

techUK CCA Target Period 5 counter-proposal

*Version 2 - final
20th October 2020*

global **environmental** and **advisory** solutions

Purpose of this document

- techUK wish to challenge the 6.67% proposed to all CCA sectors for Target Period 5.
- This document provides further information about the sector to compliment the counter-proposal evidence spreadsheet template.
- The structure of this document is as follows:
 - Overview of the sector; processes, energy intensity, market/customers, external factors influencing investment.
 - Outlook for 2021-2022 versus 2018.
 - Comments on the evidence template.

Overview of the sector

What is a data centre?

- A data centre is a building (or self contained unit within a building) used to house computing equipment such as servers along with associated components such as telecommunications, network and storage systems.
- A data centre is equipped with a guaranteed power supply and high bandwidth connectivity. Resilience is critical so redundancy (duplication) of networks, power and other infrastructure is common to ensure continuity.



In plain English:

- Data centres house computers so that they can do stuff like process, manage, store and transmit data, and talk to each other or to digital equipment in other data centres or in offices, homes, vehicles, in satellites orbiting the Earth, on the moon or in fact anywhere you can think of.
- Business processes, government services, telecommunications, transport infrastructures all depend on computers interacting in this way, exchanging digital information. Many of your everyday activities also rely on data centre processes, including obvious things like using your smartphone or the internet or sending email, and less obvious things like doing your shopping or catching a train.
- The kind of computers you find in data centres are known as servers. Servers perform computing functions remotely from their operators and therefore don't have keyboards or screens or people hunched over them in the way that desktops would.

Overview of the sector (2)



Energy users

- Servers themselves use lots of energy and this is known as the 'IT load'. In CCAs, this is the sector's 'output'.
- Servers need to be kept cool hence the next largest users of energy are the ventilation and cooling systems.
- Lighting is needed in the 'white space' (server rooms like the photo above).
- If the electricity supply is interrupted, the servers cannot 'go down' hence there are two types of back up:
 - UPS (uninterrupted power supply) is a bank of batteries that are charged and can instantaneously provide power to the servers (and support systems).
 - Back up generators that run on gas oil and within minutes can provide power to the servers (and support systems).

Energy intensity

- Electricity to power the servers and run the support systems is the main operating cost, hence the sector is very electricity intensive. As a 'new' sector without no tangible outputs, government has struggled to recognise the sector as electricity intensive under its various schemes.
- Data is easily transported so there is strong competition with non UK sites.
- In the CCA, the sector describes its energy intensity through PUE (Power Usage Effectiveness) and defined as: $\text{total site energy use} / \text{IT power use}$. As the total site energy use includes the IT energy, the PUE can never go below 1. A good PUE is around 2.



Outlook for 2021-2022

We are very surprised that the Department responsible for fostering and protecting business growth and commercial operations in the UK should propose, without any supporting evidence, an exceptionally challenging target during a period of major disruption and uncertainty. This is a target that many data centre operators cannot meet, and which will inflict very heavy penalties on the parts of the sector least able to afford them.

Moreover, we had anticipated that, in view of the exceptional pressures on UK businesses at present, dialogue would already be well advanced on accommodating the challenges imposed by COVID-19 and Brexit in TP4 targets, leading to a review and revision where necessary. The primary policy objective of the CCA scheme is, after all, to protect energy intensive businesses from overseas competition and minimise carbon leakage.

It appears that neither dialogue nor review have been initiated. Instead, a one-size-fits-all target of 6.67% improvement, with no supporting evidence, set against a new baseline, has been proposed for TP5. This is very disappointing and suggests a fundamental lack of awareness of the commercial realities that businesses are facing. The following notes explain why performance against CCA targets is currently subject to a number of serious challenges within the data centre sector. We anticipate that these will be common to many business sectors.

Outlook for 2021-2022 (2)

CV-19 Impacts:

The data centre sector has proved remarkably resilience during CV-19 and has provided the core data infrastructure on which business activity depended during lockdown. Remote working, teleconferencing, online deliveries, supermarket supply logistics, government communications and education provision all rely on data centres, and as a result, some operators have been under exceptional pressure while operating under severe restrictions. Others have had to retrench. Until a vaccine is in widespread use, CV-19 will continue to have, a serious impact on the ability of operators to meet targets. Reasons include:

- **Projects:** Multiple project cancellations due to lockdown, supply issues or COVID-19 precautions. In some cases contractors were unable to fulfil projects due to staff shortages or supply chain problems (for instance new cooling equipment where the main manufacturing base is Northern Italy). Many projects were cancelled or postponed as part of CV-19 precautions or changes in operational priorities. Many operators were forced to impose “zero change” notices and limit activities within the data centre to “essential only” and must prioritise activities to maintain service. Most data centres have restricted visitors and contractor access to site to reduce routes for infection and many of these precautions are still in place and will continue as such into the medium term. Even when conditions permit increased number on site, many are still working through a backlog of non-critical maintenance which will take precedence.
- **Diverted staff resource:** internal staff resource has been reallocated to critical functions and supporting customer IT in order to limit footfall to site (all operators reported an uplift in services like smart hands, where the operator provides on-site functions that customer staff would usually do). This means those individuals redeployed to provide remote services for customers are not available to implement energy efficiency projects. This situation looks set to continue at least into the medium term.
- **Throughput:** Economic impacts of CV-19 in the sector have been varied. Some operators, especially those supporting cloud applications and platforms are busier than normal with increased workloads. However, more commonly, colocation operators support traditional enterprise clients (businesses from high street retailers like M&S to advanced manufacturers like BAESystems). As a result customer demand has fallen as businesses contract and retrench. In some cases this is leading to increased vacancy levels with no certainty about when the space will be reoccupied or re-leased. The result is that the IT load diminishes but baseline energy load remains broadly the same and, irrespective of the efficiency of the data centre infrastructure, there is little that operators can do to reduce this fixed baseload. Customer uptake and occupancy (the equivalent of throughput in a manufacturing environment) therefore have a significant effect on participants’ ability to meet their targets, whilst being largely outside their control during recession.

Outlook for 2021-2022 (3)

- **Changing customer SLAs:** Customer Service Level Agreements – essentially what customers demand from operators contractually – are changing (see also below). As a result of COVID-19 we have seen an increased focus on individual site resilience and this is being reflected in customer and operator priorities; there is usually a trade-off between resilience and efficiency: improving site resilience usually relies on greater redundancy of equipment and lower levels of occupancy, both of which impact operational efficiency.
- **Diverted financial resource:** Operators are reporting high levels of financial distress among their traditional customer base and within a broader cross section of SMEs. This means that in some cases contract terms are being renegotiated and payment windows extended, and there are cases where customers may not be in a position to pay. All this is eating away at resource to invest in projects. This issue looks set to extend into the medium term at least.

Operators have also had to divert significant financial resource to tackling COVID-19 at operational level. For instance shift segregation, which usually means deploying staff in much less efficient ways in order to limit routes for infection, moving to 24hour shifts, paying for private transport to avoid public services, installing WFH technology and duplicating work environments. These are impacts that will have been felt across the economy.

For further information on the mobilisation of the sector in response to the pandemic. https://www.techuk.org/covid-19-information-hub/data_centres

This includes insights on operator precautions: <https://www.techuk.org/insights/news/item/17405-data-centres-and-covid-19-precautions>

And recovery actions: <https://www.techuk.org/insights/news/item/17567-data-centres-and-covid-19-recovery-planning>

And access to our COVID-19 dossier: <https://www.techuk.org/insights/news/item/17703-data-centres-and-covid-19-our-dossier%C2%A0>

Outlook for 2021-2022 (4)

Brexit

- Uncertainty over data flows is the most critical problem for operators and significant resource is being allocated to alternative, but more cumbersome, guarantees, such as standard contractual clauses in the event that the UK's adequacy status is challenged. This worry is compounded by a longer term concern that the UK's pre-eminence as the largest data centre market in Europe will suffer attrition as attention turns to other markets like Germany, the Netherlands and Ireland for data hosting and associated services that are within the EU. The UK is a huge exporter of digital services to the rest of Europe and a global financial centre so this is a threat of seismic proportions. We have already seen competing data centre markets outstripping the UK in terms of growth, both new developments and uptake of space (occupancy).

For an assessment of risks and opportunities associated with Brexit see our two reports:

<https://www.techuk.org/insights/reports/item/9554-silver-linings-the-implications-of-brexit-for-the-uk-data-centre-sector>

https://www.techuk.org/images/silver_linings_update_v3.pdf

Diverted Investment

- **Energy cost escalation:** Climate change agreements were intended to mitigate the impact of disproportionately high energy costs on energy intensive UK businesses, especially those subject to carbon leakage. The data centre sector meets both these criteria: the sector has demonstrated its electro intensity recently and data is the most mobile commodity on earth. However, as non commodity costs continue to escalate, the CCA's ability to improve the viability of investment projects becomes more limited, and it has never been a strong enough incentive to drive high capex, long payback projects. If resource is taken up in charges, taxes, levies and inflated compliance costs (see below), it cannot then be used for other investments; this is simply a commercial fact of life.
- **Investment diverted unproductively:** Investment funding for sustainability and efficiency projects is being diverted to enable operators to comply with disproportionately costly regulatory requirements such as IED (Industrial Emissions Directive, which relates to diesel generators and air quality. While data centre impacts, and therefore policy outcomes, are negligible, these obligations must be met in full. Costs for a single permit at a single site always exceed £100K, often be significantly more). The result is to render this investment unavailable for other projects, despite the fact that they might deliver more tangible outcomes. This is not related to CV-19 but will continue to impact larger sites.
- See Emergency Generation in Data Centres:
https://www.techuk.org/images/techUK_TechCttee_Briefing_Emergency_Generation_1701.pdf

Outlook for 2021-2022 (5)

Customer constraints

- **SLAs:** Operators are still constrained by customer service level agreements (SLAs). In many data centre environment, the biggest single energy saving action is to move from an ASHRAE recommended temperature and humidity envelope to an ASHRAE allowable range. This significantly reduces cooling energy requirements. Customers, however, are reluctant to allow the changes in their contractual terms that would allow this wider operational window. Even when leasing contracts are renewed, many customers are very unwilling to agree to the more up to date ASHRAE standards.
- **Operational constraints:** A data centre is not like physical infrastructure – sections cannot be “coned off” for upgrades and replacements: a major refit is like changing the engine of an aeroplane in flight. So retrofitting an existing multi-tenant data centre can only be achieved incrementally, relies on redundancy of infrastructure that in itself compromises efficiency, and is exceptionally costly.
- **Customers’ customers:** data centre business models are complex and the end user of the service is not necessarily (rarely in fact) the customer. So a cloud provider may lease space from a wholesale operator and then provide a range of services to customers who in turn have their own customers, each with their own set of contractual requirements. Implementing change is therefore not straightforward.

Other considerations

- **Diminishing returns:** Data centres have been in the CCA since 2014 and much of the low hanging fruit, in terms of energy efficiency, has been done, leaving operators with diminishing returns. It seems counter-intuitive to increase the target at this point.
- **Disproportionate penalties:** a demanding target imposed on a sector that is relatively advanced in terms of implementing energy efficiency measures will disproportionately punish early adopters and mature sites where retrofitting options are likely to be much more limited.

Comments on the evidence template

- CV-19 has meant that staff at many sites have taken on responsibility for running customer IT equipment whilst they have been unable to visit sites for themselves due to the restrictions. Therefore, we have been unable to gather data from individual sites because of staff availability.
- We have collated information from the companies on our Data Centre working group. Together they represent 30-40% of the sector.
- The majority of data centres are owned by companies that are large enough to be captured by the ESOS regime. Based on the latest ESOS reports generated during 2019, we have used the findings to identify progress of sites by 2018, and then the potential further savings possible by 2020 and 2022.
- In the template provided by BEIS, we found a lot of measures were duplicated and hence have only completed one row per unique energy saving measure.