

The drive towards net-zero: The next big business disruptor in Data Centre Operations

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Summary

Big disruptors, like the rise of the Internet or smartphones, create unavoidable waves of change through many industries. These business tsunamis always have winners and losers. Businesses that are able to adapt and embrace the change will thrive, while businesses trying to maintain the status-quo often find themselves out in the cold and often out of business.

The global drive towards a net-zero future and the targets that have been committed to, is creating another wave of disruption that will dominate industry over the coming decades. Businesses will be forced not only by governments, but more importantly by their customers, to become sustainable.

This document looks at how the drive to net-zero will create challenges and opportunities for the data centre industry, and suggests that data will underpin all efforts to achieve net-zero targets.

Finally, it illustrates how Ecocentric Energy's Numen AI platform can contribute to assist businesses on their journey towards a sustainable future.



Sustainability is no longer a nice to have

With demand for data centre capacity set to increase dramatically, combined with the urgent need to address climate change, sustainability in data centre operations is no longer a nice to have. It is fast becoming a requirement to stay in business.

Data centre operators will face significant and growing pressure, not only from governments, but from their own customers and stakeholders, to prove real and tangible progress in becoming sustainable.

According to a recent survey¹ of more than 800 data centre service providers globally, 43% of multi-tenant data centres already have a comprehensive sustainability program. This number is expected to grow significantly as 2030 net-zero targets loom closer.

According to the survey, the following key factors are driving sustainability in the data centre industry: Customer demand, business value and government regulation.

Customer Demand

Nearly all respondents to the survey listed customer demand as driving their commitment and investment in sustainability. This represents an existential threat to data centres choosing not to start the journey towards sustainability.

Many data centre customers now have public sustainability targets for themselves and their entire supply chain.



Apple, for example: *"Our goal is to reach carbon neutrality across our entire footprint by 2030 — including our supply chain and the energy required to use our products. To do this, we're committed to transitioning our entire supply chain to 100 per cent renewable energy, while also ensuring that our suppliers' facilities are as energy-efficient as possible."* - Apple Supplier Responsibility Website²

Since the sustainability of a service provider directly impacts the sustainability credentials of customers, customers demand more transparency on their sustainability goals and performance.

To add to the threat of losing customers, many software savvy customers even require real-time access to asset-level carbon footprint data, through online portals and application programming interfaces (API). Sophisticated technology solutions are thus required to adequately address the sustainability demands of data centre customers.

¹ <https://resources.enterprisetalk.com/ebook/Schneider-486-EN-1.pdf>

² <https://www.apple.com/au/supplier-responsibility/>

Business Value



The drive to net-zero represents a major disruption in the business landscape and can be compared to the rise of the Internet or smartphones. Sustainability will dominate the business agenda for the next few decades and forward thinking businesses will thrive while others get left behind.

Major disruptions like these always present opportunities to businesses willing to take a different approach. The fact that survey respondents list business value as the number two driver for sustainability projects, shows the business value that can be gained from investment in sustainability.

Marketing and Brand Value

Strong customer demand inevitably dictates a company's overall marketing and branding message. Becoming sustainable, and marketing a company as such, will have an overwhelmingly positive impact on the company's reputation and brand value. Sustainable companies are seen as promoting transparency and in doing so, greatly increasing brand trust.

The substantial brand value of marketing a company's sustainability efforts is clear from the many companies that now make this central to their branding message:

<https://group.accor.com/en/commitment>

<https://www.iag.com.au/safer-communities/our-esg-performance>

<https://www.nextdc.com/about-us/environmental-sustainability>

<https://www.apple.com/au/environment/>

Cost Reduction

Maintenance & energy efficiency through intelligent asset monitoring

Intelligent monitoring of energy consuming assets will result in early fault detection, which not only reduces system downtime, but ensures that equipment uses energy optimally. This is especially true for faulty cooling equipment that might still be providing adequate cooling, but at the cost of much higher energy consumption.

Improved energy efficiency resulting from improved maintenance and operating practices could further result in reduced energy requirements. Not only does this reduce direct energy costs, but could result in the delay or avoidance of capacity-expanding capital investment.

Artificial Intelligence (AI) will play a significant role in the intelligent monitoring of asset condition and performance. AI's ability to process vast amounts of data and highlight inefficiencies and equipment most in need of maintenance will allow companies to expand their operations without the need for more staff.

Investment in innovation and new technologies

New technologies that improve energy efficiency are constantly developed and improved. Investment in technology, such as innovative cooling systems and high-efficiency uninterruptible power supply (UPS) technology, can make a substantial difference to the overall efficiency of a data centre.

With rapidly rising energy costs, investment in renewable energy sources such as solar and wind can have very reasonable payback times and result in significant cost savings and carbon footprint reductions.

Continuous equipment monitoring can assist in identifying the most urgent assets to replace, and further set a baseline to verify and validate improvements and return on investment (ROI) once new equipment has been installed.



Employee Satisfaction and Retention

Today's workforce values sustainability and inclusivity highly. Companies that genuinely embrace these values will increase employee satisfaction and reduce the cost related to employee turnover.

Government Regulation and Reporting Requirements



Many governments around the world have well publicised sustainability targets and lawmakers are increasingly acting to reduce the environmental impact of industry through regulation. The fast growing and high consuming data centre industry is directly in their crosshairs.

Data centre operators that don't comply with these regulations will face penalties and even revocation of operating licences. In addition to punitive measures, regulation will introduce significant Environmental, Social and Governance (ESG) reporting requirements.

European Union

In the EU, the [Corporate Sustainability Reporting Directive](#) (CSRD) came into effect in January 2023. This requires a broader set of large and listed companies to provide sustainability reporting, according to the European Sustainability Reporting Standards (ESRS). This forms part of the [European Green Deal](#) which strives for Europe to be the first climate neutral continent.

In response to the goals set out in the European Green Deal, leading data centre operators have formed the [Climate Neutral Data Centre Pact](#). This pact is a self-regulatory initiative committed to achieving the ambitious greenhouse gas reductions of the climate law, and leveraging technology and digitalization to achieve the goal of making Europe climate neutral by 2050.

United Kingdom

ESG reporting requirements have also been strengthened in the UK, with various new and updated laws being phased in from 2023. The Companies Act of 2006 was expanded in 2022

to align with requirements from the [Task Force on Climate-Related Financial Disclosure \(TCFD\)](#). Large companies must also disclose the UK energy use and carbon emissions through the [Streamlined Energy and Carbon Reporting \(SECR\)](#). From 2023, the Sustainability Disclosure Requirements (SDR) will be introduced, becoming mandatory by 2025.

Australia

In Australia, ESG reporting is currently voluntary. Nevertheless, as noted by the [2022 Australian Council of Superannuation Investors \(ACSI\)](#) annual report, many corporations in Australia, including the majority of ASX200 companies, are already doing sustainability and ESG reporting. The Australian government is likely to phase in mandatory reporting from 2024, as indicated by the [government consultation paper](#) released in January 2023. The expectation is that this will include large listed businesses and possibly also large private businesses.

Singapore

Singapore has a strong focus on ESG, as evidenced by their [Singapore Green Plan 2030](#). The Monetary Authority of Singapore (MAS) established the ESG Impact Hub in 2022. Their vision for Singapore to become an international leader in green finance. The Singapore Stock Exchange (SGX) is using a phased approach to mandatory reporting in accordance with [TCFD](#) recommendations. From 2023 financial, agriculture and energy businesses listed on the Singapore Exchange have mandatory reporting requirements, and this will be extended to construction and transportation from 2024.

Singapore is considered one of the world's data centre hubs. Its strategic location, combined with its good connectivity, favourable business and stable government environment have all contributed to this.

Singapore's limited landmass and challenging climate, creates an environment where sustainability will require innovative technological solutions to reach their sustainability targets.

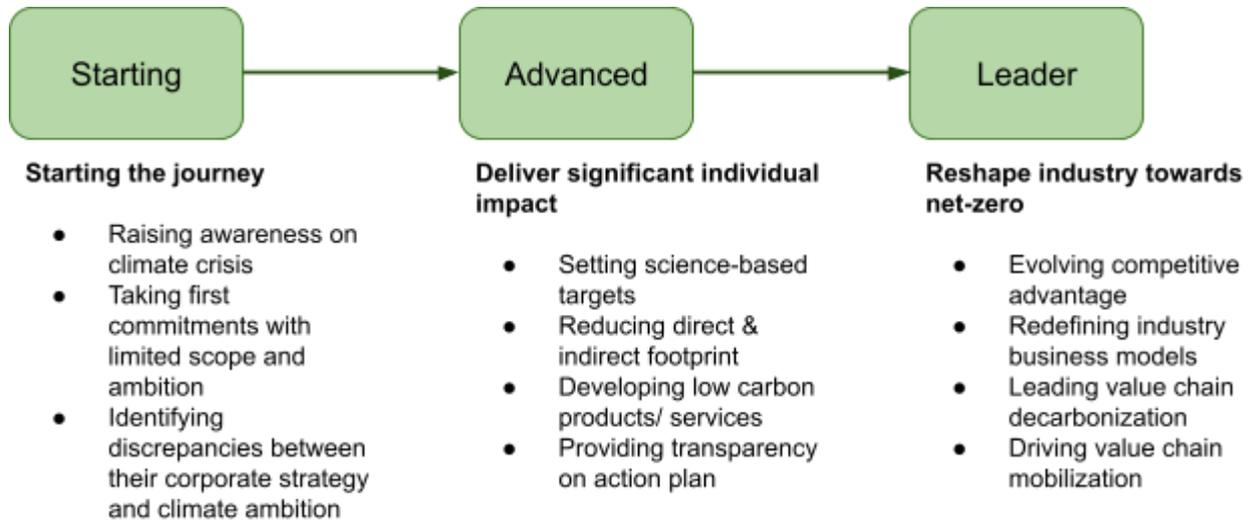
Recognising this, the Singapore government placed a moratorium on the building of new data centres in 2019. This moratorium was lifted in 2022 with the requirement that new data centres must demonstrate their sustainability plan and start with a PUE of less than 1.3.

The Singapore government has released the [Green Data Centre Roadmap](#) with a strong focus on improving the sustainability and efficiency of existing data centres.

Most data centres in Singapore, many in the middle of their lifespan, were designed and constructed without sustainability and energy conservation in mind. Looking ahead, the Singapore data centre industry is expected to experience strong and sustained growth. Consequently, the Roadmap covers the green initiatives that span existing data centres and new data centres.

The road to a net-zero future

In their paper³ [“The road to a resilient, net-zero carbon future”](#), the World Business Council for Sustainable Development has defined three main stages in the journey towards a sustainable future:



As with all journeys, knowing where you are and keeping track of your progress is essential. Irrespective of where a business finds itself along the path to net-zero, data will underpin all sustainability efforts.

Quality data will drive sustainability

The old adage of ‘if you measure it, you can manage it’ is especially true for sustainability. Governments have realised this and are putting the burden of gathering and reporting data on businesses.

It is widely accepted that technology will play a major part in achieving sustainability goals. Big data and AI are expected to deliver most of the solutions needed and this requires data, detailed quality data.

Quality data means that data is accurate and up-to-date. It is further easy to access, search and filter and is available in multiple formats that allows further analysis and integration with other systems. Data stored in different formats, on local devices, and requires manual effort to access is simply no longer good enough.

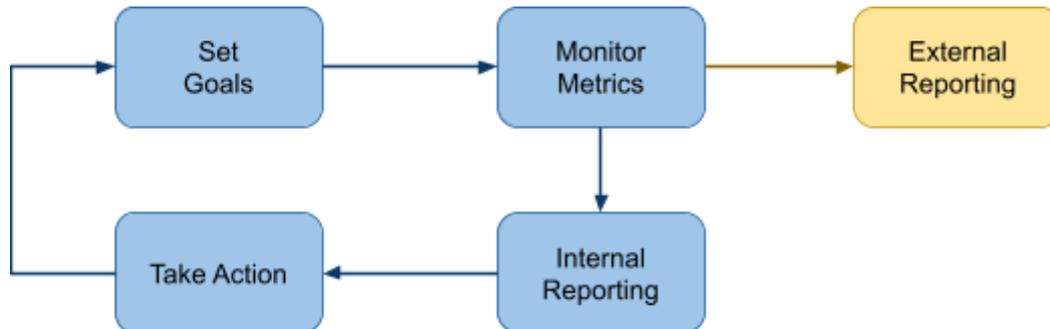


³ [SOS 1.5 The road to a resilient, net-zero carbon future](#)

Since data is such a valuable resource, it also requires the highest levels of security to avoid unauthorised manipulation and theft.

Data Centres embarking on the journey towards sustainability must have the ability to continuously measure and report not only internally for continuous improvement purposes, but also externally for customer engagement and regulatory compliance.

The following diagram shows a typical continuous improvement cycle:



Accurate granular data that tracks individual energy sources and loads is vital to drive this process. Technology that can reliably acquire, securely store and report this data is essential to enable this process. Innovative technology such as Numen makes it simple to install (or retrofit) the hardware that produces the data needed to drive the sustainability journey.

Since energy is just a part of the overall sustainability landscape, any energy data system must be able to be integrated into other systems that can track different aspects of sustainability such as waste management, water usage etc. and produce all the required reports automatically.

How Can Ecocentric Help?

Ecocentric Energy's flagship product, Numen, provides a proprietary hardware and software platform that can support data centre operators in all stages of their sustainability journey.

Numen is ideal to retrofit to existing data centres or designed into new installations.

- Accurate data acquisition system that is easy to install or retrofit to existing data centres
- Real time monitoring and reporting on important metrics such as PUE
- Equipment-level monitoring for fine grained measurement and management
- Enables data driven asset replacement strategies
- AI-based data analysis platform with a growing library of algorithms that produce actionable insights to save costs and energy
- Equipment condition monitoring algorithms for improved energy and maintenance efficiency
- Secure cloud data storage via independent network solution
- Easy integration with other systems via Numen's Application Programming Interface
- Web-based portal providing instant access to all historical and current data and reports
- Automated alerts and scheduled reports

Automated ESG Reporting

The increasing cost and burden of ESG reporting cannot be overstated. This is evidenced by the fact that the large audit and consulting firms⁴ have all geared up to provide this service to industry, in conjunction with their current financial reporting services.

Automating as much of the data acquisition and reporting as possible will not only save money⁵, time and effort, it also allows data centre operators to make timely changes to their operations to rectify any issues, rather than wait for an annual audit to highlight these issues.

To assist with automating ESG reporting, Numen can produce the following key ESG metrics in real-time:

Metric	Unit
Total Energy Consumption	kWh
Power Usage Effectiveness (PUE)	Ratio
Total Renewable Energy Consumption	kWh
Renewable Energy Factor (REF)	Ratio
Real-time Supply & Consumption Matching	-
GreenHouse Gas Emissions (Scope 1 & 2)	kgCO ₂ e
Carbon Usage Effectiveness	kgCO ₂ e/kWh

Energy Visibility

Energy visibility is the ability to access current and historical data easily and quickly provide operators with much desired visibility on their energy consumption, and more generally, the overall performance of the facility.

Numen provides a simple web-based interface that can be accessed from anywhere. The Numen console provides multiple reporting and data visualisations tools that provide a deep understanding of the performance of electrical systems.

The console further provides a way to do root cause analysis of failures in an effort to avoid similar failures in the future. Significant events can be bookmarked in the data and easily referred to for future analysis.

Data driven asset renewal

10 to 15 years ago data centres were not designed with sustainability in mind. These data centres will have to be upgraded to achieve their sustainability goals. Innovations in, for instance cooling technology must be embraced to ensure optimal performance at the lowest

⁴ <https://www.pwc.com/gx/en/services/audit-assurance/corporate-reporting/esg-reporting.html>
https://www.ey.com/en_gl/climate-change-sustainability-services

⁵

<https://www.reuters.com/business/sustainable-business/companies-pay-up-500000-sustainability-ratings-report-2023-03-27/>

possible footprint. The big question that data centres will face will be which assets to replace first.

Numen's asset level performance data is proven to be vital for identifying assets most in need of replacement. By comparing not only overall consumption but also comparing consumption of assets to similar assets in other data centres, Numen is able to identify assets that would generate the quickest and biggest returns.

In addition to driving capital investment decisions, once installed, Numen data can also validate and monitor the new equipment to ensure that the equipment is delivering the expected savings.

Continuous Condition Monitoring

AI-driven condition and performance monitoring systems are far superior to human operators. In all industries, the task of monitoring the operation of equipment is being moved from human operators to AI data analysis systems. This brings significant cost savings in personnel cost as well as improvements in operation and maintenance efficiency.

Numen offers an AI-driven device condition monitoring system that is capable of monitoring individual electrical devices with just a clip-on current sensor installed in the switchboard. The fact that no sensors are installed on plant equipment greatly simplifies installation.

In short, having continuous monitoring reduces the need for on-site staff and provides peace of mind that operations are running smoothly.

Platform-as-a-Service

In this day and age, businesses are no longer looking to make capital purchases of monitoring equipment and having to maintain the equipment themselves. Hardware and software quickly becomes out of date and unreliable over time resulting in loss of data or even worse, inaccurate data.

Smart businesses are looking for managed services that can guarantee the operation of the monitoring system itself and they completely rely on the data output from these systems, rather than worry about hardware and software.

Numen operates on a 'Data acquisition and analysis platform as a service' business model. Under this model, Numen takes care and guarantees the operation of the monitoring hardware, data transmission, storage, backups, analysis and notifications. Systems are continuously monitored and upgraded as part of the ongoing engagement.

Numen removes the headache of wondering if the data is correct and if the sensors are working. Numen provides the peace of mind that accurate data and monitoring is always available.

Start the journey

Ecocentric is ready to start this journey with you. Numen is a modular system that allows you to start as big or as small as you like.

For more information, please visit <https://ecocentric.energy/> or send an email to hello@ecocentric.energy.