positively to global goals to reduce emissions of greenhouse gases – and will save financial costs.

For more guidance on the subject, the i3 Solutions Group and EYP MCF GHG Abatement Group has recently published, "Embodied carbon considerations for Data Centers, Scope, Impact, Reductions" available as a free download from **i3.solutions/embodied-carbon**

Data centre sustainability – clearing a path through the challenges

The data centre industry needs to reduce its carbon footprint but cutting energy consumption while also maintaining business continuity is no easy task. Meeting these requirements calls for specialised tools and skills, explains

JONATHAN FEAVER, SENIOR DESIGN PARTNER, TREND CONTROLS

DATA CENTRES are under renewed pressure to reduce their energy use and cut their carbon footprint based on the commitments set out at COP26. Reaching the goal may prove difficult for several reasons, not least the energy-hungry nature of the industry. At present, the world's three million data centres have a carbon footprint that equals that of the entire airline industry.1 Significantly cutting that, while optimising overall business resiliency, is a tricky ask but it needs to happen; and soon.

The European Union (EU) is at the forefront of a wave of global legislation that will impact data centre operations. Its greatly strengthened Energy Efficiency Directive (EED), part of its "fit for 55" initiative (a legislative package to help meet the target of a 55% reduction in carbon emissions by 2030), is a prime example. This legislation will require more detailed and open reporting, with even smaller-sized data centres likely to face public audits for energy efficiency.

The pressure to perform

A well-balanced approach of CapEx expenditures in equipment, sourcing renewable power sources and process upgrades will be needed along with purchase of carbon offsets to meet these types of aggressive targets.

Noting well that most energy experts believe that carbon offset credits will grow increasingly expensive over the coming decades. Therefore, regulators and investors will increasingly want to see annual investments and improvements in energy efficiency as well as reductions in carbon emissions.

Aligning with these targets creates a difficult balancing act for data centre owners and facility managers – meeting the growing demand for services while at the same time lowering energy consumption. In an increasingly cost-sensitive industry, any approach that starts to solve these

riddles also needs to provide the additional benefit of reducing overheads and protecting bottom line performance.

Joined up thinking

It's essential for IT and facility (OT) managers to work together if the desired outcomes are to be achieved. For example, core IT equipment is a significant user of energy within the data centre environment, but a Building Energy Management System (BEMS) can play a vital role in helping achieve power usage effectiveness (PUE) targets, which can sometime be as low as 1.0X – 1.2 for the most efficient hyperscale data centres. It is important to start with an investigation of any likely structural steps that could help cut energy waste.

For example, natural cooling is a growing trend for data centres striving to reduce power consumption and carbon emissions, although issues such as filtering out particulate matter and combatting humidity can limit its applications. Despite these caveats, it is increasingly influencing the location of new facilities with many centre owners seeking out locations that offer abundant natural cooling.

The biggest likely improvements will often be derived from a fully integrated control system – a BEMS and an electrical power management system (EPMS) – enabling data centre operations managers to have a single data-driven digital platform that collects, aggregates and presents mission-critical information in a variety of easy-to-use formats. This real-time information will enable decisions to be made on how best to optimise the operation of each facility, maximising uptime and reducing overall energy consumption. While this may seem complex, it's likely that many of the core elements are already in place. So how can facilities bring all this together to maintain business continuity while optimising energy use?

Next generation insights

A fully integrated BEMS and EPMS can provide a single user interface, delivering real-time, clear information, communication and data processing for more reliable building automation and supervision. Also, gaining insights into a system's performance capabilities typically makes it easier to identify inefficiencies and reduce energy waste while also optimising security and safety procedures. Upgrades to existing systems, especially those reaching obsolescence, can additionally help deliver valuable savings.

It's important to work with partners who understand how to reduce downtime and can spot issues early, before they become system-level problems. Look to engage partners in the design process to help sustainability efforts for both retrofits and new projects through the creation of a 'whole life' approach. By incorporating third party systems into a BEMS, customers receive timely event-driven analysis in a range of formats, with automatic reporting functions; all supported by expert systems integrators.

Keeping pace with change

Running a data centre in today's world is an increasingly complex task. New technology, evolving regulations and new operational demands have left many companies feeling like they're not keeping pace with all the required changes. It's important to work with partners that understand customers' challenges and develop tailored solutions that empower safe, resilient and efficient data centres. It's important to look for a partner with global technical support and local maintenance, to help meet the needs of our customers, no matter the size or complexity. Data centres' need best-in-class integration capabilities to not only control and monitor key infrastructure but also to apply analytics to help reduce maintenance costs and enhance the lifecycles of critical equipment.

Smart, data-led insights can help reduce installation and maintenance costs, while also enhancing productivity. In-built cybersecurity compliance, based on the ISA 62443-3-3 security level 4 for critical infrastructure, adds additional peace of mind.

Mitigating future risks

Today's data centres need to be safer and more secure for both their assets and employees, more resilient against unscheduled downtime to support business continuity and capable of optimising operational efficiencies and energy management. Selecting the right technology partner is therefore essential. For more information, visit our website.

The only way is up

The data centre's place in an increasingly carbon-conscious world.

BY DAVID BLOOM, A FOUNDING PARTNER OF GOLDACRE, the tech investment arm of the Noé Group

DEMAND IS UP, density is up, inflation is rising – as are cost of materials. But the industry marches on relentlessly – 24 hours a day, 7 days a week, 365 days a year. Data centres are enabling the digital economy and consuming energy. Not only do the servers themselves use vast amounts of energy, but they also have the requirement for redundancy, density of compute and precision cooling. There is no way to sugar-coat the fact that data centres can be huge carbon guzzlers.

However, this also means that data centre operators, suppliers and investors have the potential to make a great contribution to the climate emergency, but not through silver bullet solutions but systematic and the build-up of incremental changes.

Covid-19 forced millions of people to ditch their daily motorway commutes and airplane travel, as we retreated into our kitchens and living rooms onto the digital world of Zoom and Teams. The silver lining of a disastrous 18 months was the desperately

needed slowing down of our carbon consumption. Examples like these can lead the digital world to the misguided conclusion that we are net positive contributors to the environment.

What I want to articulate is that there is a difference between aiming to improve your environmental impact and aiming to achieve net zero. There seems to be a tendency to conflate the two, responding to the desperate need for the latter with the former. We must accept that the goal post has moved. COP26 made it clearer than ever before that net zero must be the aim of all industry leaders, not surface-level environmental payoffs.

There are some big questions that our industry must address; have we done our duty as a sector? Are we doing enough? In my opinion, no. We cannot rely on the positive changes pushed forward by the pandemic – our target has to be the reduction of carbon and this requires a comprehensive and proactive approach.

There are multiple ways in which data centre can reduce their carbon consumption, which must be explored in parallel with a pro-activity that creates focus.

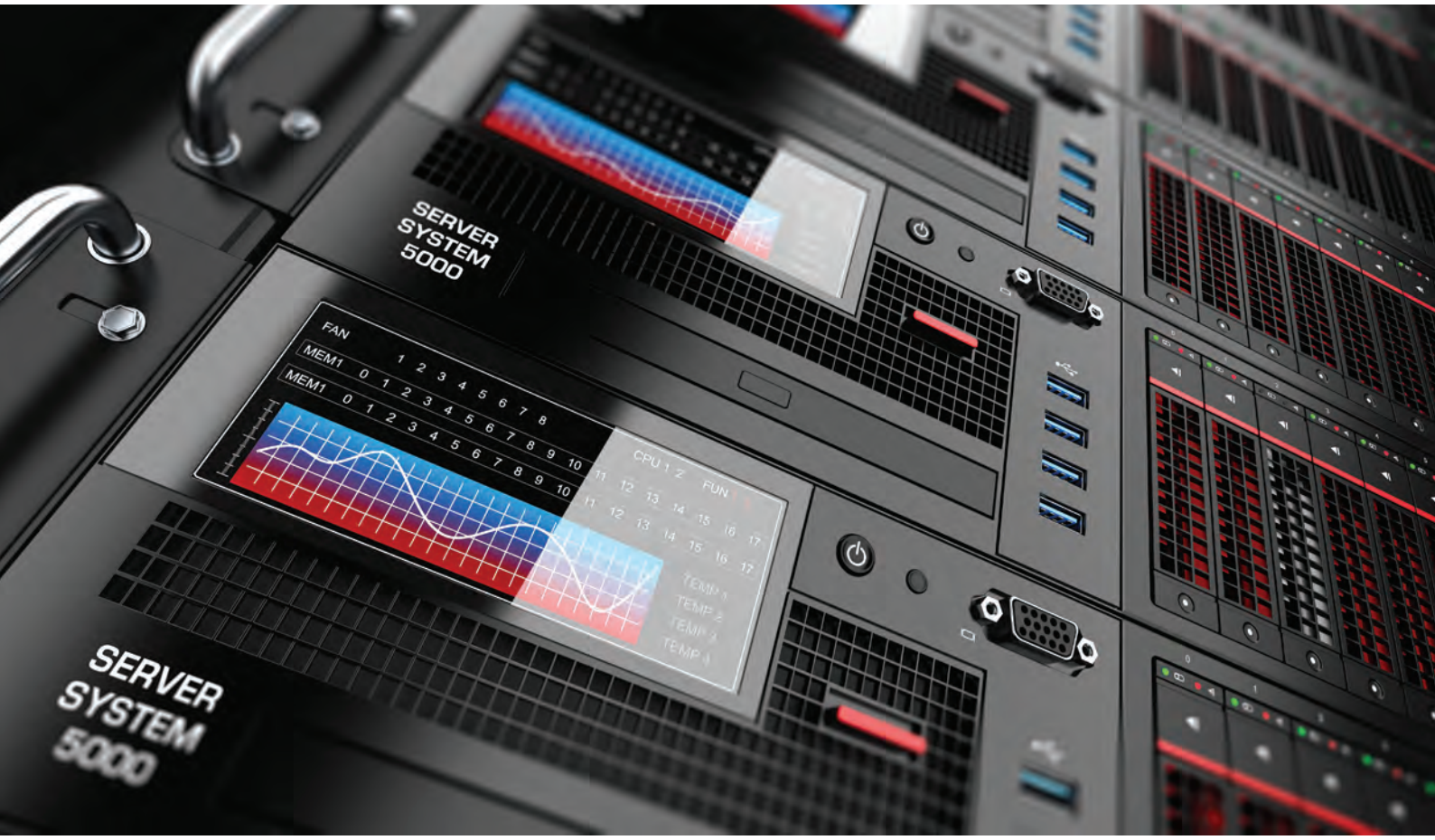
Efficiency improvements to the chip technology and servers can be made. For example, processor efficiency gains, reductions in idle power, increased storage drive density and the shift to cloud computing are having a significant effect on limiting energy use. Artificial intelligence is also playing a critical role in increasing data centre energy efficiency. For example, AI systems can predict the future temperature and pressure of a data centre over the next hour and can then give recommendations to turn consumption “on” or “off”. Beyond technological innovation, it was often proposed that locating data centres in colder regions, where servers can be cooled using the outside air and water, can significantly reduce energy usage. However, removal of mechanical cooling plus a growing drive to increase data centres’ reliance on renewable energy is a far more realistic focus. This trend is only set to continue as renewable energy becomes increasingly viable and competes with fossil fuels.

The M&E of data centre buildings is an often-forgotten issue that must also be addressed. Data centres sit at the intersection between energy efficiency, renewable energy and a burgeoning data economy enabled by digitalisation. So, in this light data centres offer an opportunity to accelerate the transition to sustainable consumption.

As investors, we have control over whom we invest in and under what conditions. This gives us power and the ability to play our part in reducing our emissions. For example, we can uphold strong environmental principles in our contracts, ensure

that environmental sustainability is an inherent part of discussions surrounding potential new deals and invest in data centre real estate in colder climates. In our increasingly carbon-conscious world, the data centre sector is beginning to play its part.

Environmentally sustainable targets must be replaced with a target of net zero. This goal must be actively pursued and woven into the DNA of each new investment to ensure that data centres take on the responsibility that we all share: to be carbon-conscious.



Maximising data centre efficiency is crucial to avoiding a corporate-consumer energy clash

Data centres consume significant amounts of energy, accounting for approximately 1 percent of global electricity use. What's more, the number of data centres is growing rapidly. In 2020 alone, over 15 new projects were constructed in the UK. And further builds are planned for 2022, including in Slough, which is set to become home to the second largest data centre hub in the world.

BY JON LEPPARD, DIRECTOR, FUTURE FACILITIES

HOWEVER, data centers, and the organisations that rely on them, are coming under increasing scrutiny for their energy consumption, held to account by government agreements and environmental movements. As data center demand continues to grow in 2022, and with it facilities' energy usage, the spotlight on the industry will only intensify. This will see resistance emerge from a broader range of groups, including consumers themselves. Particularly in local communities, near data centers.

Environmental pressures

Legislative changes, resulting from agreements made at high profile conferences – such as the recent COP 26 where the UK committed to its data centers being carbon zero by 2050 – will put pressure on facilities to evolve. This pressure will be exacerbated by environmental groups continuing to oppose the construction of new centres. And, more broadly, challenging data center owners over excessive energy consumption and their obligations to meet energy targets. However, it isn't

just government and environmental groups who are demanding change. Soon, we will see communities join the call.

Community tensions

The time will come, in certain areas of the UK power grid, when there isn't enough energy to go around, and it is highly possible that a town will experience a power cut while the local data center stays on. Faced with the lights going off in their homes, consumers will be prompted to learn more about data center energy consumption. Consequently, a community-council driven clash could arise. Consumers will go to their local councils and question how energy is allocated, how high data center energy usage is, and may then oppose the expansion of existing facilities and the development of new ones. This will put unavoidable pressure on the industry to increase the efficiency of their existing estates, as well as more carefully consider where data centers are built.

Further pressure from consumers is likely to emerge as energy prices rise dramatically in the UK. The current cause of increases is due to a range of factors unrelated to data center consumption. Including recovery from the COVID-19 pandemic which has seen demand soar, and prices then squeeze, following historically low usage in 2020. However, over time, increasing data center energy demand could exacerbate the issue and with it tensions between communities and facilities.

Digital twins and how they can help

In preparation for these scenarios, data centers must take steps to maximise efficiency and minimise energy usage in 2022.

Digital twin technology can facilitate this. A digital twin is a 3D, virtual replica of a physical data center that can simulate the data center's physical behaviour under any operating scenario so performance can be optimised.

For example, through this simulation, operators can safely trial different facility configurations in the digital realm, to ascertain which would free up the most capacity and increase energy efficiency, before implementing the changes in the real-world. Digital twins are therefore a powerful mechanism for maximising energy efficiency and reducing the need to build new data centers until absolutely necessary, both of which consumers will be paying increasing attention to.

Start preparing for the future today

As we move further into 2022, data center owners and operators need to take active steps to optimise their facilities' energy usage as pressure builds from governments, environmental groups and consumers.

This will be essential for preventing community-based opposition to their existence, not to mention the positive benefits for our planet in the years to come.

Building a ‘state of the art’ data centre

Inside Aruba’s Global Cloud Data Centre IT3

BY ARUBA

WITH CLOUD ADOPTION continuing to grow, and record quantities of data being created, it’s no surprise that more organisations are relying on outsourced data centre services. To meet increasing demand, data centre providers are renovating and upgrading existing data centres, as well as constructing new ones. In fact, a total of 111 new hyperscale data centres were opened in 2020, whilst 59 were built in H1 2021 alone.

As they expand capacity, data centre providers are increasingly prioritising sustainability. In addition to considering safety, security, reliability, uptime and cost, environmental factors have shot to the top of the agenda. Not just because of providers’ sincere desire to mitigate the global climate emergency – but also thanks to demand from customers and regulatory pressure. For example, the EU has established a self-regulatory initiative for data centre providers to commit to achieving carbon neutrality by 2030.

Let’s explore how data centre providers are achieving these ambitious climate goals by looking at one data centre that’s leading the way – Aruba’s Global Cloud Data Center (GCDC) IT3.

Introducing Italy’s largest data centre

Aruba’s Global Cloud Data Center IT3 is located nearby Milan in Ponte San Pietro, Bergamo. Over 90,000m2 of this enormous 200,000m2 campus is dedicated solely to housing data centres – making it the largest operation of its kind in Italy.
The GCDC is a state-of-the-art data centre campus. Its systems have been designed to exceed the highest levels of resilience set by ANSI/TIA-942 Rating 4. What’s more, it boasts the highest possible security standards, with round-the-clock armed protection, seven levels of security and eight different security perimeters.

These factors make the GCDC the data centre of choice for the biggest private and public companies in Italy, as well as international Fortune 500 organisations.

A leader in climate neutral data centre design
What really sets Aruba’s GCDC apart is its impressive environmental credentials. As Alessandro Bruschini, Infrastructure Manager at Aruba, puts it: “For years, we’ve been pursuing a more focused agenda – investing in renewable energy self-generation and pioneering the design of climate-neutral data centres. Aruba has also been closely involved in shaping policy around more efficient data centres – committing to the CISPE Climate Neutral Agreement and European Green Digital Coalition. Not only is this crucial to ensuring the safety of our planet for future generations, it makes us stand out in the market. We aim to lead by example.”

Self-generated renewable power

Producing power close to where its used is crucial to ensuring the cost efficiency of renewable energy. That’s why Aruba has constructed a hydroelectric plant to power the GCDC on the nearby River Brembo, which harnesses flowing water to generate electricity. The advantage of hydroelectric power – compared to other options like wind power – is that the river never stops flowing, so generation is guaranteed!

To complement this, further power is self-generated through solar panels that cover many of the buildings on the campus. All in all, the GCDC can self-generate up to 60MW of power. When more electricity is needed, it's procured from 100% renewable sources, verified by the EU's Renewable Energy Guarantees of Origin scheme.

Maximising energy efficiency

Sourcing low or zero-carbon electricity is just one side of the coin for data centre providers. The other is maximising energy efficiency. To do this, Aruba is working closely with Italian utilities provider Duferco Energia to find new energy saving solutions. To complement this work, it's also harnessing the power of big data. The GCDC's highly sophisticated energy management system analyses thousands of data points to optimise energy consumption and monitor performance.

Innovative cooling solutions

Cooling a traditional data centre requires huge amounts of power. But, with innovative cooling solutions, this doesn't have to be the case. For example, Aruba's GCDC is equipped with a highly efficient geothermal cooling system. This works by pumping cold water from deep underground into a network of pipes running through the walls of data halls. Once it's been used, the now-warm water is returned underground until it's cold – creating a continuous, sustainable cycle.

Of course, like with everything in the GCDC, there's a backup option in place. In case of an emergency, air water chillers can come into operation, providing 100% of the cooling power required. This system is also powered by renewable energy.

Alongside its geothermal cooling system, Aruba's GCDC relies on dynamic free cooling. In layman's terms, this means cooling server rooms by bringing filtered air from the outside into a large cavity positioned under the equipment. Meanwhile, hot air is expelled from the building by large fan units. To enable this, electric shutters open and close as required.

So, what does Aruba's Global Cloud Data Center IT3 teach us about data centre designs? Firstly, that renewable energy and energy efficiency should be considered from the outset of the design process – rather than as an afterthought. And secondly, that there are hundreds of ways – both large and small – that data centre providers can work to minimise their carbon footprint. A good place to start is to work with the natural resources at your disposal – just like Aruba has by harnessing hydroelectric and solar power.

Beyond efficiency tweaks

Building a responsible digital infrastructure for the long-term.

BY DAVID WATKINS, SOLUTIONS DIRECTOR FOR VIRTUS DATA CENTRES

MANY DATA CENTRE PROVIDERS are now using being “green”, as a competitive advantage, knowing that businesses in all industries increasingly demand sustainable partners.

However, with pervasive accusations of green washing in the industry, society’s ever growing digital dependency and the amount of data we use rising exponentially, there are still a number of issues to navigated if true sustainability is to be achieved.

Many experts agree that the most important thing data centres can do is to look at the technology being used and work out how it can be run more efficiently. There is also a growing commitment to “get more life” from data centre equipment; when an asset requires replacing, environmentally committed providers will assess whether refurbished parts can be used to renew and repair rather than buying new.

However, it’s a hard truth that the data centre industry isn’t going to achieve true sustainability simply by relying on developments in technology and tweaking what is being done now. Indeed, most data centres have been operating best practice for some time, such as developing a robust approach to air management and implementing effective cooling techniques. These isolated changes will make some difference, but not enough.

The industry must take a more holistic approach and consider sustainability at every point of the data centre lifecycle – from design, to build, to operation and maintenance. Indeed, reducing a facility’s carbon emissions starts with design and construction. Data centres use enormous amounts of concrete and steel, which are major sources of CO2, and as the sustainability gains from operational efficiencies dry up, providers will have to look to embodied carbon in the construction phase if they are serious about being climate neutral. As an industry, we must commit to using low carbon materials, to streamline the delivery process and minimise consumption of new resources.

We also think that there’s room to look outside of traditional comfort zones when it comes to reducing emissions. Currently, many data centre operators are focused firmly on tackling Scope 1 carbon emissions, generated directly from their own operations, as well as Scope 2 emissions, which come from the production of electricity purchased and used. However, whilst this represents progress, greater efficiencies can be realised by targeting Scope 3 emissions – or “value chain emissions” - generated from partners and suppliers. So, it’s crucial that, as an industry, we look at all of our supply chain, and demand the same rigorous green credentials from our partners and suppliers as our customers do from us.

Responsibility must also incorporate reliability and resilience

As more companies turn to cloud computing and increase their data storage needs, there has been a growing spotlight on the data centre industry and its sustainability credentials. But sustainability won't help the success of providers unless it comes under the umbrella of the 3Rs: Responsibility, Reliability and Resilience.

A sustainable data centre is often also a high performing and efficient facility. Renewable energy sources are fast becoming seen as more reliable than fossil fuels – not least, because renewable energy is not reliant on a single source, but from several – such as wind, solar, hydro and biomass. What's more, free from the fluctuations of the international oil market, renewable energy is more resilient in cases of falling demand and economic decline. The added challenge of these unprecedented times in the European energy markets means that those providers that bought their renewable energy in bulk on long term energy contracts, at fixed prices, have benefited from some stability and consistent pricing, enabling them to absorb some of the price increase – crucial as we traverse through an uncertain political and economic landscape.

Another great example of performance and sustainability being intrinsically linked is within the cooling of a data centre. There has been plenty of innovation happening in this arena, and the good news is that energy efficient methods of cooling – such as harnessing indirect adiabatic and evaporative cooling technology – are both more sustainable and more efficient than many older methods. There have however, also been efficiency improvements with older methods resulting in improved performance without the water consumption of adiabatic systems. This has led to the availability of solutions that are suitable for all climate regions around the globe.

The journey to sustainability isn't going to be easy. Data centres enable all the great technology advancements being achieved in the world – cloud computing, internet and application services, social media, remote working, learning and meeting platforms, video and music streaming, shopping, travel, health and medical research. Everything runs from a server in a data centre somewhere. Whilst that is exciting, it is also a huge responsibility and challenge for data centre providers to keep it safe, secure and available. By ensuring that data centre providers are responsible, reliable and resilient, the industry will be able to provide the high level of service and capacity that society demands, as sustainably as possible. Indeed, sustainability efforts aren't based entirely on corporate altruism or a sense of what's morally right; they are also important for the bottom line.

The data centre market and the state of sustainability

Data is growing at an exponential rate. By 2025, global data creation is projected to grow to more than 180ZB, up from 64.2ZB in 2020. As the volume grows, organisations are increasingly looking for ways to process and consume data, and as a result, the data centre market is also expected to expand at a substantial rate.

BY SHAILESH DAVEY, VICE PRESIDENT, MANAGEENGINE

IN THE UK, despite fears surrounding Brexit and COVID-19, London data centre growth witnessed a 146MW energy expansion in Q2 of 2021, while Dublin, Ireland also saw a 122MW increase. While the expansion of data centres is a positive sign for the technology sector and the economy, relying on their services means it's crucial to take into consideration the challenges the industry faces to ensure that businesses can continue to benefit.

Conquering common challenges

A data centre network is a complex arrangement of varying network devices, including routers, switches, and interfaces. These devices interconnect with various computing and storage units in a data centre's resource pool to ensure high performance. However, a lack of real-time monitoring prevents organisations from viewing performance in real time, particularly without complete visibility into all the available network devices and associated interfaces, ports, and WAN links. Built-in monitoring tools can provide real-time dashboards and a multi-level, threshold-based alerting system to instantly identify and resolve network issues based on early warning signs before they become a bigger problem.

Monitoring is also crucial when it comes to bandwidth. A lack of monitoring can lead to excessive bandwidth use, which is likely to cause traffic congestion that hinders network performance. The right solutions can allow organisations to analyse numerous different metrics such as

bandwidth and flow analysis to track interface performance.

Organisations also need to tackle the issues caused by human error. Misconfigurations can cause outages, revenue loss, and potentially failure to meet service-level agreements. Solutions with built-in network configuration models provide comprehensive network device life cycle and data centre networking configuration management. With these, organisations get the benefit of configurations for the initial setup and additional devices, change management with authorisation and configuration backups, and configlets to schedule operations in bulk. They can also more readily comply with regulations such as PCI DSS.

Improving security

Data centres are facing security threats from both a cyber and physical perspective. Organisations that fail to set up an effective defence against cyberattackers leave themselves exposed to potential threats. Monitoring also plays a part here in regard to security devices such as firewalls, which need to be constantly monitored to ensure the business remains secure.

Disaster recovery and business continuity also need to be considered. Without an effective solution in place, data could be lost and any downtime could be detrimental. In the event the primary data centre fails, rerouting to a secondary data centre can enable operations to be carried on smoothly with minimal to no downtime. In terms of physical measures, using backup power, temperature control, and fire prevention systems can help ensure business continuity while the implementation of two-factor and biometric authentication methods, among other measures, enable effective security.

Supporting sustainability

Internal audits can play a key part in the optimisation of data centre operations, allowing unused appliances to be identified and turned off and power sources to be assessed. This can lead to suitable green sources of energy being identified and utilised. It's also important to ensure operational efficiency in the data centre, i.e., to reduce storage and power use. With the right data centre management software, organisations can improve operational efficiency by analysing bottlenecks and the performance and organisation of data, helping to ensure optimum use.

Reducing energy use where possible can significantly reduce carbon emissions, and the focus here should be on temperature. Using smart temperature control devices can reduce energy use by turning cooling devices off once the data centre reaches an optimum temperature. Sustainability practices can also be extended to the user level. Green coding, for example, can produce algorithms that reduce energy consumption during software use, while the deployment of software upgrades can increase memory use without impacting device performance, increasing their life span.

Ensuring efficiency

Setting up a data centre right is just one step in reaping its value. Once this has taken place, the data centre requires constant monitoring and effective management tools to ensure it continues to run efficiently. Fully utilising a data centre infrastructure management system requires the integration of facility management, space management, physical security, power supply management, and HVAC management. With all these monitoring processes in place, data centre operations are able to stay cost-effective and play their part in enabling sustainable practices while ensuring that rapidly expanding volumes of data can be leveraged effectively.

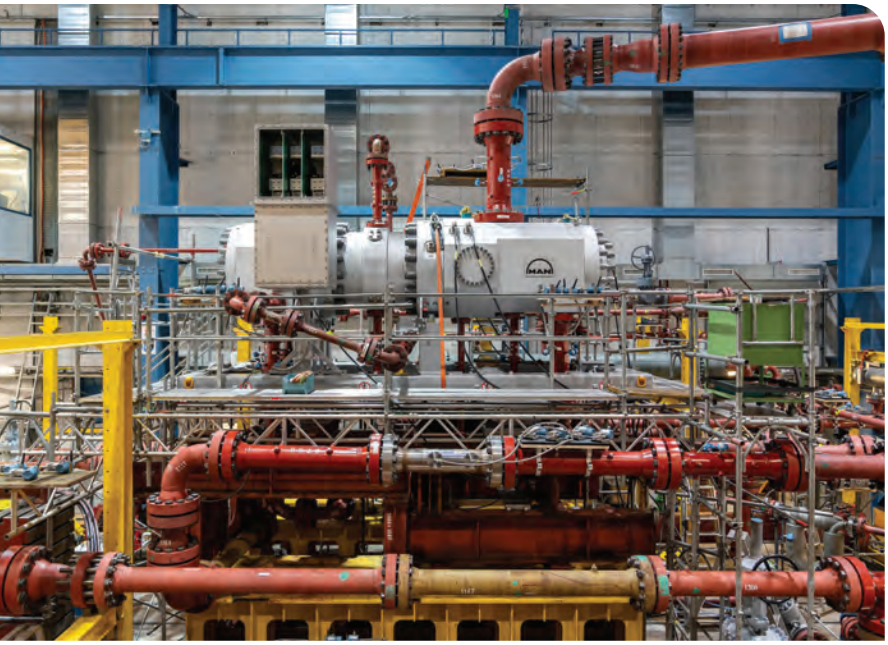
Disaster recovery and business continuity also need to be considered. Without an effective solution in place, data could be lost and any downtime could be detrimental. In the event the primary data centre fails, rerouting to a secondary data centre can enable operations to be carried on smoothly with minimal to no downtime

How data centres can get smart on sustainability with sector coupling

Data centres are voracious energy consumers, today using around 1 to 2 % of all global electricity. In a bid to reduce the environmental impact, many data centre companies are already investing heavily in renewable energy, but new technology that couples cooling, heating and renewable electricity offers a far more efficient route to solve this challenge. The breakthrough establishes sector coupling as a key mechanism to data centre sustainability.

BY RAYMOND C. DECORVET, MAN ETES BUSINESS DEVELOPMENT, MAN ENERGY SOLUTIONS SWITZERLAND LTD

PRODIGIOUS GROWTH in demand for digital services has seen global internet traffic soar. Video conferencing, online gaming and social networking are among a range of factors that have seen global internet traffic increase by a factor of 15 in little more than a decade. However, although there have been significant improvements in the energy efficiency of data centre hardware over that period, today they nonetheless account for at least 1% of global electricity production. According to recent analysis from the IEA, data centres consumed 200-250 TWh of electricity in 2020 alone. In some regions data centre energy use is greater than any other industry. In the Republic of Ireland, for example, data centres already account for more than 10% of total electricity demand and this figure is expected to top 25% within five years.



Recognising the environmental impact of their operations, many companies in this sector have been prompted to buy clean energy to meet their needs. By 2030, Google, for example, aims to run entirely on carbon-free energy. Amazon Web Services (AWS) aims to hit this same 100% renewable energy target by 2025. It's perhaps no surprise that the top three corporate renewable energy power purchasers over the last decade were Amazon, Google and Facebook.

However, there is an alternative to simply investing in additional renewable generation capacity that offers data centres an elegant and efficient route to energy sustainability.

Pump up the power

Electro-Thermal Energy Storage (ETES) is a novel approach to bulk energy storage that intimately and interchangably links electricity, heating and cooling. By effectively combining these three energy sources in a high-efficiency reversible process, ETES represents a major breakthrough.

ETES technology is able to use 'waste heat' from the data centre or other sources for allied businesses like district heating which require heat

energy. At the same time, the ETES system can provide data centres with their cooling needs. This capability, known as sector coupling, connects the cooling requirements for data centres and other IT infrastructure with heat demand for sectors like district or campus heating, food and beverage production, or other process industries like chemicals and pharmaceuticals. By taking advantage of the ETES system, data centres can not only meet their environmental and sustainability goals but can also secure significant economic benefits. The cooling capacity which data centres need is a coupled by-product of ETES.

As a potentially climate-neutral alternative to traditional large-scale heating and cooling technologies, which typically rely on fossil fuels, it's an attractive and efficient solution that can address two of the more challenging sectors associated with the green energy transition. The ETES system can easily feature multiple storage capacities at different temperatures, making it ideally suited to a range of industrial and commercial applications.

Indeed, given that heating and cooling contributes about half of Europe's total energy demand, sector coupling is widely seen as an essential component in harnessing renewable energy to break through fossil fuel dependency for heat and cooling generation. ETES offers whole host of additional system-wide benefits too.

For instance, if a lot of inflexible electricity generation and fixed power demand is installed on a system, potential imbalances become huge and the cost of addressing that is tremendously high. By storing any excess renewable energy as either heat or cold, ETES has the ability to balance the variability of renewable energy sources such as wind and solar. As such it makes a significant contribution to the economics of renewable energy, can help to cut grid congestion and improve load factors for all forms of generation.

Furthermore, the stored energy can readily be converted back to electricity, the operational flexibility of the ETES system allows it to supply electrical balancing power in the short term to help maintain grid stability. This ancillary services function has considerable commercial value and potentially offers an alternative revenue stream. In addition, ETES technology offers other commercial advantages like economies of scale and reduced capital expenditure that are not available with chemical batteries.

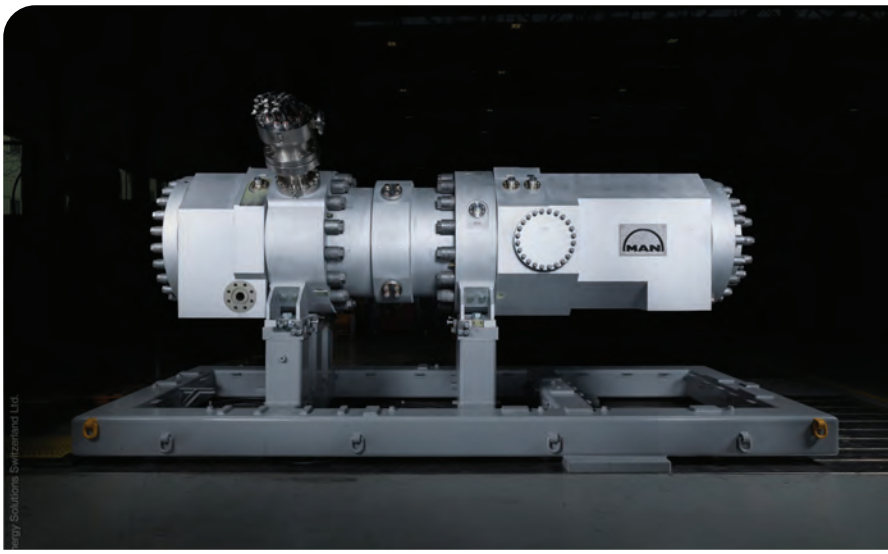
Rolling in the deep with the ETES roll out

The compressor at the heart of the ETES system (see box out) has long been deployed in the oil and gas industry and thoroughly proven in the most extreme deep-sea environments. Now it is being rolled out at scale to meet all the diverse heating, cooling and electricity requirements of a large modern metropolis.

In the largest CO_2 based heat-pump plant deployed to date, MAN Energy Solutions is developing a turnkey ETES system in the Danish port city of Esbjerg. The development will help the city take a big step towards its 2030 zero-carbon ambitions. This project is being developed on behalf of DIN Forsyning, the Danish multi-utility company that operates the district heating network in Esbjerg, Varde and a part of the island Fanø, and delivers approximately 1 million MWh of district heating to its customers. Two ETES heat-pump systems will be installed that will largely replace an existing coal-fired facility due to be decommissioned next year. With a total capacity of 50+ MW, the new ETES installation will supply around 235,000 MWh of heat annually.

Construction is scheduled to be completed by 1 April 2023 when ETES will form the backbone of a network of smaller and more sustainable heat sources deployed for the city's 100,000 residents as well its commercial and industrial heat demand. As any heat source can be recovered as usable energy through the ETES system, energy will be supplied from nearby wind farms as well as the Bay of Ho (Ho Bugt) in the Wadden Sea, a UNESCO World Heritage Site. "Because we are close to the coast we have a big heat sink. It's at a low temperature but it's a stable and with 8 million cubic metres of new water each tide, there is a huge amount of heat energy accessible from the ocean," explains Claus Nielsen, Business Development Director at DIN Forsyning.

Under the terms of a contract signed last year, MAN Energy Solutions will supply the entire system including the heat exchangers and all the associated electrical infrastructure for the roughly DKK1.2 billion (EUR161 million) project.



"What we see from the major global trend is that renewable electrical power will be the basis of the whole energy system in some way. We see ETES as part of a transition," says Nielsen, adding: "If we are to bring in more renewable energy into the district energy system in Esbjerg then we have to find a smart way to integrate the network with the electricity system. The best method that we have seen is the electrically-driven heat pump."

Meeting system-wide clean energy goals with ETES

By having the flexibility to pull energy from different parts of the system at different times to suit supply and demand characteristics, Nielsen argues that the city-wide energy management possible with ETES can help the whole region move towards a more sustainable clean energy footing. Indeed, this flexibility is one of the reasons ETES makes a good solution for applications/infrastructure with significant demand for both cooling and electricity. "If you have to integrate renewable power into the energy system you need to be flexible and that's what the ETES heat pump solution gives to our customers," notes Nielsen.

This flexibility doesn't just come from a conventional interruptible supply contract, as might be the case with electricity. Cooling and heating capacity can be stored within the network itself and additional flexibility achieved by adjusting the temperature in the network, making it slightly warmer temporarily to free up extra energy for other purposes, for instance.

As Nielsen explains: "For nearly all places where you have a district heating network you can use this. Most of western Europe and some parts of the US like many university campuses have a district energy network. In these district energy networks you can achieve this transformation to decarbonize heat and integrate more renewables because you can add flexibility to renewable electricity production."

Fundamentally, while data centre technologies have become far more energy efficient, sector coupling offers a new way for energy efficiency to become fully embedded into IT industries. As Nielsen says: "The problem is there's too much focus on primary energy. The best way to improve sustainability is thinking about efficiency first."

With the full ETES system flying through all factory acceptance tests ahead of large-scale deployment in Esbjerg, data centres now have a clear opportunity to embrace innovation and adopt a groundbreaking leap towards a sustainable energy system. By effectively combining electricity, heating and cooling and coupling their use across different sectors, ETES puts efficiency first. As such it represents a breakthrough in decarbonising cities, their people, industries, and their IT infrastructure.

The beating heart of ETES

AT THE CORE of the MAN ETES system is the HOFIM® multi-stage radial turbocompressor that allows the reversible conversion of electrical energy into thermal energy (heat & cold) This energy is then stored in simple insulated reservoirs as hot water and chilled water or ice. The core technology is the simple and robust oil-free hermetically sealed high-speed motor-compressor units with integrated expanders developed by MAN Energy Solutions.

In operation, ETES is comparable to a conventional domestic fridge. The system uses environmentally safe and non-toxic CO_2 (R744) as the working refrigerant which is successively compressed or expanded in a closed cycle. The process allows heat and cold to be distributed according to demand, but also offers the option of converting it back into electricity with a current round trip efficiency of 45% (near future ca. 60% achievable). With this quite impressive cycle efficiency, ETES maintains a consistent and stable performance throughout its +35 year-plus design life. Chemical batteries degrade during every charge and discharge and currently only last 10-12 years.

In an ETES cycle, electrical energy powers the turbocompressor. This power can come from renewable energy or other power sources, such as a low-cost night time tariff. The CO_2 is compressed to some 140 bar and 150°C or more and then passes through a heat exchanger to dump energy in the hot store which may feature as many as four tanks at different temperatures or can be supplied directly to the consumer(s).

Still pressurized, the CO_2 then passes through an expansion phase where the gas condenses and cools. In a second heat exchange process the liquid CO_2 is used to produce ice from the water in the cold storage tank or chilled water In the reverse "re-electrification" process, gaseous CO_2 passes through the cold side heat exchangers. It condenses and the temperature of the cold tank increases. The liquid CO_2 then passes through a pump where the pressure is increased and on through the hot side heat exchangers. The heated and pressurised CO_2 then passes through an expansion turbine where an attached conventional generator produces electricity.

The modular nature of the ETES system and its multiple tank arrangement ensures that it is always possible to optimize the thermodynamic cycle and maximise the efficiency for each application.

HYGOOD

Stop fires.
Not hard drives.

Acoustic Nozzles

For suppressing fires in hazard areas where sound levels from standard nozzles may affect sensitive electronic equipment.

For more information visit hygood.com

The power behind **your mission**

Johnson Controls

Working with big tech unlocks the true green capabilities of cloud computing

The problems posed by climate change simply cannot be overlooked any longer, with carbon dioxide emissions being the biggest cause for rising temperatures around the world.

BY ASHISH ARORA, VICE PRESIDENT UK, IRELAND & BENELUX AT HCL TECHNOLOGIES

THE UK has been particularly vocal in raising the alarm, and will use the UN's 2021 COP26 climate change conference, hosted in Glasgow, to urge economies to drive towards net-zero emissions by 2030, in line with the Paris Agreement and the UN's own Framework Convention on Climate Change.

It's not just governments who have been taking responsibility over climate change – businesses have been looking to change their behaviour as well. In particular, many have been coming to terms with the environmental impact their everyday IT activities are having.

For example, a single Google search uses the same amount of electricity as it takes to run a lightbulb for 17 seconds. The five billion views of music video Despacito by 2018, meanwhile, meant that it

had driven the consumption of the typical amount of energy used by 40,000 US homes a year. When you have billions of people running Google searches or watching YouTube videos every day, it's easy to understand how big our carbon footprint could become.

All of this activity is really adding up: Greenpeace has warned data centres consume almost 7% of the world's electricity as part of its 'Click Clean' campaign. But exactly how can businesses start to move in the right direction and cut down on these alarming figures?

Cloud computing can cut carbon footprints

In very simple terms, if businesses switch their IT systems from on-premise to cloud computing, it's the equivalent of joining a car pool or using public transport, rather than using their own vehicles. Having your own servers on-premise requires hardware, facilities equipped with power supplies and cooling units to avoid overheating.

If they can join a "car pool" with big cloud service providers like Amazon, Microsoft and Google, businesses will be in line to reduce costs and operate more efficiently, with cloud-native applications consuming less infrastructure, physical space, and energy per user. Businesses will also be better-equipped to support remote workers, further reducing carbon emissions involved in creating and maintaining large office spaces. Of course the cloud provider will still be using data centers, but the big players are all harnessing their resources to work towards carbon-neutrality.

Big tech is leading the charge

The tech giants are all hard at work reimagining their infrastructure to lead the fight against climate change. Analyst house Bloomberg NEF says the technology sector is signing a growing number of clean energy deals, driven on by sustainability commitments and pressure from investors and governments.

Google is being particularly vocal about the progress it has made, claiming to be the first organisation of its size to operate with 100% renewable energy. Google›s data centers run on wind farms and solar panels, and AI/ML are used to adjust cooling technologies to ensure servers are protected, but also that energy is not wasted.

Microsoft, meanwhile, has set itself the target of becoming a carbon negative organisation by 2030. Twenty years further down the line, it wants to remove more carbon from the environment than it has emitted in total since being established in 1975. As well as favouring renewable energy sources, Microsoft is also investing in carbon reduction and removal technologies, as well as leading the experimentation of how data centers could be operated under water, keeping them cool without draining electricity.

Amazon has also pledged to reach net-zero carbon across its entire businesses by 2040. AWS' data centers in Virginia account for almost three quarters of the world's internet traffic, meaning Amazon achieving net neutrality could have a massive impact on the planet.

Using green data centers to reduce carbon footprints

The EU wants data centers across the continent to be carbon neutral by 2030, and if we invest in the right areas, new innovations and technologies could achieve this goal. If the world runs cloud computing in a greener manner, businesses can also benefit from reduced costs, greater efficiency, enhanced reputations and future-proofed operations.

All of this means moving to green data centres should be a no-brainer for cloud service providers. We need to adopt renewable energy sources, use energy-efficient hardware and software, power facilities with clean energy and use energy-efficient lighting. IT decision-makers everywhere have a responsibility to check their suppliers are taking these kinds of steps, and set up KPIs that drive them to further reduce their emissions. Just because a business no longer has physical servers and data centers, it can't take an 'out of sight, out of mind' approach: when using cloud, all of us should take responsibility to ensure our carbon footprint is as small as possible.

How will data centre innovations materially affect healthcare experiences?

Sustainability and our day-to-day healthcare are becoming increasingly intertwined. Innovations in AI, digital infrastructure, and data security are determining the quality of our healthcare service, so how is it changing?

BY PASCAL HOLT, DIRECTOR OF MARKETING AT ICEOTOPE

WE ALL UNDERSTAND that entering the health system as a patient can be stressful. Throughout the pandemic, no matter what the condition, whether awaiting diagnosis, treatment, or a scheduled check-up, the impact is acutely understood. Digital healthcare is at a pivotal point from the perspective of technological innovations facilitating improvements in disease treatment, improved individual well-being and personalised care.

A new age of Predictive Care beckons

Healthcare systems worldwide will be expected to deliver diagnostics and care that is both predictive and proactive. Connected care and bioinformatics commentators, including the World Economic Forum annual meeting (2020), forecast that these

innovations will be enabled and enhanced by artificial intelligence (AI), machine learning (ML) and data-driven analytics.

In the very near future, the application of advanced analytics, including AI and ML, will greatly improve clinical decision-making and patient care outcomes. Analysing patient health records alongside vast datasets that cover populations, conditions, countries, environmental factors, virology data and more will be leveraged to help manage a myriad of health conditions.

Gartner state, "Demands for care collaboration and coordination across the ecosystem are increasing the demand for real-time data, insight and workflow optimization and orchestration." This is resulting in foundational technologies, such as real-time health systems (Hype Cycle for RTHS Technologies - subscription required). The analyst predicts that in the coming years, "healthcare will be characterized by a reengineering of clinical care and operations around digital health and pervasive, real-time use of data to achieve goals."

Understandably, healthcare providers and medical teams alike are excited about the potential for AI-powered diagnostics and precision medicine. Primarily, this is because of what it means for improvements in patient care – especially when so many countries expect the continuation of care to be extended to meet the needs of a larger population of senior citizens in years to come.

The Future is Data-driven Patient Care

Clinical informatics, for example, uses data and a range of tools to support health professionals. These include data analytics, preventing hospital patients from having accidents on wards, running systems for storing and sharing X-rays, as well as ultrasound and magnetic resonance imaging (MRI) scans. Within a few years, AI will be used to access data sources and reveal patterns in disease, aiding treatment and patient care programmes.

AI-driven data analytics and resource-intensive task automation will enable public and private healthcare providers to increase productivity and efficiency of care delivery, at the same time enhancing resource use, reducing waiting times and tackling employee burnout.

Transformational technologies such as Digital Health Platforms (DHP), will enable healthcare providers to quickly respond to external uncertainty as well as planned change. They can do this using cloud-first healthcare applications and tools that bring together Electronic Health Records (EHR), data connectivity and powerful analytics. By doing so, they can address strategic issues for providers, where monolithic EHR-centric application architecture fails to meet changing patient and clinical workforce demands. It is believed that DHP will reduce EHR total cost of ownership (TCO), releasing data for deeper insight and delivering improved clinical and lower-cost outcomes.

There is no doubt that to facilitate change, strategic partnerships – ecosystems – must develop between healthcare providers, technology companies, data centre service providers and associated organisations to drive this digital transformation. Many in healthcare already see the positive results of investment in AI as a powerful enabler of operational efficiency, which leads to better diagnosis, treatment, and outcomes.

The majority of PACS (Picture Archiving and Communications System) Administrators and IT departments have probably never seen density requirements like those demanded by today's power-hungry chips, let alone have the capability to accommodate these requirements within their current IT infrastructure

In addition to solving the challenges of integrating and provisioning healthcare systems whilst offering a potentially faster route to shorter queues for treatment and less pressure on healthcare resources and personnel, ecosystems could also offer a solution to clinical HR shortages. With Health Education England forecasting that they need to fill a skills gap of a staggering 672% to meet the anticipated requirement for a "digital workforce" in the coming decade, technology professionals in the IT channel could be of strategic importance by providing critical support.

Healthcare needs data, data needs infrastructure

The data demands of AI and ML-driven applications will rely on higher density processor chips, especially high-density GPUs to provide the real-time grunt to ensure the swift delivery of processes like data capture, analysis and interpretation. The majority of PACS (Picture Archiving and Communications System) Administrators and IT departments have probably never seen density requirements like those demanded by today's power-hungry chips, let alone have the capability to accommodate these requirements within their current IT infrastructure.

IT transformation, mobile devices, and the Internet of Things (IoT) are also creating enormous volumes of data globally. IDC predicts that in 2025, 175 zettabytes (175 trillion gigabytes) of new data will be created around the world, while Gartner is forecasting that more than 75% of enterprise data will be generated and processed outside of the traditional data centre.

A rising phenomenon of 'data gravity' is drawing the physical location of analytics, software applications and IT hardware towards the data source itself. This is creating a whole new set of challenges in healthcare, which must be overcome to support the patient anywhere from the doctor's surgery to the emergency room, operating theatre and hospital ward right up to the bedside.

'A year in the life of the NHS AI Lab', 2020, illustrated that diagnostics had the most prevalent use of AI within the NHS. This marks the beginning of the use of deep learning (DL), ML and categorisation technology on enormous sets of medical images to create workflows and algorithms. While this will allow for faster and more accurate outputs at the point of care, it also means that an increasing amount of data processing also needs to be done at the healthcare edge. In turn, this gives rise to a range of additional challenges from power, space and acoustics to physical and data security.

Digital healthcare and sustainability

As the reported producer of the equivalent of 4.4% of global net emissions, the healthcare sector faces its own sustainability challenges. At the same time, data centres have recently come under the spotlight for the rising demand upon power grids all over the world. Put together, these add up to greater IT infrastructure challenges. Healthcare leaders are set to prioritise sustainable initiatives, with projected cost savings as an additional driver, which many believe go hand-in-hand with technology advancements. Since the data centre industry provides services and infrastructure to support the digital transformation of almost every sector, it is also set to inherit a substantial proportion of their sustainability challenges. Data centres exist to process, store and transmit data as efficiently as possible, enhancing the benefit for customers and owners. For the provider of data centre services, the highest operating expense is electricity – the cost to power and cool IT equipment and its supporting environment. Depending on the source of its grid supply, the data centre industry has also been highlighted as a growing source of GHG emissions. However, the projected introduction of increased renewable energy sources into the grid energy mix will not only substantially reduce carbon footprint, but also help hedge the industry from price and supply volatility. At the same time, it will help increase resilience as dependence on imported fossil fuels is reduced.

Hotter chips mean a new cooling paradigm to deliver advanced healthcare promise

In the coming years, the exponential upsurge in data processing necessary to extract patient insights from large datasets will continuously drive the requirement for higher power compute densities. CPU power consumption is on the rise, with Thermal Design Power (TDP) mapped to reach 400+ watts - resulting in hotter chips and higher rack densities. Increasing the use of high-power GPUs alongside the CPU to accelerate computational workloads is also resulting in much higher power consumption and is driving the need for a fundamental review of thermal management in the data centre and at the edge.

Currently, the predominant way to remove heat from IT server equipment is by inefficient cool air drawn through the chassis, using numerous internal electrical fans to satisfy the higher density processors within the servers. Even the most efficient air-cooling systems cannot cope with the requirement of CPUs with mapped TDP of 400+ watts. Simply blowing more cool air at the problem is neither practical, efficient, nor sustainable. The efficiency of compute also requires the collaboration between servers, data centres, interconnectivity and the customer to understand how best to move, process and store data. HPC and supercomputer level computations require specific layouts that increase the need for direct-to-component cooling.

The industry-standard measurement of data centre efficiency - PUE - has plateaued over the past 5 years. The continued use of air cooling is a roadblock preventing both the use of additional high-density ITE as well as more efficient operations throughout the data centre industry. A step-change in cooling technology is needed and today, liquid cooling alone is the only system that can take up the mantle to enable digital transformation inside and outside the data centre. In doing so, it can provide the transformation needed to deliver high-quality, personalised healthcare delivery efficiently, sustainably and cost-effectively.

CELEBRATING 12 YEARS OF SUCCESS

The DCS Awards: 31 categories across four themes

DCS AWARDS 2022

THURSDAY 26 MAY

Leonardo Royal Hotel London St Pauls

Headline Sponsor

HUAWEI

BOOK YOUR TABLE PACKAGES NOW

All tables sold on a first come, first served basis.
All packages include the welcome reception and three course meal with wine and water.
Champagne Table Package includes four bottles of champagne.
A waiter/pay-bar service is available throughout the evening for other refreshments.

Champagne Table - £3,395

Table of 10
4 bottles of champagne
3 bottles of house wine
3 course meal and coffee
Drinks reception
Evening Entertainment

Standard Table - £2,995

Table of 10
5 bottles of house wine
3 course meal and coffee
Drinks reception
Evening Entertainment

Half Standard Table - £1,795

Table of 5
3 bottles of house wine
3 course meal and coffee
Drinks reception
Evening Entertainment

SPONSORSHIP PACKAGES

The DCS Awards offer extensive branding and sponsorship opportunities through online advertising in our Datacentre Solutions & Digitalisation World publications, and of course at the awards ceremony itself.

For sponsorship opportunities and/or to book your awards table please contact: awards@dcsawards.com or call +44 (0)2476 718970

dcsawards.com

Supported by

dca The data centre trade association

Why considered outdoor lighting solutions are critical for data centres

In this latest article from the **ZUMTOBEL GROUP, THORN'S HEAD OF APPLICATION ELIOT HORSMAN** explores the value that well considered outdoor lighting can add to a data centre and how it can enhance security and day to day operations, using the National Cyber Security Centre's five key principles for ensuring networks and technologies are designed and built securely.

IT GOES WITHOUT SAYING that data centres hold sensitive or proprietary information, including customer data and intellectual property, which means both digital and physical security of the site is pivotal.

Physical security of a data centre can comprise of various kinds of built-in safety and security features to protect the premises and thereby the data stored within it. Site safety and security starts from the outside, and is already considered at planning stages, where some of the initial considerations are location selection and authenticated personnel access points

Physical security is equally as important to the smooth operation and protection of assets of any data centre, anywhere in the world. How we approach and integrate outdoor lighting solutions is therefore a fundamental layer in the security infrastructure.

In this article, Thorn's Head of Application Eliot Horsman explores the value that well considered outdoor lighting can add to a data centre and how it can enhance security and day to day operations.

When we look at the LIGHTING of cyber security architecture, the National Cyber Security Centre outlines five key principles to help ensure that networks and technologies are designed and built securely.
These are:

- Establish the context
- Making compromise difficult
- Making disruption difficult
- Making compromise detection easier
- Reducing the impact of compromise.

These five key principles of cyber architecture transfer across to the critical layers of defining the right outdoor lighting solution for a data centre and in terms of the physical architecture of the space. Allow us to expand on this.

1. Establish the context

For outdoor lighting solutions, to establish the context is to determine and understand the environment in which a data centre is located and how this correlates to its surroundings.

Light pollution and the impact that artificial light can have on neighbouring residents and the natural ecosystems of plant and nocturnal animal life is a huge focus. Building Regulations across the globe are changing to ensure a reduction in light pollution which takes many forms, from light spill, light trespass and sky glow. Flooding a data centre's outdoor environment - building surrounds,

pathways, car parks etc, with light to give a clear view for surveillance and security systems is not a viable solution from a sustainability or energy cost perspective.

Regulations to limit light pollution can be used to the advantage of a data centre, beyond the benefits to human wellbeing, ecology systems and reduction of energy costs.

As high security critical environments, data centres must not stand out in their surroundings as a beacon to onlookers. Maintaining a low key presence in the built environment is paramount. In addition, both humans and ecology systems rely on periods of darkness to thrive. Lower lighting levels and warmer white light are proven to be beneficial to both human wellbeing and ecology, where artificial light is needed.

Innovations in advanced lighting technologies, such as Thorn's NightTune and Variable Light Technology, illuminate the required area and gradually warm in colour to a more ecologically sensitive warm white light. As the light colour changes over time, these technologies also allow gradual reductions in light levels during periods of low activity, reducing energy costs and allowing the site to blend into the environment, creating an ecology sensitive advanced lighting solution.

2. Making compromise difficult

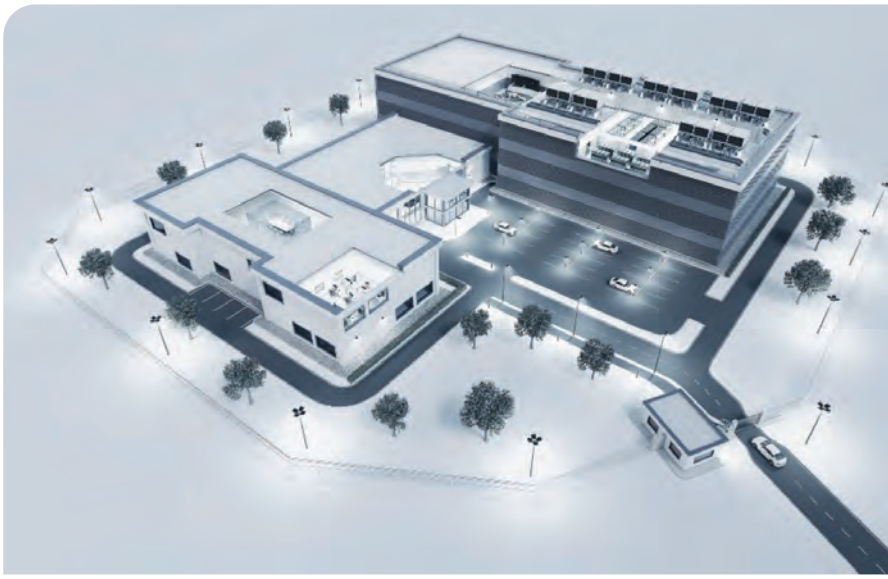
Limiting entry points is an effective way to enhance data centre security. Alongside this, multi-factor authentication prior to allowing a person's entry, introduces security systems which often rely on facial recognition.

This could be for security personnel to verify against a photo I.D. or automated facial recognition. Being able to determine the details of a person's face requires high quality colour rendition from the outdoor lighting to create a clear and accurate representation.

When a data centre's outdoor entry points are lit, lighting is typically installed above.
For example, when you drive down a road with street lights that are in operation, your eyes can detect obstacles such as cars moving, not because the cars are lit but because the cars are in shadow and in contrast to the well-lit horizontal road surface.

For optimum operation and so that facial recognition is not impeded, to fully determine the details of a person's face we must also consider vertical illuminance.

Only by using the latest LED lens technology to ensure the right light in the right place and plane can we accurately represent facial recognition and enhance security and surveillance systems in place to protect data centre assets.



3. Making disruption difficult

Independent research studies tell us that well integrated lighting installations, sympathetic to their outdoor environment, can improve people's perception of safety during the hours of darkness.

On the contrary, lighting can also be an incredibly valuable method of deterrent to those that seek to disrupt a data centre.

This does not mean that the outdoor environment of a data centre should be over lit – indeed, too much light can cause glare, making it more difficult for the human eye to adjust to low light conditions. It can also cause glare for visual surveillance systems, giving an unclear view of any disruption.

Creating the lighting design alongside and hand in hand with the design of security systems is key to ensuring that outdoor lighting supports those security systems and includes the right light quality for optimum operation.

Well considered lighting installations aid in the perception of safety that staff and visitors have when navigating through the outdoor environment of a data centre. Using different lighting techniques and adding layers of light results in better wayfinding, ease of activity and a more comfortable feeling of safety.

Considering light as a deterrent, lighting around the outer perimeter of a facility is often a useful method to deter anyone seeking to disrupt the data centre facility. Unlit sections of the outer perimeter and building surrounds are viewed as gaps in the security infrastructure and are proven to be the focus access points for criminals. The key here is to avoid breaks in the layers of security created by lighting and use the correct luminaires and controls while respecting dark sky requirements for limiting light pollution.

4. Making compromise detection easier
For the outdoor lighting system of a data centre, smart control technology can act as an additional layer to the installed security systems.

As we saw earlier, to protect the night time environment and reduce energy costs, ideally the outdoor lighting would be dimmed and the space illuminated in a warmer white.

If we add a further layer into this solution – smart controls - any movement within the lighting scheme can be detected and activate the lighting to a higher level of brightness and more neutral colour of white light. A clear visual highlight to security systems and security personnel of any movement activity on site. A great example of using technology to achieve a sustainable solution that acts as an aid to surveillance systems.

Smart lighting control can monitor each individual light point, with secure remote access from anywhere in the world, to see what the operation of the luminaire is, and take a full lighting asset management view at any period of time. A fundamental part of a strong data centre security system.

If there is a compromise of power supply to the facility, Building Regulations require lighting to operate in emergency mode to ensure that the means of escape can be safely and effectively used at all material times

Reducing the impact of compromise

This obviously has a specific meaning for cyber security, but for outdoor lighting around the site of a data centre, we can interpret this as the need for emergency lighting outdoors.

If there is a compromise of power supply to the facility, Building Regulations require lighting to operate in emergency mode to ensure that the means of escape can be safely and effectively used at all material times.

This is where local or central battery supplies to the luminaires allow the fittings to operate at a reduced light output, if the normal operation fails.
We often see emergency lighting as an indoor only requirement – to be able to navigate out of the building, away from danger.

However, emergency lighting in the outdoor environment is also required so that occupants can navigate away from the building to a determined location point, often signed as a fire point.

There are three primary elements to this:

- Emergency lighting for wayfinding – a clearly visible illuminated route to safety
- Emergency lighting at changes of direction - there can be no ambiguity for users in an emergency situation at pathway intersections
- Emergency lighting at changes of level – in an emergency situation, risk assessments consistently identify that even a single stair tread can cause incident and delay in people reaching the designated areas of safety.

Integrated emergency lighting throughout the outdoor lighting installation reduces risk to occupants in an emergency situation.

So to summarise: every data centre has a unique set of needs, dependant on its architecture, location, scale and security systems.

However, the outcome needed from data centre outdoor lighting is always the same.

Outdoor lighting needs to be an aid to security and surveillance systems and play an active role in asset protection, personnel safety, operating at minimal energy costs whilst following light pollution and emergency lighting regulations. Bringing together these often opposing requirements is now possible by tailoring a specific combination of products, smart controls, lighting technology and lens technology to create a best in class solution.

Engaging with a lighting specialist partner on your project as early as possible in the development and construction process is key, so that at every stage, the outdoor lighting solution has been considered and properly integrated into your data centre.

Coming soon...

Europe's most connected data centre campus

Step into your connected future with Telehouse South

Interconnected to the main Docklands campus via a diverse Dark Fibre network

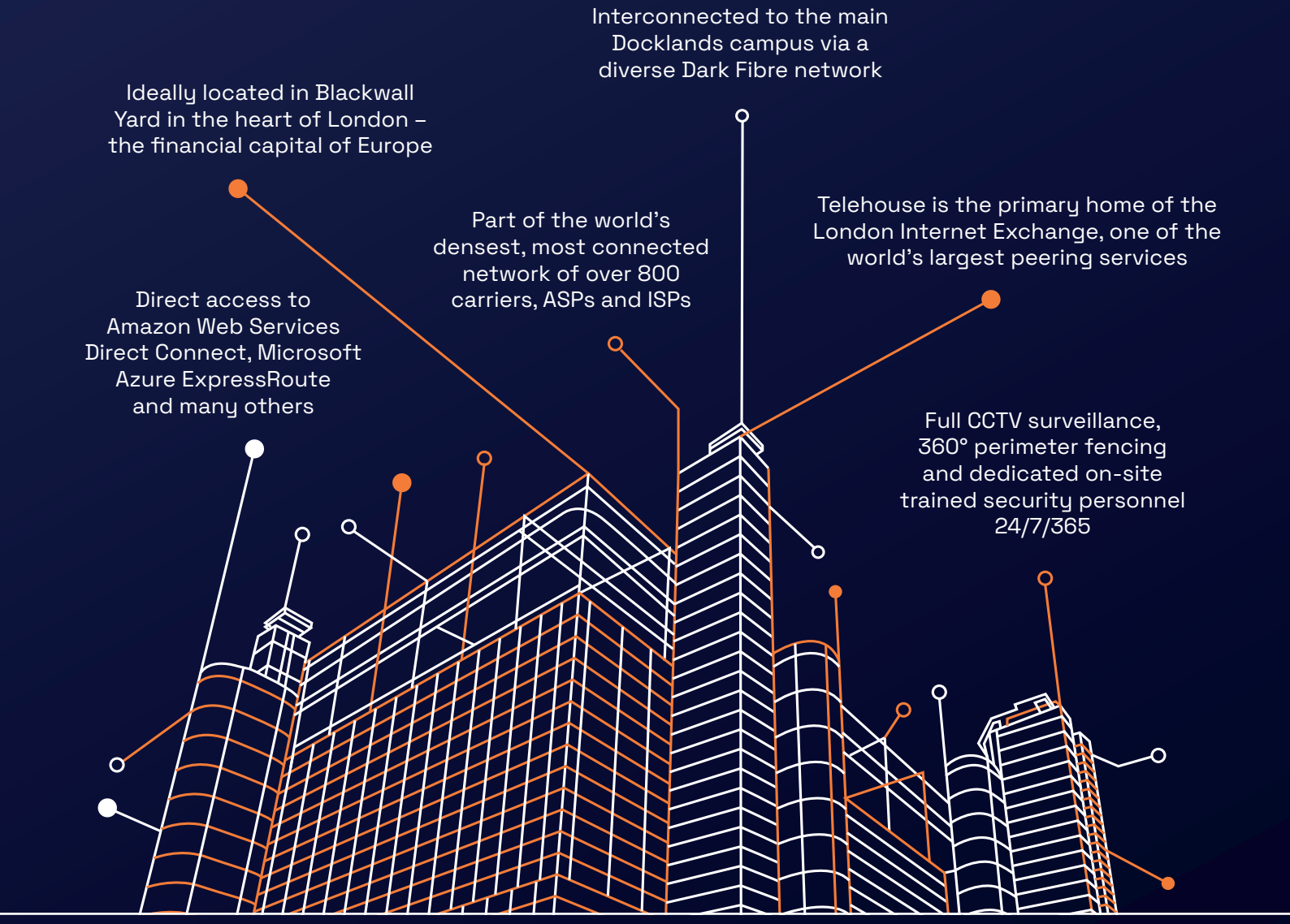
Ideally located in Blackwall Yard in the heart of London – the financial capital of Europe

Part of the world's densest, most connected network of over 800 carriers, ASPs and ISPs

Telehouse is the primary home of the London Internet Exchange, one of the world's largest peering services

Direct access to Amazon Web Services Direct Connect, Microsoft Azure ExpressRoute and many others

Full CCTV surveillance, 360° perimeter fencing and dedicated on-site trained security personnel 24/7/365



Reserve your space today:

telehouse.net/telehouse-south
+44 (0) 207 512 0550
webenquiries@uk.telehouse.net

DCS AWARDS 2021 WINNER

TELEHOUSE

The pressure on edge data centres

How to ensure network reliability during the age of 'hybrid' working

BY ALAN STEWART-BROWN, VP EMEA, OPENGEAR

THE TRADITIONAL data centre has been a mainstay of computing and connectivity networks for decades, with most processing transactions being carried out in a centralised core. Although core networks are essentially the backbone of any network, mobility, technological advancements and user demands have increased the need to add edge elements to the core. Gradual but growing adoption of new generation data-rich applications and IoT technologies have increased the demand for deployment of IT infrastructure closer to the end user.

The move to remote working that we have seen since the pandemic began has, in turn, helped boost the move to the edge. Edge computing is a distributed, open IT architecture that features decentralised processing power. Instead of transferring data to a data centre, IoT (Internet of Things) devices transfer it to a local connection point. The data is processed by a local computer, or server, at this edge location.

Nearer to the source

The advantages of this model are that since the edge is specifically designed to be located closer to the user, it can provide much faster services and minimises latency by enabling real-time processing of large quantities of data that then communicates across a much shorter distance. At these edge compute sites, the most commonly found devices are network switches, routers, security appliances, storage and local compute devices. Unlike origin or cloud servers, which are usually located far from the devices that are communicating with them, the edge is located closer to the user for optimal data processing andprocessing power application or content delivery.

Edge computing brings data processing and information delivery functionality closer to the data's source. It is the next generation of infrastructure for the internet and the cloud – and it is experiencing rapidly accelerated growth. We've already seen a massive migration to the edge during the Pandemic

and it is now widely reported that by 2025, 75% of all data will be processed there.

With employees often now widely dispersed, edge data centres create a reliable 'last mile' of connectivity, bringing critical data 'nearer' to those needing to use it, increasing reliability of access, security and worker productivity.

Covid has boosted edge computing in other ways, of course. We have seen a boom in people moving away from shopping in big city high streets and prioritising convenience stores in their local area.

We have seen the growth of video streaming, an increase and an ongoing rise in online gaming. And all this together has led to an increase in demand for compute power at the edge to drive these kinds of activities, which are increasingly happening in remote locations.

Moreover, edge computing processes data locally which brings many benefits to a wide variety of industries. Financial institutions, for example, are adopting edge computing to better process data that is collected through mobile banking applications, ATMs and information kiosks. In the case of Healthcare edge computing allows organisations to access critical patient information in real-time rather than through an incomplete and slow database, while in retail, edge computing helps to improve customer experiences, increase operational efficiency, and strengthen security measures.

Finding a way forward

For all the reasons highlighted above, and more, we are seeing computing power transitioning to the edge, and edge data centres, in particular. But with this power comes an element of vulnerability. As consumers continue to demand faster, more efficient services and more IoT devices are added, a greater strain is put on the organisations distributed IT networks, thereby increasing the likelihood of outages.

To keep edge data centres up and running, there is a clear need for organisations and service providers to put in place proactive monitoring and alerting, to ensure they can remediate networks without the need for truck rolls to send an engineer on site.

Smart Out-of-Band (OOB) Management tools can be used to diagnose the problem and remediate it, even when the main network is down or congested due to a network disruption, or even if it is down completely.

Failover to Cellular™ (F2C) provides continued internet connectivity for remote LANs and equipment over high-speed 4G Long Term Evolution (LTE), when the primary link is unavailable. Easily integrating with existing IT systems and network infrastructure, F2C restores WAN connectivity without the need for manual intervention.

Organisations are also using a combination of automation and network operations (NetOps) for zero touch provisioning, effectively getting the network provisioned and up and running, without having to do anything manually. Often, they will want to 'zero touch provision' their own devices. They will also want to use this technology for the orchestration of maintenance tasks and to automatically deliver remediation in the event of an equipment failure or other technical problem.

That effectively means that organisations can ship new or replacement equipment to site and using Smart OOB quickly bring the site up via a secure cellular connection allowing for the remote provisioning and configuration of the equipment in-situ with having to send a skilled network engineer to site. This can deliver huge cost savings for many companies implementing new edge deployments, especially those trying to do so at pace across multiple geographies. Then following deployment, if a problem develops that results in a loss of connectivity to the production network and one that cannot be resolved immediately, business continuity can be maintained with organisations continuing to pass any mission critical network traffic across the secure OOB LTE cellular connection.

Edge computing is poised to transform the data centre landscape and is already influencing network strategies. The concepts around the edge are not necessarily new but are increasingly relevant as IoT connected systems continue to scale. Organisations are realising that relying on centralised data centres for the large amounts of sensor and endpoint data that is being collected, simply isn't realistic or cost effective.

What the future may bring

As cloud service offerings increase, content streaming grows and more IoT is integrated, organisations are challenged with diversifying their network initiatives. The more applications and devices that that use an edge network, the greater the strain.

As companies and organisations move more and more of their compute load from large data centres to edge compute locations, they must adjust their network management processes to ensure they continue delivering the always-on uptime that customers expect.

To do this, they must use hybrid solutions that leverage internet and cloud-based connectivity, as well as physical infrastructure. A combination of NetOps and Smart Out-of-Band Management ensures that organisations have always-on network access to deliver the network resilience needed for fast evolving edge computing.

How 5G, IoT, AI/ML and remote work will change the demands on data centres

This year, we will continue to see a number of last year's trends impacting data centres, especially since the Covid-19 pandemic and the ongoing restrictions have continued to have a greater impact on our lives than we anticipated at the beginning of 2021. Here's a deep dive into these key trends and how they will affect data centres in 2022 and beyond.

BY LEWIS WHITE, VICE PRESIDENT, ENTERPRISE INFRASTRUCTURE – EUROPE AT COMMSCOPE

Remote work will continue to increase demand
Most people had expected to be back in hybrid work environments by mid-2021, but we're a few months into 2022 already and we're still seeing a slower than anticipated return to the office. For some, it looks like it will never happen. All the videoconferencing used for work, education, and entertainment in 2021 had a big impact on data centres, and we see this trend growing. There's a lot of video storage required as people record live video calls, and users expect easy, jitter-free access to services. IT managers therefore need to consider how to best gear up for that.

Cloud migration will continue

Scalability and cost are driving people to the cloud, which will require more data centre storage. According to predictions from Gartner, global

spending on cloud services is expected to reach over $482 billion in 2022, up from $313 billion in 2020. When you can rent something and scale it within days, versus planning and building something in years, that's a compelling argument for the cloud. However, compliance and regulation is holding this back for some. For example, in Europe, GDPR data regulations require data to remain within a country or on-premises.

The growth of 5G

Service providers and private companies will continue to evaluate the most pragmatic ways to add capacity and capability into 5G deployment plans. In terms of its impact on the data centre, 5G promises faster access to information, which will drive more edge datacentre builds. More and more data is latency-sensitive and requires faster access, so we're seeing migration from large core, small edge data centre architecture to smaller core, larger edge architecture.

Cloud core 5G will expand data centre builds significantly in private companies. If you can build private 5G based on cloud architecture with local radios in the cloud, that's a very data-intensive, latency-sensitive application, and that will drive growth in both data centres and edge data centres. While this trend will begin this year, it will roll out over several years as businesses devise how to get the rights to use 5G spectrum from carriers.

IoT will continue to skyrocket

IoT growth shows no signs of slowing. In fact, according to Statista, the number of IoT devices worldwide will almost triple from 8.74 billion in 2020 to more than 25.4 billion in 2030. When it comes enabling IoT and smart technologies, everything comes back to data. If you think about all the tiny data points involved in something as simple as a door sensor and you multiply that by the number of sensor applications, all data that needs to be stored somewhere and accessed by multiple apps and users. The infrastructure that makes that work is all in the data centre. We foresee ongoing strong business investments in IoT. In fact, the biggest impact from IoT in the data centre will be video applications – entertainment, security monitoring, data mining and safety, for example. Companies need to store that data and act on it in real time, rather than analysing static data or photos.

Growth in AI, AR and the metaverse

Artifical intelligence (AI) and machine learning (ML) use cases, combined with augmented reality (AR), will grow rapidly in 2022. The rise of the metaverse will also drive increased use of AR. We can see a point in the very near future where users will be able to duplicate a physical interaction with a virtual one. We've grown used to seeing each other on video, and we'll no doubt get used to seeing each other in AR worlds.

We need AI because as you collect more data you need AI to process that data – you can't do it manually anymore (think of facial recognition or contact tracing). Anywhere you have lots of complex data, machine learning will apply. This could help with the supply chain crisis by automatically calculating shipping routes and helping with logistics, for example. The caution here is not to trust AI too much. If we're not supplying high-quality data, you can get some poor decision-making or false assumptions.

In terms of its impact on the data centre, 5G promises faster access to information, which will drive more edge datacentre builds

Making the business case for UPS systems

SolarEdge is a leading global provider of clean energy technology spanning solar PV, critical power solutions, backup batteries, and power trains for electric vehicles. Its expertise in transformative technologies has enabled its Critical Power Division to develop highly innovative approaches to backup solutions. Here, Yaron Binder, VP Product Management, describes a new vision, in which UPS systems are leveraged to augment grid supply and enable businesses and institutions to meet a wide variety of operational and financial needs.

UNINTERRUPTIBLE power supply (UPS) systems are generally thought of as insurance policies for companies and institutions with critical power requirements. For hospitals, research facilities, laboratories, data centres, manufacturers, food processors, government and transportation facilities, a reliable power supply is mission critical.

Using UPS systems as more than emergency backup – and monetising their use - makes a compelling proposition. Seeing these systems as assets and new revenue generators – with no risk to backup capabilities – introduces a new, strategic way of thinking about UPS capabilities.

At present, the most common method of providing backup power is the use of generators with UPS batteries. This method bridges the gap between the power interruption and the point in time when the generators produce a stable power supply. This is the traditional model that protects those with critical power requirements from grid failures. Typically, it can take between a few seconds to a few minutes for a generator to reach appropriate production levels. If a generator is not in place, a longer battery backup solution will be needed to bridge the time until grid power is resumed.

However, grid failure or grid interruption are not the only factors that need to be considered by energy users; there are a wide variety of commercial implications to think about, too. First, there are variations in tariffs throughout the day: power from the grid at peak times is more expensive. Secondly, in some countries, rates charged are based on the maximum consumption in a given period.

For example, a manufacturer on a five-day week might have a disproportionate spike in power usage when operating multiple machines or devices at the same time, or when using a high power device infrequently. Power usage will be several times higher than the maximum consumption level for the rest of the week, but that increase in power consumption, even for a short period of time, will determine the tariff rate for the entire period. There is a way of ameliorating these challenges by using UPS systems that are already installed.

New, specialised software allows energy to be stored when charges are less expensive, to be used in place of grid power at times when charges are higher. This can be done automatically as part of normal operations whenever surplus battery capacity is available, while still ensuring that sufficient capacity is preserved for emergency backup if required.

Similarly, it is possible to draw energy stored in UPS batteries during low usage periods to supply extra peak power when needed, thus reducing or eliminating predictable spikes in consumption and reducing the overall tariff.

In addition to this, UPS batteries can be used to provide additional power for short periods of time in instances where energy cannot be sourced from the grid. Consider the case of a hospital that needed to install a new scanner. The inrush power requirement of the scanner was in excess of what the grid connection could provide, though its post-start-up operation was within the available capacity. The hospital's location also made it unfeasible to upgrade the energy supply. This is quite a common problem in cities around the world where infrastructure tends to be stressed.

With the new model of UPS application, the hospital can draw on its UPS power in the scanner's inrush phase to complement the grid supply until energy demand falls. Use-case scenarios such as these extend the limits of grid connection and enable the user to have access to more power than the grid can supply, while not taking away from the UPS system's emergency functionality.

Adding solar to the mix

The next step in this evolution is to combine the increased capabilities of UPS systems with a renewable energy source. Many companies and institutions with critical power requirements have already installed some level of solar energy generation as part of their wider carbon reduction goals and to reduce energy costs.

When the grid is on, solar power is used to supplement grid energy for operations and to charge UPS batteries. But what happens when the grid is down?

Companies may not realise that when this occurs, solar inverters need to be isolated from the grid, which can result in lost energy production. However, there are solutions that manage to overcome this issue. For example, SolarEdge's UPS backup solution includes hardware that isolates the inverters from the grid to maintain solar energy production while the grid is down, effectively creating a micro-grid.

UPS systems can also be utilised to help organizations improve their self-consumption of solar power. Energy usage does not always align with the energy generation of a PV system. As such, in order to overcome this inconsistency, energy can be stored in a battery for consumption at a later time instead of limiting energy production.

One way to achieve this is with a stand-alone storage system. However, it might be more cost-effective to add extra batteries to the existing UPS system and store the energy there instead. By adding batteries to the UPS system, this otherwise wasted energy can be utilized at a lower cost than adding a separate storage system. In this way the UPS system acts as a hybrid system manager. Crucially, this use of solar energy and batteries does not add risk to an organisation's UPS provision. This is because the energy levels reserved for critical power are automatically monitored, regulated, and preserved. Beyond these requirements, using surplus solar energy can cut costs without adding risk: it maximises self-consumption when the grid is on and provides backup power capabilities when the grid is down.

Putting it together

The integration of flexible solar+UPS solutions changes the whole dynamic of working with energy suppliers and using the grid. An integrated solar+UPS system can add value and reduce costs, on top of providing users with energy protection. Longer backup times can be achieved, and the flexibility of allocating batteries to the solar and/or UPS sides of the system can deliver further efficiencies and savings, transforming a backup solution from a necessity to an asset.

The impact on critical power

The SolarEdge solution integrates three important elements: backup, storage and PV. By joining UPS and PV solutions together, it improves the use of existing UPS resources, allowing users to reduce energy costs while also benefitting from uninterrupted power supply and battery backup. Full-integration of the solar PV system with existing UPS provision provides higher efficiency and further reduced costs.

As a manufacturer of both solar and UPS systems, SolarEdge is able to design the system components so that they work together seamlessly. A single controller manages both systems. As such, it knows how much solar energy is being produced, how much capacity must be reserved, and the exact prioritisation of all applications. This ensures smooth operation with maximum system availability and best total cost of ownership (TCO).

Those planning to install or renew a UPS system will always enquire about cost, and adapting to this new integrated vision requires a new perspective. However, with a fully-integrated solar+UPS solution, ROI actually enters the conversation, which is typically not the case with traditional UPS systems. SolarEdge UPS batteries have an expected lifetime of 15-20 years. After an initial payback time, which depends on the tariffs and incentives, they are expected to create income for many years. With the cost of batteries continuing to fall, the future ROI will likely continue to improve.

Critical power is, and will always be, essential for certain organisations and institutions. As renewable energies, particularly solar energy, become a larger part of the wider energy mix, the vast potential it brings when combined with critical power applications, in terms of financial investment, uninterrupted operations, and of course sustainability objectives, can no longer be ignored.

ONLINE ROUNDTABLE

Connecting Leaders & Experts in the Data Centre field

- Based around a hot topic for your company, this 60-minute recorded, moderated zoom roundtable would be a platform for debate and discussion
- Moderated by the editor Phil Alsop, this could also include 3 speakers
- Questions would be prepared and shared in advance
- There would be an opportunity to view and edit out any unflattering bloopers

This event would be publicised for 4 weeks through all our mediums including:

- A banner on the Digitalisation World homepage for 8 weeks
- 4x weekly dedicated HTMLs
- 4x news pieces which would also appear on the weekly newsletters
- Promoted through our social media platforms for 8 weeks (pre and post event)
- Available as an on-demand asset through all mediums
- All registered attendees' details would be made available to you

Cost: £4995

DCS DATACENTRE SOLUTIONS

DEVELOPING DIGITAL INFRASTRUCTURE IN A HYBRID WORLD

Contact: Jackie Cannon
jackie.cannon@angelbc.com

ANGEL EVENTS

DCA data centre sustainability SIG

An Introduction from DCA CEO Steve Hone

AS THE Trade Association to the Data Centre sector the DCA understands that it is imperative that key issues affecting the sector have a point of focus.

The DCA SIG's (Special Interest Groups) / Working Groups regularly come together over shared interests to discuss issues, resolve problems and make recommendations.

Outcomes result in best practice guides, collaboration between group members, participation in research projects, this includes clarification and guidance for decision and policy makers.

Members find these groups are a great way to ensure their opinions and views are considered in a positive and cooperative environment.

The DCA currently facilitates nine Special Interest or Working Groups. DCA members can join any of the groups and contribute find out more here: https://dca-global.org/groups

The DCA Sustainability SIG is chaired by Astrid Wynne, Sustainability Lead at Techbuyer The purpose of the Sustainability Special Interest Group is to develop best practice in the UK data centre industry with respect to materials usage, energy efficiency, skills development and workforce retention in an operational data centre environment.

The group aims to achieve this through:

- Optimising energy efficiency at use phase
- Expert insight into IT hardware and the effect on energy draw
- Insight into the role of IT load with respect to this, including:
  a. the effect of full utilisation on efficiency as measured by compute power over energy.
  b. the ability of software to dematerialise hardware.
  c. minimising data transfer and storage, potentially leading to a sector Code of Conduct
- An understanding of the importance of Scope 3 emissions (also known as embodied energy) in the hardware, facility and building.
- Circular solutions for the IT hardware and other infrastructure
- Circular solutions for heat, power and IT load
- Use of renewable energy in the sector.
- New technologies that can aid this.
- Existing and upcoming standards relating to this.
- Education of workforce with respect to sustainability insight and practice

The group work very closely with the Energy Efficiency SIG to provide DCA members with an entire overview of data centre energy efficiency and sustainability.

To request to join this group please contact the DCA - mss@dca-global.org

2022: The year of action

Sustainability special interest group update, March 2022

AFTER DECADES spent focusing on energy, this is the decade where we begin to look at the wider picture – materials supply, social benefits and how we can support the needs of today without compromising on the needs of future generations. The good news is that this offers a distinct set of advantages for all businesses – and the data centre sector is no different. From the Harvard Business Review to Black Rock, more and more capitalists are pointing to the advantages of sustainable business practice. These include sales revenue increase; staff attraction and retention (particularly interesting for data centres at the moment); investment; legislative compliance and resilience during hard times (topical again).

The Sustainability Best Practice Whitepaper

It is against this backdrop that the Data Centre Alliance sustainability special interest group is releasing the first of its best practice whitepapers this Spring. It has been created in partnership with a number of organisations outside of the DCA, including the Sustainable Digital Infrastructure

Alliance in Europe and Interreg-NW-funded circular economy research project Circular Economy for the Data Centre Industry (CEDaCI). We have very much aimed to make this of its time, with a discussion of the current landscape. More importantly, we have tried to make it accessible with five simple steps organisations can make today. These cover each aspect of the triple bottom line: people, profit and planet.

Workshops

The Special Interest Group re-booted our monthly workshops in March after a short hiatus to generate the best-practice document. The format of the meetings is a 20-minute presentation from a specialist (this is posted on our SIG portal) followed by a 70-minute discussion of the issues raised (which is full, frank, fun and private). Our first this year was from Colin Curtis of Triple Bottom Line Services, talking about how to set up and manage a framework to support the UN Sustainable Development Goals. This is something the DCA and its members will be looking at in more detail over the coming months.

Following on from this, we will be looking at Circular Economy approaches, creating a code of conduct, conducting impact assessments and other topics related to these and carbon accounting that are of use and interest. We take this hands-on approach because there is a time imperative to get moving on sustainability. Yet at the same time, it is an evolving area, and we need as much advice as possible on next viable steps. As a high-impact, high-growth sector (according to some estimates, a projected 500% growth globally by 2050), data centres in the privileged position of driving significant positive change and we are hoping to chart a pathway towards this.

Call to Action

Each of our five suggestions this year is relatively easy to begin, and we have provided short explainers and resources in the document. However, as a group we know that there are challenges the industry will face in getting where we need to be. One example of this is the Net Zero Pledge, which will involve accurate measurements of Scope 3 (embodied) Greenhouse Gas Emissions. This is going to be difficult to assess at the moment given the lack of Environmental Product Descriptions on the market and the lack of standardisation around Life Cycle Assessment. However, beginning the process will activate positive change in the market. The DCA sustainability special interest group aims to do its part in this, highlighting developments that help us move in the right direction and leading the conversation on what might be missing. We are trying to do this in a world which is dramatically changing.

Practical advice

In line with this, our articles in this issue try to look at real-life solutions in the face of issues we are seeing today. Mohan Gandhi of STG Advisors is extremely experienced in highlighting the importance of data and integrating this into core decision making within an organisation. He has given us an insight into the importance of transparency when it comes to driving positive change.

Five actions to create positive change

- Make a Net Zero Pledge
- Address Environmental Impacts through Circular Economy practice
- Create a code of conduct for your company and the supply chain
- Carry out an impact assessment
- Announce Support of the UN Sustainable Development Goals

DCA sustainability special interest group member Enel-X is an expert on managing energy market volatility, which has now become very much an operational concern in our sector. The supply chain issues related to the pandemic have been compounded by the events in Ukraine and resulting sanctions on Russia. Addressing the profit and planet aspects of sustainability, author Andrew Toher gives pointers on contracts, secure supply and energy use avoidance that are currently very topical.

We hope that you enjoy reading these articles and some of the topics raised in them. We also look forward to introducing our Best Practice Whitepaper later this year and discussing some of the issues raised in the group and in industry forums. This sector is full of robust and honest debate. We look forward to enjoying this soon.

Energy markets volatility

Energy strategy Q&A with Andrew Toher, Head of Customer Insights, Enel X Europe

IN THIS Q&A, Andrew shares the answers to some of the most frequently asked questions by our customers as a result of current energy market volatility.

What has happened to wholesale electricity and gas prices?

Wholesale electricity and gas prices across Europe and UK have increased dramatically and recently reached all-time-highs. This is primarily due to uncertainty about whether natural gas supplies will continue to flow into Europe from Russia because of the war in Ukraine and associated sanctions. This impacts electricity price due to much of the electricity generated across Europe coming from gas fired power generation. Prices have risen significantly but also the volatility or the size of price changes from day to day and within day has also increased.

Can the recent price increases be justified?

There is a lot of sentiment currently driving market prices with market participants pricing in concerns about future availability of gas supply. The high volatility also indicates low liquidity so in some cases, even though prices for future periods have increased dramatically, there are relatively low volumes of gas and electricity being traded at these high prices. That said, there is a real potential for reduced supply of gas in future and we are advising our customers to prepare for the risk of a sustained period of elevated prices.

Will there be a situation where there is no gas and electricity available to my premises?

It should be noted that currently there are no gas or electricity shortages in Europe and UK markets. If there were to be a significant abrupt reduction of gas flowing from Russia then there are a range of alternative ways the market could respond. This can range from alternative electricity generation sources such as coal and nuclear to alternative gas sources including pipeline gas from other countries, increased liquified natural gas imports and withdrawing more gas from storage. While local risks of no availability of gas or electricity cannot be completely ruled out, this is relatively low risk, the bigger risk is on prices spiking higher.

Should I enter a long-term fixed price deal now?

Generally following such a ramp up in prices this is not the right time to enter a long term fixed price deal unless you can tolerate the price and it is critical to have certainty of price. We would generally advise customers to enter into flexible price contracts where they can, and to implement an active risk management strategy using a progressive purchasing approach. Where customers cannot access flexible supply contracts, they should consider a shorter term fixed price deal, then actively monitor markets to determine the best time to run a further tender or contract extension for future periods.

Should I make some hedges for future years now?

The first step is to ensure you have a flexible supply contract covering the periods that you wish to actively manage. This allows you to move quickly if there are opportunities to lock in lower prices. Even though the near term market is significantly elevated compared to historic prices, you may consider making some hedges for future periods as part of a progressive purchasing strategy. It's best to have a defined strategy for example using a Capital at Risk model to provide some overarching risk controls and help you navigate these decisions.

How do I budget for energy costs with so much uncertainty?

Our customers found it helpful to have regularly updated position reports showing the forecast spend for remainder of year vs the budget, along with regular updates to finance team with explanations of what is happening in the market.

Is there anything I can do to avoid high energy prices?

Yes. The lowest cost energy is the energy you don't use! Therefore doubling down on low/no cost energy efficiency and avoiding waste is the best place to start. Following this, accelerating distributed generation and onsite renewables projects can help as this will avoid both the elevated commodity prices and non-commodity charges such as network charges. Battery energy storage can increase the electricity utilised from onsite renewables to further reduce grid imports. Customers should revisit the return on investment (ROI) calculations for all recently considered energy efficiency and onsite renewable projects as they may now represent better investment cases. Corporate power purchase agreements (PPAs) are another way to fix prices for a longer period of time and avoid the market volatility we are seeing. In addition, customers can consider how to extract value from the energy markets. For example participating in demand response schemes to support the grids through these volatile periods can be a revenue source to help offset increased commodity costs.

Should I switch supplier now?

Many suppliers are not taking on new customers and where they are taking on customers they may not be offering attractive terms and / or asking for large security deposits. Extending terms with existing supplier may be most favourable situation particularly where you are in a flexible supply contract.

Can I get out of my existing retail supply contract?
If a customer is already in a fixed price deal from last year then now would not be a good time to try and exit this. This would likely expose you to a further significant increase in commodity cost and as set out you may struggle right to get the best terms from new suppliers.

Are there any other risks to be aware of?
We have also seen a significant inflation in the cost for unbundled renewable energy guarantees of origin costs (REGOs or GoOs). While this is not directly linked to the situation in Ukraine we have seen some retail suppliers back out of previously agreed fixed price green electricity uplift costs on green retail tariffs. Where this happens it then exposed customer to a risk of procuring the REGOS or GoOs at a significant premium. There are a range of options to procure REGOs/GoOs through retail supplier or other routes and all should be considered before accepting inflated pricing from Retail Supplier.

Should we postpone our renewable or net zero carbon targets?
No! As described above, energy reduction and renewables adoption may represent the best way to avoid this commodity price volatility. It also takes time to develop these programmes and the commodity market backdrop can be ever changing. The global trend towards decarbonisation is unlikely to fundamentally change due to this situation and if anything may be accelerated.

Sustainability is a data play

By Mohan Gandhi, Senior Sustainability Consultant, STG Advisors

WOULDN'T IT BE IDEAL if decision makers could see the environmental impacts of their decisions? If design, procurement, operational and disposal related decisions could be made with full visibility and consideration for the environmental consequences? In almost every case, the well-informed decision maker would make the most sustainable decision possible (business considerations held equal). Sustainability, therefore, is the act of getting the right information into the right hands at the right time to make the right decisions. Sustainability is a data play.

Current Best Practise

Currently, good sustainability practices include the creation of a corporate sustainability team, annual public reporting of scope 1 & 2 emissions, ESG statements and the occasional Life Cycle Assessment of a product or process, consistent with the ISO14000 series on environmental management systems. The conversation naturally moves to the purchase of offsets and green energy, or as I call it, the purchase of forgiveness. This isn't wrong, but it isn't the most effective method of improving company operations. The following article will outline who, what and how corporations can make more sustainable decisions.

The Right Hands: The Decision Maker

No matter what stage of the life cycle, sustainability is best delivered by the persons holding the keys to business decisions. Too often sustainability is considered retrospectively, by a sustainability team in the Head Office at the end of the year. Let's use the increasingly common scope 1,2 & 3 calculations as an example. They're often calculated and reported at the end of the year, by the sustainability team, using data held - but never used - by the engineering/design teams. Whilst annual reporting is a great first step towards transparency, we should ask ourselves whether GHG reductions would be more effectively delivered by the engineering/ design team in the first place. If GHG emissions reductions were considered at an earlier point in the decision chain, significant reductions could be realised.

It is the empowered decision maker (the engineer, the designer, the procurer, the disposer etc) who can make significant inroads into emissions reductions.
The Right Information: Relevant, Measurable Impact data

To determine what is relevant, identify the most pertinent impact categories related to your Industry. For ICT we believe energy consumption, GHG emissions, pollution, raw material use and e-waste are the most important.

Conducting an LCA is a great next step because it will identify what information is relevant, and where that information can be collected. Follow this up by creating a collection process, and increasing the granularity of the data as resources allow. If data collection processes don't exist, create and embed them. Use measured data over proxy data wherever

possible. Crucially, LCA practitioners rarely feedback their findings to the right person in the organisation. Make sure LCA insights are fed back to the decision maker.

The Right Delivery: Practical and simple

Once you've mapped what to collect and who to deliver it to, ramp up the frequency of delivery. The gold standard is real-time information however developing this process may take time. For the decision maker, the information must be as accessible and simple. If we're trying to create a sustainability motive to compliment the profit motive, then the "price signals" we use need to be as simple and accessible. This will empower the decision maker, without overwhelming them or turning them off the subject altogether. As a result, you may need to forego accuracy in favour of simplicity in the beginning.

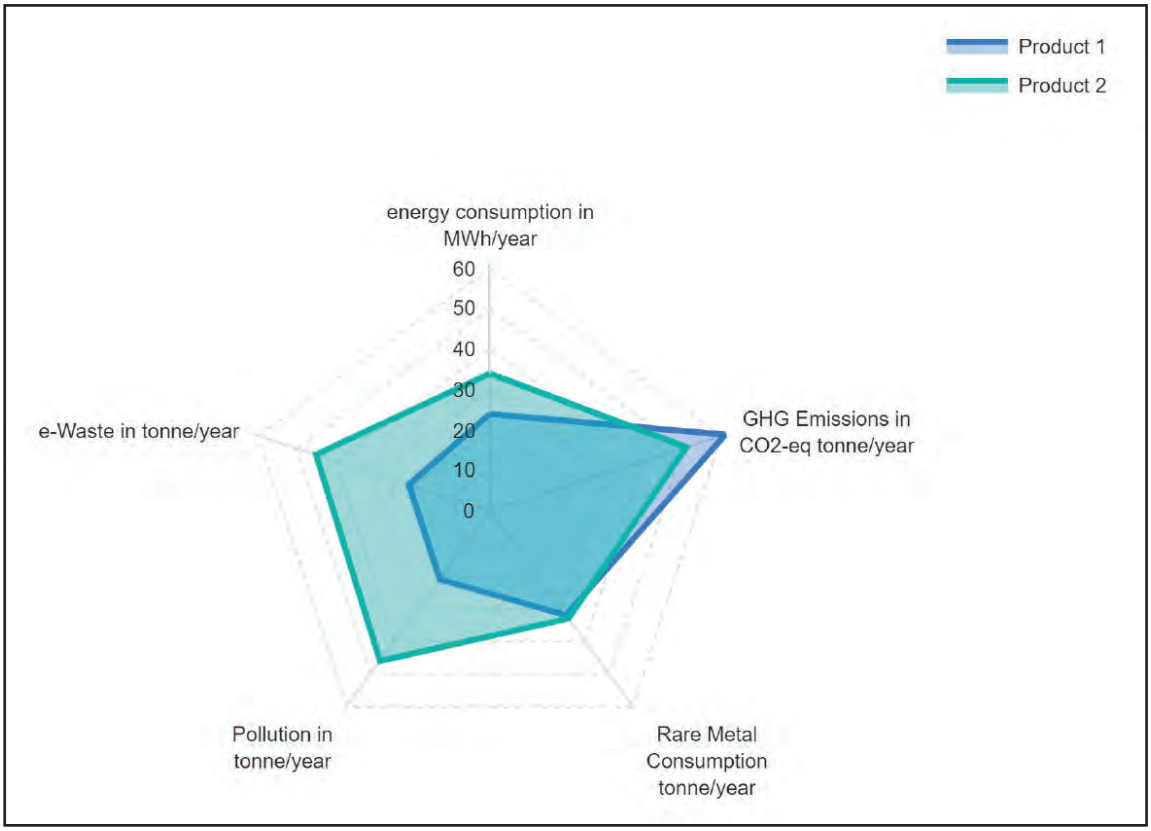
It falls to the sustainability team to identify, collect, structure, and deliver the right data. This requires the free flow of relevant information horizontally and vertically throughout the organisation. Continuous monitoring often does occur in an organisation, but this data is often collected and stored for a different purpose, in a different team, on a different system. You'd be surprised how much information is already collected in an organisation but stored in an information silo, waiting patiently to be deployed.
The Right Decisions: Understanding Trade-Offs
Organisations often treat GHG emissions as the only form of impact. However, environmental sustainability is far broader. From water consumption, e-waste production to ozone layer depletion, sustainability is a broad spectrum of impacts. The figure to the right denotes a powerful yet simple visual aid that would empower the decision maker to understand the environmental trade-offs of any product/option etc placed in front of them. This is because the diagram structures the environmentally pertinent information in a simple, practical way.

Conclusion

Without data, it is impossible to make informed decisions. It's impossible to understand the potential impacts, or to make sense of environmental trade-offs, or report your scope 1,2 & 3 emissions. The only way to make more sustainable decisions is to empower the right decision maker with the right information, delivered in the right way. This information must help the decision maker to understand business-environmental and environmental-environmental trade-offs. The data must be collected accurately and robustly, and delivered in a practical and simple manner.

Call to Action

Sustainability teams will play a crucial role over the next decade. Beyond annual reporting, ESG statements and reports, the sustainability team has the powerful opportunity to make their organisation sustainable by design - by becoming fluent with their data. Mapping the decision makers, sourcing the correct information, developing data collection processes, structuring the data in the correct format and delivering the data into the right hands. This is the opportunity for the well-motivated sustainability team.



EcoStruxure™
Innovation At Every Level

Deploy your data centre FASTER with less risk using EcoStruxure™ Data Centre solutions.

EcoStruxure™ for Data Centre delivers efficiency, performance, and predictability.

- Rules-based designs accelerate the deployment of your micro, row, pod, or modular data centres
- Lifecycle services drive continuous performance
- Cloud-based management and services help maintain uptime and manage alarms

Discover how to optimise performance with our EcoStruxure Data Centre solution.

se.com/datacentre

Life Is On | Schneider Electric