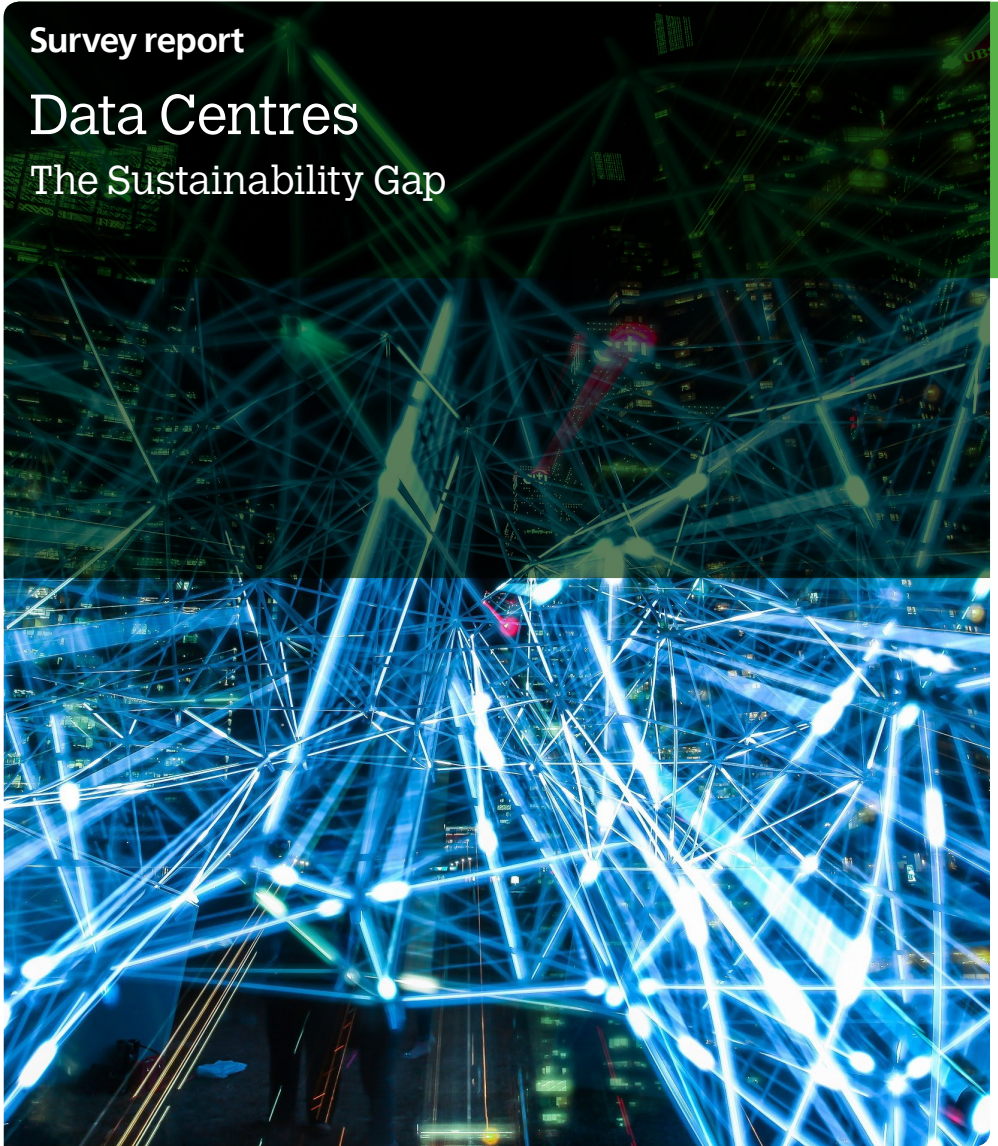


Survey report

Data Centres The Sustainability Gap



BREEAM is a holistic sustainability assessment method designed to capture a wide range of impacts relating to the procurement, design and construction of buildings. It recognises and reflects the value in higher performing assets across the built environment lifecycle, from new construction to in-use and refurbishment. Since its inception in 1990, it has been used in 83 countries worldwide, and been used to certify over half a million buildings.

In 2010 the BREEAM UK Data Centres scheme was launched, assessing the design and construction of new-build data centre facilities in the UK. The scheme was launched in response to a growing need to assess the sustainability of data centres due to concerns around rising energy consumption. The scheme also took a holistic approach to addressing wider sustainability impacts such as management, water consumption and transport.

In the years since the launch of the BREEAM UK Data Centres scheme the industry has changed dramatically with new metrics, standards, and best practices. As a result, BREEAM set out to determine how the scheme could evolve to address these new sustainability challenges faced by data centres all over the world.

Early in 2019 BREEAM released a survey, supported by Keysource, to answer some of the following key Data Centre industry questions. The aim of the survey was to improve understanding of how the next iteration of BREEAM for data centres could bring value to the industry:

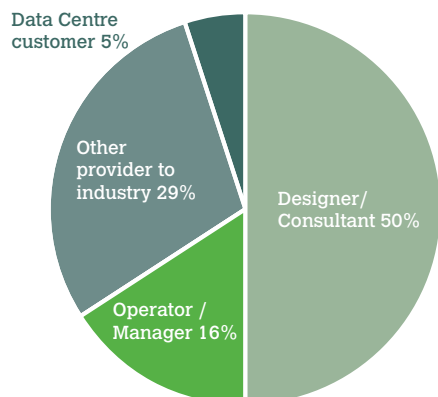
- Are wider sustainability impacts of data centres currently being addressed?
- Which sustainability impacts are considered to be the most important to the industry?
- Do current industry standards address these sustainability impacts?
- What are the benefits to industry of addressing these sustainability impacts?

What is your role in the Data Centre Industry?

58 responses were received for the survey.

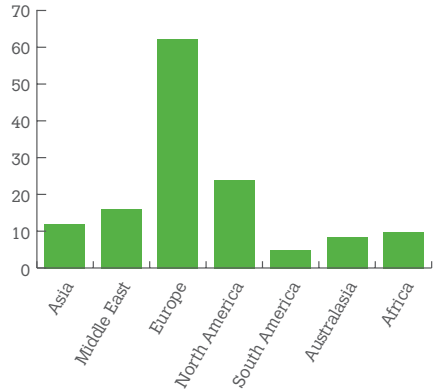
Half of the respondents were industry consultants or designers, and their views form a significant proportion of these survey results.

Other providers to industry included data centre infrastructure providers, sales representatives, analysts, communications officers and content writers.



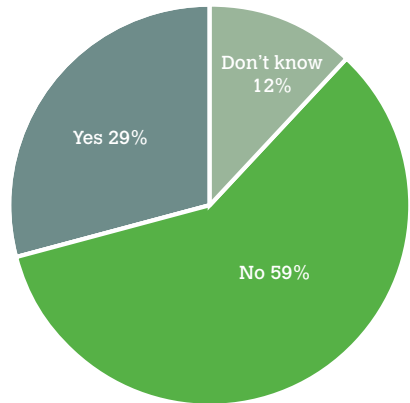
In which geographical areas does your organisation primarily operate?

Over 60% of respondents listed their primary geographical operational area as Europe, with all other areas comprising less than 25% of responses. The survey results may therefore reflect views most relevant to the European industry.

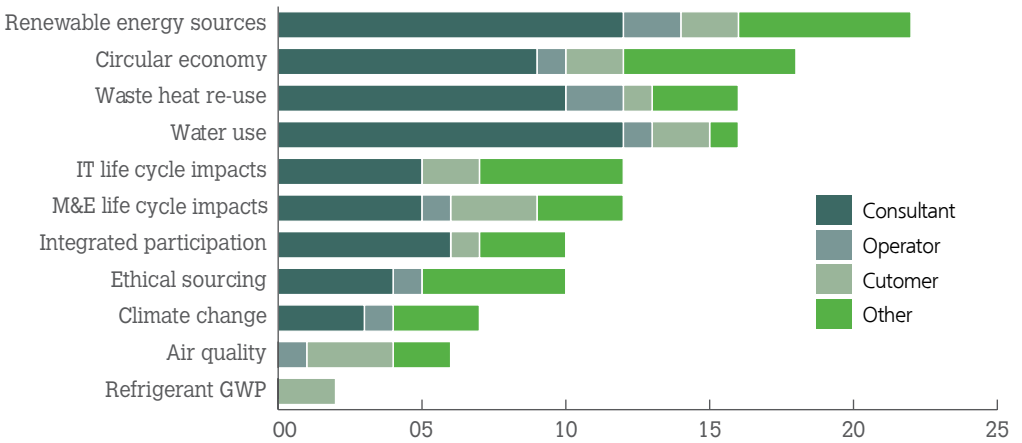


Do you believe current industry standards adequately address wider sustainability impacts?

The majority of the survey respondents do not believe that wider sustainability impacts of data centres (i.e. impacts unrelated to energy efficiency) are adequately addressed in current industry standards.



Besides operational energy management and efficiency, what other sustainability impacts do you consider most important for data centres?



38% cited renewable energy sources
 31% circular economy (IT re-use and disposal)
 28% Waste heat reuse
 28% Water use



This question intended to define the sustainability impacts that respondents believe to be the most important to the industry. The results found that of these impacts considered most important, most are outside of the direct control of the operator and may require wider collaboration across different industries:

- With energy being the most significant operational consideration, it is unsurprising that ‘renewable energy source’ is a sustainability consideration high on the agenda. This is particularly important given the scale of energy generation involved in operating data centres, making it difficult to produce any meaningful renewable contribution on-site. A variety of mechanisms exist to audit the transfer of renewable energy across the grid, though in reality this benefits the grid as a whole. Nonetheless the industry continues drive demand for renewables, potentially effecting wider change in the energy market.
- With global e-waste generation at 44.7 Mt in 2016 and likely to exceed 50 Mt in 2020¹ the need for a circular economy is increasingly apparent. With a complex global supply chain on both the manufacturing and disposal side, ultimately operators may have little control over the cradle and grave of their IT equipment without clearly mapping out their entire supply chain and having the legal and practical means to enforce responsible practice at every stage.

- Due to the usual site locations for data centres, the opportunities for waste heat re-use are rare, limited by the availability of a suitable recipient of the heat nearby, and a suitable infrastructure through which to provide it.

Only water consumption from cooling may be directly influenced by the operator in the specification and operation of cooling systems. As global water shortages increase (by 2025 two-thirds of the world’s population may face water shortages²) does the data centre industry have a role to play in balancing energy and water efficiency?

Keysource:

The focus of the group on the importance of renewable power is not only interesting from a sustainability point of view, but with respect to wider opportunities as well. We have seen increased potential and uptake for the development of datacentre facilities alongside renewable energy facilities, which provides low cost and local renewable energy benefitting both the data centre operator and generator.

Considerations around waste heat re-use continue to be a challenge for operators with conventional IT infrastructure which produces low-grade waste heat. Smaller scale specialist high density and liquid cooled applications may assist with the usability of this heat but considering the scale and use of air-cooled commodity servers, it will be a long time and require wholesale shifts across the industry before it becomes viable. The increase in thermal storage technologies may help but unless there is a compelling reason for the wider industry to turn to direct liquid cooling or other similar technologies this will not happen soon.

Source:

¹ <https://globalewaste.org/wp-content/uploads/2018/10/Global-E-waste-Monitor-2017.pdf>

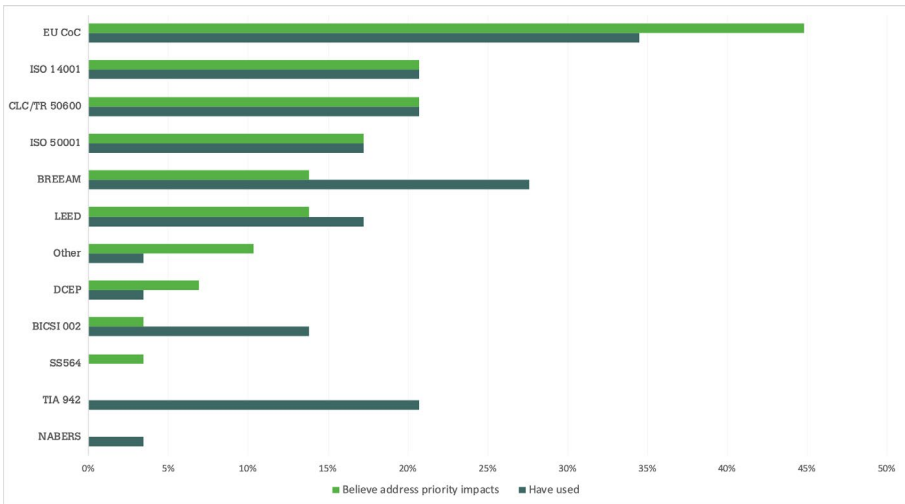
² <https://www.worldwildlife.org/threats/water-scarcity>

Which industry standards do you use? Which do you believe address wider sustainability impacts?

BREEAM and LEED, both holistic sustainability assessment schemes with data centre criteria, scored low (28% and 17% respectively) against other specialised industry standards. The high awareness and use for the EU Code of Conduct for Data Centre Energy Efficiency may imply the influence of geography (most respondents primarily worked on projects in Europe) and / or specialisation – preference for standards specifically addressing data centre requirements.

Keysource:

A lot of the standards and practices within our industry are currently targeted principally at addressing the availability of services and the design implications thereof; and are currently not inherently intertwined with more sustainability focused practices such as the EU Code of Conduct for Data Centre Energy Efficiency, something which will change with CLC/TR 50600 99-2 / ISO 30133



34% of consultants had used the EU Code of Conduct, and 45% believed these addressed their selected priority impacts.

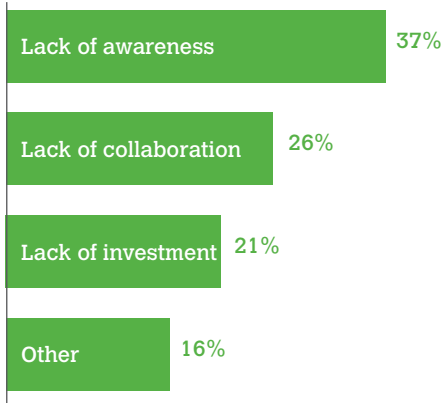
Only 14% of consultants had used either BREEAM and LEED.

28% of respondents believed that BREEAM addressed wider sustainability impacts of data centres

17% of respondents believed that LEED addressed wider sustainability impacts of data centres

Note: only consultants were asked this question.

What are the challenges to addressing these sustainability impacts?



37% cited a lack of sustainability knowledge sharing, awareness and education within the industry

“Wider sharing of knowledge between corporations ... share real world data and stricter governance on claims of efficiency”

26% cited a lack of collaboration

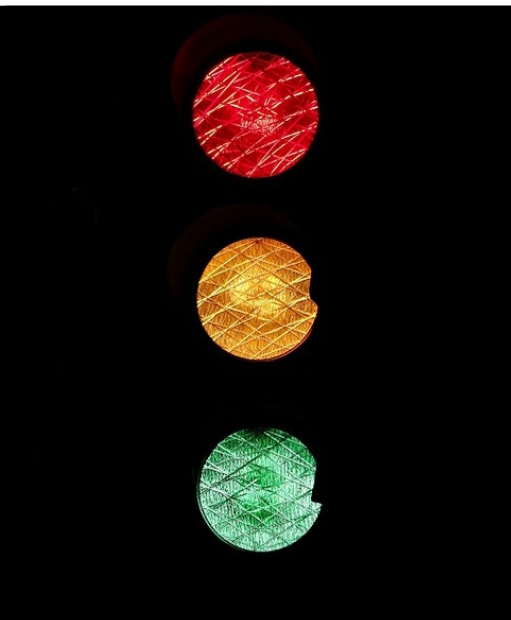
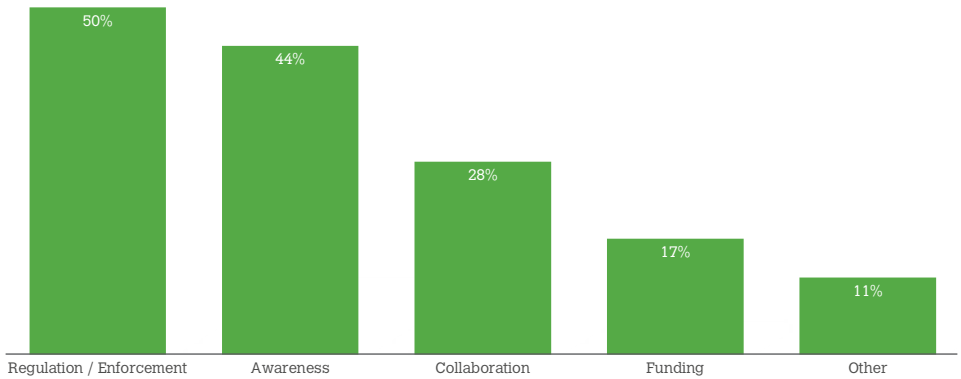
“Stop passing the buck when it comes to sustainability as a whole”

21% cited a lack of investment in wider sustainability

“Not enough money invested in sustainability roles / practices”



What are the solutions?



50% believe the industry needs to be more regulated

“With government support or by an existing agency.”

“Time for regulation - before non-sector legislators impose something unsuitable.”

“An industry body that is vendor agnostic that can help drive best practises and legislation in this space.”

44% believe in better awareness and education of all parties, including end users

“Better education. Involvement of advisors and consultants who... understand the data centre industry”

28% believe in better collaboration

“By educating [data centre users] on how to use resources more effectively and collaborating and working more closely together with server and software developers...”



The most prominent theme from the comments was collaboration, knowledge sharing and awareness. The results indicate a desire from the industry for more openness and transparency not only amongst operators, but also for customer and end users as well. There is an understanding that to effect real change, all parties need to work together to make progress towards achieving better sustainability.

A large proportion of respondents wanted to see more regulation, though they don't always agree where this comes from. Some responses included calls for government involvement, industry self-regulation, or a neutral organisation with no vested interest to take the lead.

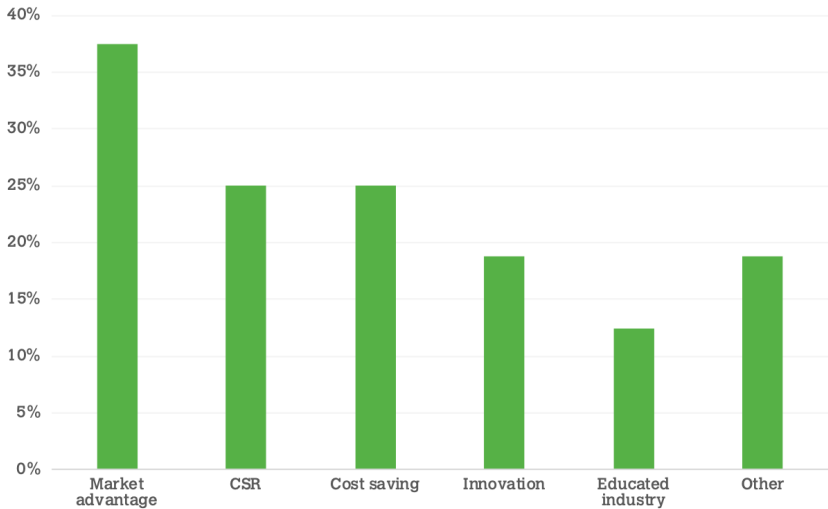
The third theme indicated a lack of investment in achieving wider sustainability. This may arise from the fact that addressing wider impacts may not necessarily improve the business bottom line and so without a clear quantifiable payback, organisations may be less willing to invest.

Keysource:

When the industry talks about the call for greater regulation and standardisation we need to consider the impact that this will have on the operation and deliverables of any given data centre. We must also consider that whilst a proportion of data centres (professional colocation for example) have similar services they deliver, most facilities serve different needs and achieve this in different ways to meet their business requirements.

Regulation and over-standardisation has the potential to negatively impact the innovation and development of our industry which has been so critical to growth of both our sector and many other industries.

What would be the benefit from addressing these sustainability impacts?



Although practicing sustainability can often lead to cost-savings, this wasn't the primary driver for respondents, which instead leaned towards reputation – helping companies stand out from the rest of the market through their CSR practices, driving innovation and awareness.

Whether the reputational gain would lead to more business, or whether the cost saving benefit would accumulate over years of operation, a significant proportion of respondents found benefit in seeing the 'sustainability gap' being filled.

Keysource:

The call for greater regulation and implementation of sustainable practices will inevitably only be embraced wholesale by the industry when this is either mandated or accepted to provide tangible benefits against the facility deliverables and the industry as a whole, without negatively impacting other important considerations such as cost and availability.

38% of responses cited market advantage

"Potential to set the standard in the industry."
"Future proofing and long term, efficient design."

25% cited CSR (Corporate Social Responsibility)

"Intrinsic to operation, energy saving and societal responsibility and accountability"

25% cited cost savings

"Cost reduction and reduction in environmental footprint."

Summary of key findings:

The majority of respondents believed that existing standards, including holistic sustainability assessments such as BREEAM and LEED, do not currently adequately address wider sustainability impacts of data centres. This presents an opportunity for built environment sustainability assessment methodologies to engage with the data centre industry to better respond to their sustainability needs.

Beyond energy efficiency the top impacts considered most important were renewable energy, circular economy, waste heat re-use and water use. With the exception of water use, fully

addressing factors outside of the direct control of facility operators may require a more holistic collaboration across different industries.

Better awareness and collaboration within the industry are considered the main drivers to addressing these wider sustainability impacts. Better education and regulation (from government, industry or neutral party) are viewed as the ways to facilitate this change. Respondents agree that the benefits would create greater market advantage, CSR, and cost-savings for those who adopt these practices.

What next?

The responses of the survey show that the industry remains focused on achieving standards for energy efficiency and availability, presenting an opportunity to increase industry engagement with wider sustainability and for a revised offering which addresses this sustainability gap.

In response to this BREEAM, along with associates Keysource, Carbon3IT, Future-Tech, Operational Intelligence, PTS Consulting and Water 2050 have developed new modifications to the BREEAM International New Construction manual that focuses on wider sustainability performance of new build data centres.

This 'Criteria Appendix' to the base manual is aligned with the CLC/TR 50600 series of standards, and as a building assessment scheme it focuses on measures taken in the location, design, specification, construction and commissioning of the building which play a significant factor in affecting facility energy efficiency.

Beyond this, it integrates wider sustainability factors beyond CLC/TR 50600 and within direct operator control such as water stewardship, building and M&E life cycle analysis and climate change resilience.

The pilot of the Data Centre Criteria Appendix (DCCA) will launch on the 16th October 2019, and assess the construction of new-build data centres anywhere in the world. It is hoped that this pilot programme will stimulate debate, collaboration and increased engagement within the data centre industry and, alongside other sustainability schemes, help to address the sustainability gap.

The DCCA pilot document will be made available on the BREEAM website for review. To find out more, and to register your interest in participating in the pilot programme, please get in touch at bream@bregroup.com.

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