



# Data Center energy waste could be costing you the Earth

## How to cut your data center cooling energy use by a third.

At a time when organizations worldwide are committing to ambitious net zero carbon reduction targets, new research from data center performance optimization specialist EkkoSense suggests that many operations are missing out on proven ways to reduce their cooling energy consumption.



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# Missing out on proven ways to cut data center cooling energy use.

EkkoSense's research findings – based on rack-level analysis from a broad range of data center halls – suggests that...

Midsize, enterprise and hyperscale data centers are overlooking a potential worldwide carbon emissions reduction of over 3.3m tonnes CO<sub>2</sub>-eq. per annum – that's equivalent to the energy needed to power around one million UK homes for a year.

Organizations are overspending on data center cooling energy costs – and could make cumulative savings of over \$1.7bn by optimizing their data center performance.

Current average data center cooling utilization levels are just 40% - offering considerable opportunity for optimization.

Organizations in a lot of cases are overspending on new cooling infrastructure, which ultimately contributes very little to the overall cooling performance while still resulting in additional operational and maintenance cost.

Data center cooling energy savings of up to 30% per annum are achievable using the latest software-based optimization approaches.



# The research assessed cooling performance across a sample of some 133 data center halls with granular analysis of over 33,000 IT racks.

The results showed that the current average data center cooling utilization level is only 40%. EkkoSense's research also identified that those organizations that have implemented an effective thermal optimization programme have collectively secured a cumulative 10MW+ cooling power saving - equivalent to a minimum \$10 million cooling energy cost saving since deployment. In carbon terms, this equates to a cumulative saving of around 20,000 tonnes CO<sub>2</sub>-eq emissions reduction<sup>i</sup>.

EkkoSense's latest research follows on from a study conducted by the company four years ago. Comparing the two sets of findings shows that it's hard to identify any underlying improvements in efficiency across the data center sector during this period, with comparative findings showing:

- An increase in potential data center cooling energy savings up from 24% to 30%
- No improvements in data center cooling utilization levels across the industry
- Ongoing levels of significant risk in the whitespace, with a consistent 15% of racks remaining outside ASHRAE compliance

EkkoSense's analysis of the actual cooling performance within live data centers - for many of the world's leading brands - suggests that organizations are currently missing out on proven ways of cutting their data center cooling energy consumption by up to 30%.

When this level of performance optimization is applied to the broader global estate of 22,474 midsize, enterprise and larger hyperscale data centers<sup>ii</sup>, EkkoSense believes that potential worldwide cooling energy savings of over \$1.7 billion per year are fully realizable. Additionally, an overall annual carbon emissions reduction of some 3.3 million tonnes CO<sub>2</sub>-eq worldwide could be quickly secured simply by applying the systematic and synchronized application of data center cooling optimization best practices on a global basis.

The good news is that, with the latest generation of software-driven data center optimization solutions, there's a real opportunity for organizations to achieve significant carbon reductions. From its research into the kind of optimization benefits that are attainable, EkkoSense analysis shows that data center operators can reduce their cooling energy consumption significantly. Indeed, EkkoSense's in-depth analysis of data center thermal performance shows that it's now possible to secure cooling energy consumption reductions of around a third simply by following current thermal optimization best practices.

That's an action that few data center teams can afford to ignore - particularly as the pressure to deliver energy savings and meet carbon reduction targets intensifies.

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<sup>i</sup> Based on UK Government GHG Conversion Factors for company reporting.

<sup>ii</sup> Based on Garter Forecast Analysis: Data Center Sites Worldwide - 11 September 2020 - based on global numbers for midsize, enterprise and hyperscale data centers.



# Need to start delivering on 'net zero' carbon commitments.

**Following the inauguration of Joe Biden as US President and the decision for the USA to rejoin the Paris climate accord, there's a renewed focus on broader initiatives to address the climate crisis.**

According to the United Nations Framework Convention on Climate Change, 2020 saw the number of commitments to reach net zero emissions from local governments and businesses roughly double in less than a year. At the same time, many investors are now asking companies to reveal their exposure to net zero commitments - with the focus not just on risk exposure but also how they are progressing towards achieving their targets.

Given that both the public and private sectors have been making dramatic net zero carbon commitments, there's going to be increased pressure on organisations and the high energy users within them to start making serious carbon reductions. Stripping out significant data center cooling costs can make a huge difference, while at the same time helping organizations address their growing obligation not just to deliver quantifiable carbon reductions but also to be seen to be delivering against this agenda.

The scale of the challenge is huge, but the pace of transition is accelerating, and more and more companies are starting to take it very seriously. In fact, there are signs that many organisations are looking to go much further than initial 'net zero by 2050' targets, with some brands citing 2030 as their ambitious goal.

**With data centers already established as one of the world's highest collective consumers of energy, it's imperative that IT operations teams do everything they can to deliver the quick carbon reduction wins that will help organizations to deliver on their net zero commitments.**

**Data centers have a critical role to play in helping to deliver 'net zero'.**

Data centers have a critical role to play here in meeting these targets. With data centers already established as one of the world's highest collective consumers of energy, it's imperative that IT operations teams do everything they can to deliver the quick carbon reduction wins that will help organizations to deliver on their net zero commitments. And with around 35% of this energy taken up by powering cooling equipment, any initiative that can reduce data center cooling will help to make a significant contribution to carbon reduction.

Recent initiatives such as the Climate Neutral Data Centre Pact - a European self-regulatory initiative to help make data centers in Europe climate neutral by 2030 - demonstrate the strong commitment among cloud infrastructure and data center providers to lead the transition to a climate neutral economy. Similar initiatives include the recent publication of the '2020 Best Practice Guidelines for the EU Code of Conduct on Data Centre Energy Efficiency' (co-authored by an EkkoSense non-executive director) that sets out best practices for data center operators and levels of expected minimum practices.

However, achieving these commitments and maintaining best practice standards could be a considerable challenge for the many data center or facilities teams that don't yet have a clear understanding of how their data center rooms are performing from a thermal, capacity and power perspective. While data center operators can clearly deliver unprecedented efficiency and environmental performance levels at hyperscale, the reality is that many midsize and enterprise data centers still face considerable operational cooling and efficiency challenges.

Given that the typical response of many organizations facing IT cooling challenges is to further invest in more expensive cooling equipment, EkkoSense's findings show that the underlying cause of poor data center thermal compliance is clearly not a lack of cooling capacity. Instead, facility teams and other technical stakeholders need to be focused on optimizing their data centers' thermal performance and using their investment in existing cooling systems more efficiently. This not only results in reduced cooling costs year on year but also eliminates, or defers, the need for expensive cooling capital investment while also freeing up valuable data center capacity.

It's clear that the global data center industry should be grabbing hold of the optimization opportunity with both hands. This is particularly the case given the \$1.7 billion plus potential global data center cooling energy savings that are achievable simply by applying the systematic and synchronized application of data center cooling and optimization best practices. However, before unlocking these potential savings, data center operations need to look beyond their legacy DCIM (Data Center Infrastructure Management) reporting tools to start to uncover the tangible M&E insights that in turn will allow their data center estates to be run much leaner.



# Visualizing data center performance at a more granular level.

**Organizations clearly want to deliver on their carbon obligations, but that can be challenging when data center operators don't always have a clear understanding of how their rooms are performing from a cooling, capacity and power perspective.**

Indeed, when faced with an external issue – such as an increased thermal demand placed on facilities by a surge in hosted services - the default position for many operations teams remains to just keep throwing more cooling at the problem. This simply adds to the data center's overall carbon footprint, and often does little to resolve the original issue.

Data center operators also need to recognise that optimizing thermal performance positively impacts data center risk management – however it's difficult to ask the right questions if you don't actually have any granular visibility into how individual racks and cooling equipment are performing. EkkoSense's research shows that only 5% of data center M&E teams currently monitor and report equipment temperature actively on an individual rack-by-rack basis - and even less collect real time cooling duty information or conduct any formal cooling resilience tests.

So, while operators remain keen to secure carbon reductions, the reality for many is that they don't have access to the tools that can help them to make smart data center performance choices in real-time. While legacy DCIM tools are useful at helping data center operations teams manage their facilities, many find them limited when it comes to the kind of deep data analysis needed to really optimize performance at the mechanical and electrical level.

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## Moving beyond legacy DCIM reporting.

So perhaps it's time to stop treating efficient data center operations as a black art. You don't need over-complex DCIM suites or expensive, non-real-time and often imprecise external CFD consultancy to tell you what's going on in your own data center. It's much more useful to have a real-time dynamic viewpoint of your mission critical estate.

That's why for true data center infrastructure management, M&E reporting tools need to get much more granular – drawing on the latest low-cost data center IoT sensor technologies and intuitive 3D software visualizations to see rooms in a realistic 360° real-time digital-twin view. This makes the immersive real-time optimization of data centers a reality for operations/facility teams. By gathering and visualizing this data at a granular level, they can start to identify how individual racks and cooling equipment are performing. They can then draw on the latest AI and machine learning analytics capabilities to secure actionable improvements as part of their efforts to actively manage and maximize the performance of their critical data center environments.

From a space perspective, data center operations can use the 3D visualization approach and a simple drag and drop interface to support a range of M&E capacity planning activity from basic rack changes through to complete new room layouts. Capabilities such as space planning and reserved space allocation can help organisations to unlock any stranded capacity from their existing data center cooling and power infrastructure – effectively enabling them to do much more with less.

While there's an increasing awareness of what best practice thermal optimization can achieve, it's an approach that still demands much more attention. Data center teams recognize that the benefits software-driven thermal optimization can bring – reduced risk, the ability to unlock increased IT capacity from existing resources and lowering energy costs being some of the most important ones. Key advantages here include:

- Low-risk and light touch deployment
- Benefits available immediately
- Payback in under a year
- Very low total cost of ownership and human resource overhead during operation
- Costs typically financed by cooling energy savings of 30%

In contrast to DCIM solutions that can take years to implement, software-driven thermal optimization gives data center teams much faster access to the insights they need for less cost and less human management overhead. The result is exactly the kind of data-driven decision-making and scenario planning that lets them make the transition from simply monitoring critical facilities to identifying and actioning thermal, power and capacity opportunities to offer demonstrable and rapid ROI.

Based on our analysis of a significant sample of midsize, enterprise and hyperscale data centers, we estimate that an overall annual global carbon emissions of some 3.3 million tonnes CO<sub>2</sub>-equivalent emissions reduction is achievable – simply by applying data center cooling optimization best practices.





# Optimizing data center performance with EkkoSense.

**EkkoSense is a global leader in the provision of software-driven thermal optimization solutions for critical live environments.**

With its powerful EkkoSoft Critical SaaS 3D visualization and analytics solution for data centers, EkkoSense is making it even easier for data center operations teams to collect granular real-time data, visualize airflow management improvements, manage complex capacity decisions, and quickly highlight any worrying trends in cooling performance.

The key difference with the EkkoSense approach is that the solutions not only pick up the problems or underlying negative trends but also suggest best practice solutions based on EkkoSoft Critical's extensive knowledge base and deep analytics capability. This effectively removes data center thermal risks and provides 100% rack-level ASHRAE thermal compliance. All this comes at a fraction of the cost of more expensive and complex legacy data center DCIM or CFD solutions and offers a genuine ROI of less than 12 months in most cases.

EkkoSense has already helped its clients to reduce their cooling power-related carbon emissions by around 4,100 tonnes CO<sub>2</sub>-eq per year – equivalent to a cumulative 10 MW+ cooling power saving and a \$10 million cooling energy cost saving. These totals are being added to on a daily basis.



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# Win/win performance optimization.

## For data center operators this kind of performance optimization is a win/win proposition.

Cooling energy usage reducing by 30%, presents a clear carbon emissions saving that will support their net zero emissions programmes, while also delivering a net cut in their overall data center cooling energy spending as well as potentially eliminating additional capital investment.

EkkoSense's distinctive software optimization approach allows data center operations teams to gather and visualize cooling, power and space data at a granular level. Customers can analyze multiple complex data sets simply and quickly in an easy-to-interpret 3D environment, and then apply AI and machine learning analytics techniques to secure actionable performance improvements. Once actioned, these processes can be repeated and measured for continuous 24x365 optimization.

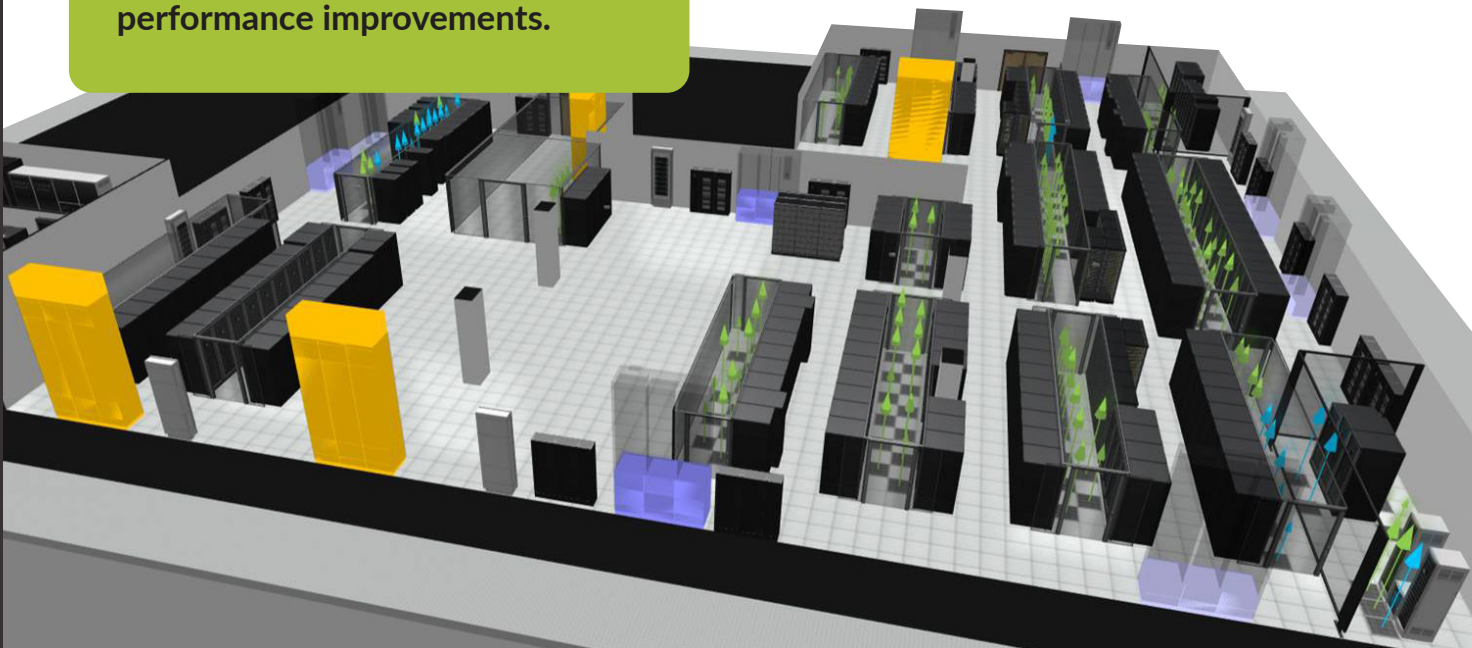
This kind of approach goes beyond legacy DCIM reporting tools to provide tangible M&E insights that in turn allow data center estates to be run much leaner. Decisions can also be made more quickly, thanks to true live capacity planning functionality.

**Customers can analyze multiple complex data sets simply and quickly in an easy-to-interpret 3D environment, and then apply AI and machine learning analytics techniques to secure actionable performance improvements.**

However, it's also important to look for capabilities that make data center capacity planning and management even easier for operations teams to action. Transitioning from more static legacy DCIM approaches to true live capacity planning presents a great opportunity to take more control of data center estates – making the real-time operation and management of power, cooling and space a reality and helping data centers to run more efficiently.

Functionality here that can deliver real value includes the ability to reserve data center space, power and cooling for future projects, as well as introducing intuitive ticketing and change workflows to simplify activities for operations teams. Examples include making it much easier to add new racks, enable further capacity or reduce space from racks, and also remove existing racks entirely. These features make a huge difference for data center teams that are currently limited by complex DCIM systems that they find difficult to manage, or who are still relying on unwieldy spreadsheets to manage capacity changes to their estate.

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# The EkkoSense® Effect...

Optimize your cooling  
with energy savings of

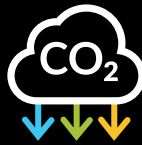
**up to 30%**



EkkoSense provides proven 30%  
reduction in energy consumption  
with a typical ROI <12 months

Reduce your Carbon  
footprint in your quest for

**net zero**



EkkoSense delivers clear Carbon  
emissions savings to support your  
net zero emissions programmes

Unlock your unused  
cooling capacity by

**up to 60%**



EkkoSense works with your  
existing cooling infrastructure avoiding  
need for costly capex spending

**Monitor Manage Maximize**  
your data center performance  
Contact EkkoSense: +44 (0)115 678 1234



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