Digital Sustainability Case Study

Silicon Sands:

measured for today, contracted for the future

Digital Infrastructure Cost & Carbon at Blackpool Council:
A joint assessment by P2Zero & Posetiv Cloud, study funded by Computacenter



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Tony Doyle, Head of ICT Services, Blackpool Council

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Background

Blackpool Council, a unitary authority in the North West of England, declared a climate emergency on 26 June 2019, with a commitment to make Council carbon emissions net zero by 2030. As part of its of its ICT and investment strategy the Council is developing Silicon Sands, a locally owned, lower-carbon alternative to hyperscale cloud for public-sector workloads, anchored by a new Exemplar data centre. The Council already held detailed operational data on its data centre estate.

To support the investment case it commissioned an independent assessment to bring that data together into a measured account of cost, energy and carbon, and to help inform the environmental performance requirements for the Exemplar concession. The engagement delivered both.

The study covered the Council's four data centre environments. For an always-on AI workload modelled across six locations, it found the Council's own sites markedly cheaper and lower carbon than an equivalent public cloud service. It also set out a staged plan of energy and cost measures, several of which the Council was able to act on straight away, and its findings informed the environmental performance measures now built into the Exemplar concession.

Key findings for the Council from the assessment

Measure	Result
Always-on AI workload, Council sites against public cloud (modelled)	roughly two to five times lower cost and two to eight times lower carbon on the Council's own sites
Estate IT energy and efficiency	789 MWh a year across the estate, with a measured PUE of 1.38 at the primary site
Operational Scope 2, whole estate	193 tCO_2e at the UK national emissions factor; 43 tCO_2e on the actual North West grid
Refrigerant held in cooling plant	about 235 tCO_2e across the estate, the largest single carbon exposure identified
Embodied carbon in Council hardware	156 tCO_2e, of which 48 per cent sits in equipment that is powered off
Exemplar concession	environmental performance measures aligned to ISO/IEC 30134, evidenced by measured data

The baseline behind the figures covers four environments, twelve months of rack-level telemetry at about 820,000 readings, a site visit with a 57-question evidence base, F-gas certificates for every cooling unit, a device-level embodied carbon model of the Council hardware, and a representative AI workload costed in six locations.

What the Council got from it

What the Council got	What it changes	Value
A measured PUE for the primary site, reconciled to the building meter	The site can be reported and benchmarked on measured data	A firm basis for the cooling investment case
A per-rack load picture across the estate, with dormant equipment identified	Idle kit and power-feed items each have an owner	Cooled capacity reclaimed at no cost
Refrigerant specification informed before the cooling plant replacement	A lower-GWP option priced alongside free cooling	Avoids locking a high-GWP gas into a fifteen-year asset
A refrigerant inventory in tCO_2e for the estate	Scope 1 can be reported and the largest exposure is visible	About 235 tCO_2e quantified
An evidence base for the legacy site's decommissioning timeline	Cooling renewal is weighed against closure rather than treated as routine maintenance	Avoided capital and lower running cost
Environmental performance measures for the Exemplar concession	Measured, standards-based obligations from the outset	Aligned to ISO/IEC 30134

How the assessment was carried out

Following scoping workshops with the Council's IT, energy and sustainability teams, a full-day site visit captured answers across a 57-question structure covering metering, cooling and water, refrigerants, asset condition, cost, capacity, workloads, the Exemplar specification and governance. The visit added context a desk exercise would have missed, including how the cooling plant is configured and operated and the kind of high-density workloads the estate is now being asked to host.

The Council's DCIM and UPS platforms already logged the data the assessment needed. The Council's IT team exported the rack-level telemetry and its energy team supplied the building meter data, which let the assessment reconcile telemetry to whole-site consumption and calculate efficiency from measured rather than modelled figures. As examples, this included:

Metrics	Detail
UPS and rack data	twelve months of UPS output data at roughly 79-second intervals, and per-rack PDU exports for all active racks at the primary site
Cooling	twelve months of cooling demand data for every cooling unit at the primary site, and the building meter
Embodied carbon	the Council's hardware, modelled by device using Circularity First data amortised over seven years

For the workload modelling, one representative workload, an AI-assisted CCTV video search running day and night at about 0.5 kW, was costed for cost and carbon in six locations over three years on the same server class, covering the Council's own sites, its immersion-cooled proof of concept, the Exemplar and two public cloud regions.

Ewen Anderson of P2Zero

> *"Most councils have to make data centre decisions on a headline PUE and an energy bill. Blackpool already held rack-level data in its DCIM, and once it was extracted and reconciled the estate went from an estimate to a measured position, with every recommendation in the report traceable to a specific set of readings."*

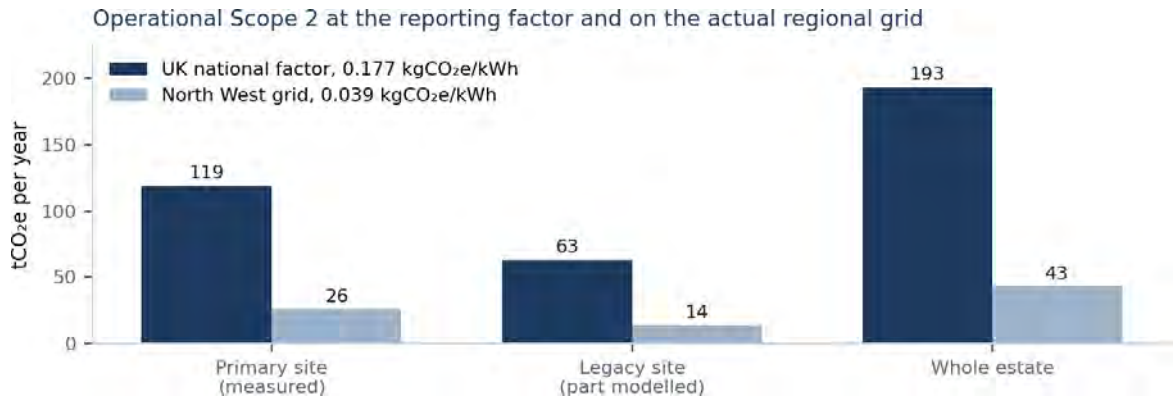
What the assessment found about “cost and carbon”:

Running the workload on the Council's own sites, its annual carbon is about 455 $kgCO_2e$, and on the renewable-fed proof of concept and the Exemplar about 215 $kgCO_2e$. The same service in a major public cloud provider's UK or Irish region costs between two and a half and five times as much, depending on commitment term, and emits 1,090 to 1,670 $kgCO_2e$ a year, because those regions sit on more carbon-intensive grids. The on-premises figure excludes space, network and staff, and the gap is wide enough to survive that.

What the assessment found about the existing sites:

The primary site is efficient, and demand is growing - Measured annual PUE is 1.38, well below typical UK legacy sites, on a site with no free cooling. Energy use grew 17 per cent year on year and the delivered electricity price has been rising 30 to 40 per cent a year, so each measure that reduces energy reduces the bill in proportion. The Council is already progressing a cooling plant replacement with free-cooling capability, which the assessment estimates would cut cooling energy by about 45 per cent.

Local grid carbon intensity is a quarter of the national factor – while compliance reporting uses the DESNZ national factor of 0.177 kgCO2e per kWh, the North West grid region, supplied by Heysham nuclear and Irish Sea wind, runs at about 0.039. Estate facility electricity of around 1,090 MWh a year therefore reports as 193 tCO2e and is closer to 43 tCO2e in practice.



Source: report figures. The primary site is measured to the door meter; legacy-site facility energy is modelled at PUE 1.45 pending metered cooling.

The largest carbon exposure is refrigerant, not electricity - Analysis of the F-gas certificates gives the Council a reportable Scope 1 inventory. The refrigerant charge held in the cooling plant, expressed as CO_2e, is larger than the embodied carbon of the Council's hardware and several times the estate's annual operational Scope 2. The finding fed directly into the specification for the cooling plant replacement, where a lower-GWP refrigerant option is now being priced alongside free cooling, and into the Exemplar specification, where refrigerant type, GWP and leak monitoring are now addressed.

Half the Council's embodied carbon is in kit that is switched off - Council-owned hardware carries about 156 tCO_2e of embodied carbon, and 75 tonnes (48 per cent) sits in equipment that is powered off or awaiting

decommissioning. Powering it down recovers nothing; removing it and routing it to reuse or resale is what frees the space, the cooling and some of the embodied value.

Mark Butcher of Posetiv Cloud

> *"The number that mattered most turned out to be the refrigerant rather than the PUE. A council can spend years optimising cooling energy and undo all of it with a single cooling plant order that does not specify the GWP (global warming potential) of the refrigerant. A measured baseline is worth having because it shows which decisions are open now, and who owns them, while there is still time to shape them."*

Informing the Exemplar concession

The Exemplar is being procured as a long-term concession, and the Council had already positioned it as an exemplar facility with strong commitments on cooling, heat recovery and renewable supply. The assessment gave the Council a measured view of its own estate to set those commitments against, and a clear picture of the evidence that would be needed to show the new facility performing as specified over the life of the agreement.

Working with the Council's procurement and commercial teams, and within the constraints of the procurement stage, the team helped develop environmental performance measures for the concession aligned to ISO/IEC 30134, with reporting based on measured data rather than estimates or portfolio averages, and with the transparency the Council and its tenants will need to meet their own reporting obligations.

The result is that the environmental performance the Council expects of the Exemplar is defined in measurable terms from the outset, rather than described in a tender response and revisited once the facility is operating.

What the Council can act on, and in what order

The report set out recommendations in three horizons, each with an owner, the evidence required and the consequence of doing nothing, ordered by dependency. Among them:

Action	Owner	Effect or basis
Power down dormant equipment	DC operations	Immediate, no capital
Specify a low-GWP refrigerant for the cooling plant replacement and the Exemplar	Infrastructure and procurement	Cuts the warming impact of any leak by about two thirds on a fifteen-year asset
Meter cooling power at both sites	Energy manager and DC operations	Converts the legacy site's modelled PUE to a measured one
Remove and reuse or resell decommissioned kit	IT asset management	Releases about 75 tCO_2e of embodied value plus floor space
Replace the cooling plant with low-GWP free-cooling plant and consolidate the estate	CIO and infrastructure	About 45 per cent lower cooling energy

If you are another public body

Most public sector organisations will recognise elements of this story, whether that is operational data that has not yet been brought together, cooling plant approaching renewal, electricity costs held outside the IT budget, or a procurement where environmental performance still needs to be expressed in measurable terms. At Blackpool these were addressed in a single exercise, building on the data and commitments the Council already had, and carried through into the requirements for its next facility.

Role	What this case shows	What to do
CIO or digital director	the estate can typically be measured from data already held	Establish the baseline, then build a reduction plan on measured facts
Energy or estates manager	the building meter is the item that converts a modelled PUE into a measured one	Meter cooling at the door, hold the F-gas register, and specify low-GWP at renewal
Procurement	environmental performance defined in measurable terms before award is far easier than adding it afterwards	Include measured KPIs and reporting obligations in the contract, not only in the tender response
Sustainability lead	the UK average grid factor can overstate operational carbon; embodied carbon and refrigerant can be larger than operational electricity, as they were here	Report both the national and regional factors with the source stated; move from electricity narrative to hardware lifecycle and F-gas

Where it goes next

The project is now a reference case for the Government Digital Sustainability Alliance procurement stream, as a practical example of a public body measuring its estate first, then using what it learned to shape the requirements for its next facility.

Philip Pearson, Sector Director, Public Sector, Computacenter

> *"We funded this because the question the Council was asking, whether locally owned infrastructure can be a credible alternative to hyperscale cloud, needs independent measured evidence. The answer in the report is usable by the Council today and also by other public bodies asking the same question."*

Tony Doyle, Head of ICT Services, Blackpool Council

> *"P2zero, Posetiv Cloud and Computacenter have been extremely helpful in supporting Blackpool Council's exploration of future digital infrastructure. They have helped us better understand the strategic value of operating our own infrastructure, giving us greater control over our data, our carbon footprint and our long-term operating costs. As data sovereignty becomes increasingly important and the need to respond to climate change grows, we believe these considerations will be fundamental to how organisations develop and sustain their ICT services and the next generation of AI infrastructure. Their expertise and collaborative approach have made a valuable contribution to our thinking as we shape our future digital strategy."*

Basis: primary-site IT load, per-rack load, UPS load and cooling are measured from DCIM exports over twelve months to May 2026 and reconciled to the FY25/26 building meter; PUE is door-meter energy divided by UPS-output IT load. Legacy-site cooling is unmetered and PUE is modelled at 1.45. Refrigerant charges are from the contractor's F-gas certificates; no realised leak emission is claimed. Scope 2 is location-based at the DESNZ 2025 factor of 0.177 $kgCO_2e$ per kWh, with the North West regional figure of 0.039 from National Grid ESO carbon intensity data shown alongside. Embodied carbon covers the Council's own hardware only, from Circularity First and manufacturer lifecycle factors over a provisional seven-year life. The workload comparison models a 0.5 kW always-on service on a three-year asset life at published cloud pricing and PUE; it excludes on-premises space, network and staff. None of this is a metered annual inventory of the whole estate, and the assessment does not present it as one.