Lost in Migration?

Attributing carbon when outsourcing to cloud

Emma Fryer, November 2019 (first published in Data Economy Magazine)

When organisations use third party data centres or cloud service providers, there is a general assumption that efficiency improves, and that energy and carbon benefits are realised. From a technical and operational point of view it looks like a no-brainer, and there is a growing body of literature to support this. But how does an individual customer know that this is true for them?

When companies manage their own services, whether analogue or digital, they have access to relevant energy use data- at least in theory – after all, they pay the bills. But when a service is outsourced to a third party cloud provider the energy impact of that activity sometimes becomes much less transparent. So how can organisations demonstrate, with a reasonable degree of confidence, that their outsourcing decision is indeed delivering environmental benefits – and more importantly, how can they identify occasions when it is not?

We looked at two examples; publishers moving from printed to digital media and public sector bodies migrating in-house activity to cloud. In publishing, the physical printing process is frequently outsourced but the carbon and energy are transparent and reported in detail, so these media companies can report their scope 3 emissions with confidence. Once the medium becomes digital they tell us, perhaps surprisingly, that transparency tends to diminish and their reporting is incomplete.

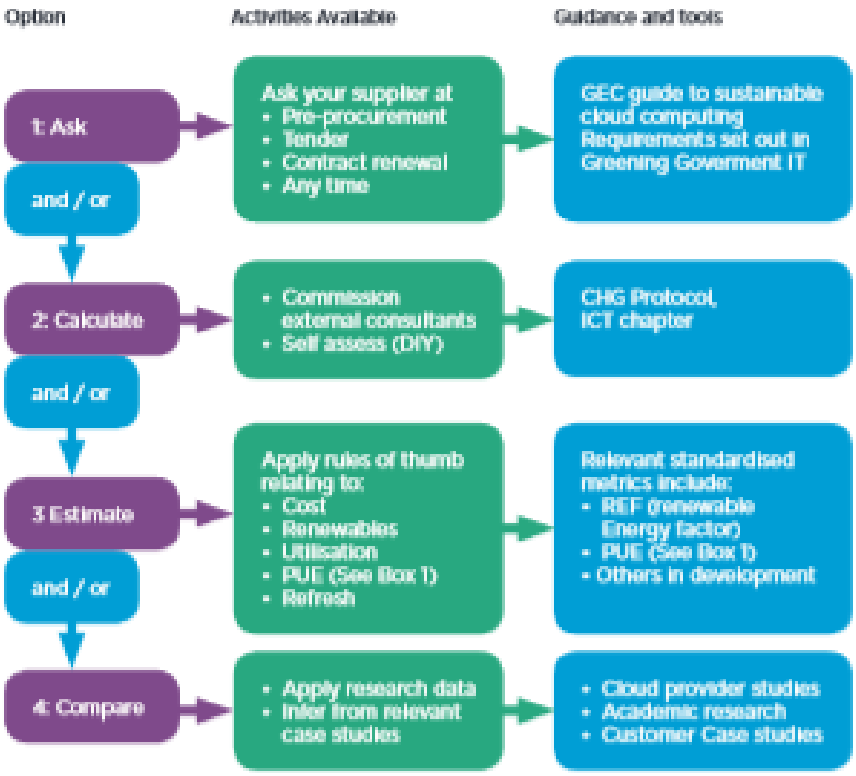
So why is it so tricky to attribute carbon to a cloud service like this? Unlike colocation, where energy is transparent – and usually recharged – a cloud service is different. For starters there is the complexity of the cloud business model, with multiple layers of service from infrastructure to applications, involving one to many providers. Then of course work is moved between facilities and even between regions to optimise efficiency. Customer access to digital media also involves energy-using devices and just to make things more complex, many end users consume a combination of printed and digital content.

Over in the public sector the situation is a little different. As digital activity is migrated, departments are required to report energy and carbon footprints and explain how these will be reduced. Presumably, if called before the Environment Select Committee, those responsible also want to demonstrate with confidence that they are making sustainable choices. Not all bodies have good baseline data so this can make before-and-after comparisons tricky. Nevertheless we are seeing an uplift in demand for the energy and carbon data associated with a given contract or service. This is already being requested in UK government tenders and looks likely to become more widespread. More importantly, these customers will not be satisfied with corporate energy and sustainability statements: the data that that they are requesting is bespoke.

So where do we start? What can organisations do to understand the impact of those digital activities they outsource to cloud? We identified four potential avenues of enquiry: 1) ask, 2) calculate, 3) estimate and 4) compare.

<u>1: Ask:</u>

In the first instance, customers should ask cloud providers for energy and carbon data relating to their individual requirement, ideally at the procurement stage or when contracts are being renewed. The GEC's Purchasers Guide for Sustainability and Cloud Service Procurements[1] should help.



<u>2: Calculate:</u>

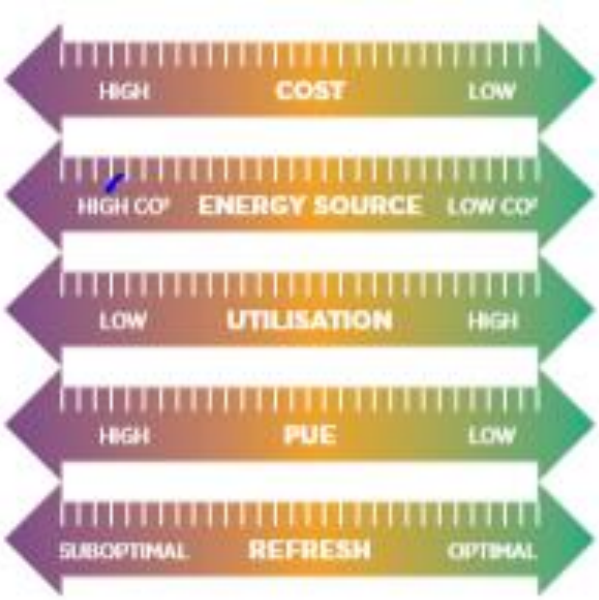
Some organisations with the necessary in-house expertise can measure the carbon impact of their IT functions, including those outsourced. There are now several peer reviewed tools to help this process, for example the ICT Sector Guidance which is available from the GHG Protocol website[2]. Others use third-party experts like The Carbon Trust to conduct carbon footprinting studies or make comparative assessments of changes in process. Such exercises are invaluable in accounting for energy. However, they can be expensive and tend to cover a limited time period.

[1] https://greenelectronicscouncil.org/wp-content/uploads/2019/03/GEC-Sustainable-Cloud-Services_Purchasers-Guide_FINAL-March-2019.pdf

[2] http://www.ghgprotocol.org/guidance-built-ghg-protocol

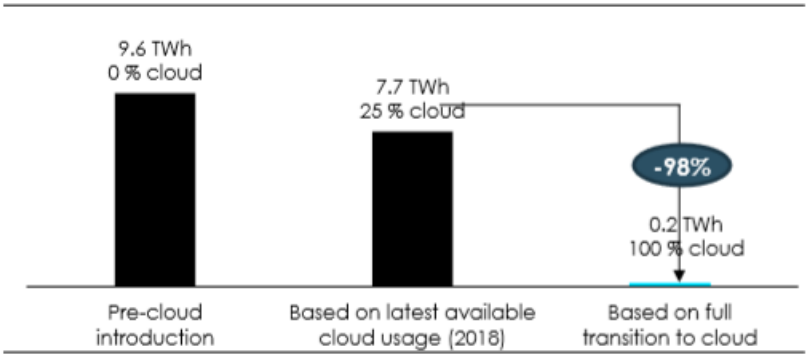
3: Estimate:

If actual numbers aren't needed and the objective is simply to establish whether outsourcing to the cloud will be a net positive activity, then simple rules of thumb can be applied. The GEC guide will come in handy here but we felt that factors like cost, energy source, utilisation, PUE and server refresh intervals should, in combination, allow a customer to decide whether they are doing the right thing with a reasonable degree of confidence.



4: Compare:

There is also a growing resource available to aid decision making in the form of research reports, studies and case histories. These include studies by Microsoft[3], Google[4] and UKCloud[5] to academic research: the University of Bristol has specialised in this area for some time and work at the University of East London on the eureca project is a good source of baseline data for public sector IT.



Note: The Eurostat survey data provides binary yes/no information on cloud use, without capturing the type of setup chosen by businesses that report not to use cloud. Since some of those may be using off-site servers, the 7.7 TWh figure may be overestimated insofar as some of those Eurostat respondents rely on more energy efficient solutions for their servers than the standard in-house server.

Source: Copenhagen Economics based on Eurostat(isoc_ci_eu_en2, sbs_sc_soa_r2, nrg_pc_205) and Google(2011), Google's Green Data Centers

We must all work together towards the UN's Sustainable Development Goals and the UK's net zero targets. These are driving organisations to apply greater scrutiny to their scope 3 emissions.

We anticipate that over time, transparency will improve for all types of cloud customer, and in doing so, other net carbon gains from cloud computing, such as lighter mobile devices and truly mobile working through online collaboration tools will also become more transparent. Assessing these impacts, getting the system boundaries right and keeping pace with ever-changing technology will continue to present challenges for some time to come.

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[3] https://www.microsoft.com/en-us/download/confirmation.aspx?id=56950

[4] https://www.copenhageneconomics.com/dyn/resources/Publication/publicationPDF/0/500/1569061077/copenhagen-economics-google-european-dcs-infrastructures-impact-study_september2019.pdf

[5] https://ukcloud.com/wp-content/uploads/2019/05/greening-ict.pdf