

Review of the Energy Taxation Directive Submission from the UK data centre sector



4 June 2018

Introduction

techUK is pleased to provide supplementary input to our responses to the Energy Taxation Directive Survey, which we have completed on behalf of UK data centre operators. techUK is the trade body for the digital technology sector in the UK.

In summary

- Data centres are energy intensive because they consolidate IT functions, but far more efficient than the distributed IT they replace.
- Data is highly mobile so carbon leakage can result from poorly directed taxation.
- Energy costs vary markedly across Europe: harmonised taxation cannot level a playing field that is not level to start with.
- Energy taxes are particularly problematic for businesses in countries with high energy costs.
- Other regions are aggressively marketing their credentials as locations of choice for data centre operators. Energy cost is a primary bargaining chip.
- High energy costs in the UK are the result of policy failure and the price for this failure should not be paid by those businesses least able to bear the cost.
- Energy efficiency measures are more costly to implement with longer payback periods in highly resilient digital infrastructure compared to other industries.
- Whilst the sector gets some relief through a Climate Change Agreement, this only addresses a fraction of the burden. The UK's CCA scheme has been very effective and should be expanded in scope.
- Data centres should be included among electro-intensive industries.
- Current compensation measures are limited to certain manufacturing industries and the focus seems to be on preventing decline rather than protecting growth. This needs review.
- To genuinely level the playing field a maximum non commodity charge on energy should be considered.

What Are Data Centres?

Data centres process, store, transmit and receive data. Data centres consolidate corporate and government IT functions into specialised, purpose built facilitiesⁱ where they are performed more efficiently and securely than in a distributed computing environment. Data centres underpin an internet economy that contributes 10% of UK's GDP, is estimated to contribute £225 billion to our economy and is growing at 10%, faster than any other country in the G-20. Data centres are a fundamental – but often unrecognised – part of our critical national infrastructure and enable an incredible range of activities across government, business and communities. Our digital economy and our highly networked society rely on data and connectivity being managed securely and efficiently. Data centres improve competitiveness and drive growth in all sectors. Delivering our Digital Agenda commitments depends on state of the art technical infrastructure which in turn relies on a thriving and competitive data centre sector.

Data Centres and Energy

The UK's 150 or so commercial data centres (providing "colocation" or third party services) collectively consume 2.57TWh of power a year and we estimate that in-house facilities (known as "enterprise" and run by banks, government, retailers, etc.) consume at least the same again, putting electricity consumption somewhere between 6TWh and 7TWh a year (more if we included distributed IT in our calculation). The UK sector is globally important: London is the second largest commercial marketplace in the world and the largest in Europe.

So data centres are energy intensive, and data is the most mobile commodity on Earth. As a result the UK commercial data centre sector is vulnerable to offshoring and carbon leakage. UK operators already struggle to compete with overseas counterparts who are not burdened with high energy costs. The gravest threat to competitiveness is from additional burdens added to the basic commodity costs. These non commodity costs, or third party charges, include network charges and a variety of taxes and levies: Network charges cover transmission system costs, distribution network costs, balancing services and assistance for areas with high distribution costs¹. Taxes and levies on electricity (with the exception of the CRC² which contributes to general tax revenues) are paid by consumers to fund our renewables programme³ and include the Renewables Obligation (RO), Feed in Tariffs (FiT), the Capacity Market (CM), Contracts for Difference (CFD) and the Climate Change Levy (CCL). These are collected in six different ways, by five different authorities⁴ and are billed inconsistently - depending on supplier and contractual arrangements.

Non commodity charges currently account for around 50% of the price of electricity and the proportion of these charges is set to rise by around 30% between now and 2019 as the impacts of the CfD and CM start to be felt. There is a growing electricity price gap between the UK and competing markets. High energy costs are severely challenging the competitiveness of commercial data centre operators in the UK and are presenting obstacles to inward investment and sector expansion.

Level Playing Field

Energy costs in Europe vary markedly. Applying a minimum taxation regime simply adds an additional layer of cost to an uneven playing field. It does not do anything to level that playing field. Industries in countries with high domestic energy costs are still at a disadvantage within Europe and at an even more striking disadvantage compared to countries outside the EU. Other regions outside the EU are aggressively marketing their cost advantages to win business away from European operators: many have the double advantage of low commodity costs and no additional energy tax burdens. Since energy is the largest operating cost for data centre operators, this is an important factor in decision making for inward investors and existing operators when they choose a location to establish or expand their data centre businesses. Unfortunately, cheaper energy does not always mean lower carbon energy and there is therefore the risk of carbon leakage if EU taxation regimes are too inflexible.

¹ TNUoS: Transmission Network Use of System; DNUoS- Distribution Network Use of System, BSUoS – Balancing Service Use of System; AHHEDC – Assistance for Areas with High Electricity Distribution Costs.

² Carbon Reduction Commitment Energy Efficiency Scheme, due to end in April 2019

³ , which has already delivered a substantial improvement on the carbon intensity of grid power on which we are making good progress: the carbon intensity of a kWh has dropped from over 700g to 420 g over the last ten years

⁴ CRC is BEIS / Environment Agency, RO is via the market or Ofgem, FiTs is Ofgem, CFDs are Low Carbon Contracts Company, CM is Electricity Settlements Company and CCL is HMRC

Electro Intensive Status

The data centre sector is not officially classified as electro intensive or listed in Annexe II to EU ETS, despite being more energy intensive than some qualifying industries. As a result the sector does not receive compensation for the cost of renewables and moreover, has to share the additional costs imposed on other industrial energy users who shoulder the burden of those compensation measures. This should be reviewed.

Maximum as Well as Minimum Threshold

In the UK our energy market is dysfunctional and over-complicated. Data centre operators and other energy intensive businesses pay unnecessarily high energy costs due to policy failure and multiple ill-conceived government interventions at a time when costs should be falling, not rising. While we understand the reasoning behind a minimum energy tax, we believe that this only works if energy costs are also level. So if the Commission's intention is to level the playing field and ensure that the EU is competitive and energy efficient then a maximum threshold for non commodity charges placed on energy should also be considered. This would improve competitiveness and prevent nation states from offloading the cost of their policy failures on to those industries least able to bear this burden. It would also send an important message to policy makers that those responsible for expensive market failures should take responsibility for correcting them.

Cost of Implementing Improvements

Digital infrastructure that supports mission critical activity tends to be exceptionally expensive to upgrade, so implementing efficiency measures can be far more problematic than in traditional industries or in offices and homes. This means that strong incentives are needed to encourage investment and shorten the payback period. Taxation simply reduces the available funding pot. Issues operators face include:

- Systems have to be kept running 24/7 and any work has to be scheduled during periods of low usage (systems are never "off"), so opportunities are limited.
- Activity must not compromise service level agreements. Customers may also refuse.
- Maintenance or upgrades are often scheduled at weekends and unseasonable times when staff costs will be significantly higher, or staff may be hard to find.
- There may be unwillingness to take any unnecessary operational risks.
- Data centre systems tend to be run on "N+1" or "2N" (and other) configurations, which simply means that the supporting infrastructure provision always exceeds that which should be required by the facility at any time. N+1 means that there is one extra, 2N means that there is double capacity, and so on. So if a chiller unit fails, there is spare capacity to cool the facility and operation will be unaffected. However, this means that if the chiller units are upgraded, a 2N facility will have double the cost for any given energy saving, because they will have to upgrade two units, only one of which will ever be used at a time. The upgrade cost will always be exaggerated compared to the potential savings, for this reason, which means a longer ROI period.
- There are many other additional cost burdens when implementing any changes to mission critical systems, from the provision of additional back up power supplies to cyber security.

Value of Domestic Exemption Schemes

The survey mentioned scope for exemptions for energy intensive sectors provided they met efficiency targets. In the UK a domestic exemption scheme to reduce the energy tax burden for energy intensive industries is implemented through sector specific Climate Change Agreements. The UK data centre sector has had a climate change agreement in place since July 2014. While this provides very welcome relief from

some of the more punitive taxes, it does not go far enough to address the other escalating non commodity charges listed above or robustly address the barriers identified above. The sector urgently needs a similar approach to be extended to address these additional charges and barriers. The CCA has been an exceptionally successful policy tool and provides an excellent model for wider application. Scheme overview and benefits are set out below:

What is a Climate Change Agreement?

Climate Change Agreements (CCAs) are negotiated arrangements between UK government and energy intensive sectors. The objectives are to improve energy stewardship without damaging growth. Over 50 industry sectors are covered and the scheme has been running since about 2001. In return for a reduction in, or exclusion from, some carbon 'taxes' (CCL and CRC), participants are given energy efficiency targets. These targets are sector-specific so they can be focused exactly where they can deliver the most benefit. To date, CCAs have delivered greater energy savings among participating sectors than conventional policy measures would have achieved.

This is because the CCA really does change behaviour. A bespoke policy tool like a CCA at first glance seems to run counter to perceived wisdom, which takes the view that increasing energy costs forces people to take steps to improve efficiency – the basis of all “polluter pays” policy instruments. Instead the CCA provides compelling incentives to improve efficiency through a simultaneous carrot and stick – tough targets while providing companies with the means to invest in efficiency measures. Because CCAs accommodate growth by focusing on energy efficiency instead of net reductions, they are particularly suited to drive efficiency improvements in sectors like data centres that are energy intensive, growing fast, and vulnerable to overseas competition. The CCA does not give energy intensive businesses a free ride but it does protect them from unfair competition from counterparts operating in less regulated areas. The scheme is also effective in delivering a wider range of benefits. These include:

- **Reduced carbon leakage:** Carbon leakage happens when energy intensive organisations locate their operations overseas to avoid carbon taxation and end up in less regulated areas where the generation mix may be more carbon intensive. It is an unwelcome side effect of unilateral carbon taxation or regulation. Because energy is such a predominant cost for data centres and because data is so easily transmitted over long distances, data centres are very susceptible to carbon leakage. The CCA provides policy stability and some relief from unilateral carbon taxes that might otherwise encourage offshoring.
- **Greater certainty of meeting policy outcomes:** The clear target set in a CCA provides much more clarity of final outcome than an uncapped CRC or other polluter pays mechanisms like CCL, or a scheme like ESOS that obliges companies to undertake audits but does not require them to implement the findings. It gives the potential for government to set stringent targets taking the unusual circumstances of data centres into account such as relatively fast equipment replacement rates. Regular review of progress towards targets keeps minds focused and if they start to look too unambitious, target renegotiation can ensure they remain challenging.
- **Fewer perverse incentives:** Because the CCA rewards energy *efficiency* rather than demanding simple net reductions it encourages the flow of work to where it can be done most efficiently, making those efficient companies more competitive. It therefore works in the opposite way to taxes like the CRC, which penalised growth. Unlike those one-size-fits-all approaches, the CCA applies bespoke targets that are designed to drive change where it is most needed.

- **Greater reach for the policy instrument:** The CCA is open to operators that fall below the threshold for other policy measures such as CRC or GHG accounting or ESOS, so as a policy tool it has wider reach than those approaches. All participants have to implement sub-metering and audit energy use as a pre-requisite to entry and previous experience tells us that this will be new territory for many of these smaller entrants. Moreover they will be bound by energy efficiency targets for the first time, so the CCA is capturing a wider cohort of energy users than other policy tools. Even for those not under the regulatory radar, the CCA is much more ambitious than ESOS.
- **Greater flexibility in addressing sector specific issues:** CCAs are flexible enough to take into account sector characteristics. A data centre comprises a complex array of different technologies and a system level approach is needed when implementing efficiency improvements.
- **Enabling the enablers:** Data centres underpin the transition to a low carbon economy: they enable smart grid, smart cities, broadband and a huge range of ICT-enabled low carbon technologies from vehicle logistics to teleworking, from earth surface monitoring to building management systems. The more efficient our data centre functions are, the more compelling these alternative, dematerialised, approaches become.
- **Improved energy stewardship and transparency:** The requirement to measure and report energy consumption in a robust, consistent and auditable way, including the obligation for all sites to implement sub-metering, has set a much higher standard for energy monitoring. PUE⁵ is now being measured more consistently and appropriately. This has improved transparency and has given us a better understanding of the way the sector uses energy. The aggregate figures provide invaluable insight into sector energy demand and have already dispelled a number of myths about data centre energy use, which has previously been a subject of much poorly informed speculation. In many cases we are also seeing more open customer-supplier dialogue on energy to address the kind of split incentives that have historically occurred in landlord-lessee scenarios. CCAs are the only UK policy instruments that collect site level energy data sector by sector.
- **In summary.** It is hard to overstate the value of the CCA to the UK data centre sector. The scheme provides much needed relief from some of the more punitive non commodity costs currently added to the price of electricity. It helps to level the playing field for UK operators trying to compete with overseas counterparts, it improves the business case for investment in efficiency measures and releases funding that would previously have been allocated to paying carbon taxes so it can be directed at implementing improvements.

Further information:

Please do not hesitate to contact us if further information or clarification on any of the points made above is needed. The documents listed below provide additional context and contact details are at the end.

⁵ PUE, or Power Usage Effectiveness is a measure of energy productivity widely applied to data centres. It is the ratio of energy delivered to the IT function divided by energy to the facility. The lower the PUE, the higher the energy productivity.

Reports and useful references

[Climate Change Agreement \(CCA\) for Data Centre: Target Period Two: Report on progress](#)

[Climate Change Agreement \(CCA\) for Data Centres: Target Period One: Progress report](#)

[Climate Change Agreement \(CCA\) for Data Centres: First Findings Report, November 2014](#)

[UK Data Centres Council Communication on Energy Costs](#)

[UK Data Centres Council Communication on DSR Policy Conflicts](#)

[Data Centres: Engines of Growth \(Archive- 2013\)](#)

[So What Have Data Centres Ever Done for Us? \(Archive - 2013\)](#)

Contacts



Emma Fryer
Associate Director, techUK
Tel: 01609 772 137
Mob: 07595 410 653
emma.fryer@techuk.org



Lucas Banach
Programme Assistant
Tel: 020 7331 2006
Lucas.banach@techuk.org

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ⁱ See: Er What IS a Data Centre: <http://www.techuk.org/insights/reports/item/273-er-what-is-a-data-centre>