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Data Centres and Water Use

Intro

- Generally when you hear discussions about data centres, the main concern is energy, and rightly so
- But there is another consideration which often flies under the radar, particularly in Ireland, and that's water use.
- Data centres are not only power hungry, they're also very thirsty.
- The consistent running of IT equipment generates a lot of heat, so you need to actively cool the processors. This is often done using a system with cooling towers which distribute cool water to computer room cooling units, a process that often uses considerably high volumes of water.

How much water?

- Reporting shows that data centres water use can vary from 0.5 million litres per day to 5 million litres per day,
- Just for contrast, your standard household would use 345 litres of water per day, so that's enough water for approximately one and a half thousand households at the lower end of the scale, and over 14k households at the higher end of the scale.
- There are many cases arising now in America where in states like Oregon, California and Georgia there is immense community opposition to data centres because their wells are running dry, and their water is more polluted since the establishment of some of these data centres.
- It's a really serious problem there already.

Advancements in Technology

- However, there have been advancements in cooling technologies in recent years; air cooling systems can draw cool air from the outside in to cool the processers, which can result in considerable reductions in water demands.

- But one thing to be very aware of, despite advancements in data centre cooling technology, air cooling methods still require water cooling in certain circumstances, for short periods of the year when temperatures are above 25^{o}C. So basically, once it gets beyond 25 degrees, the air cooling no longer works, and that's when they have to rely on backup water cooling

Irish context

- Ireland doesn't currently get that many days over 25 degress, but that's changing with our changing climate. One weather station in Kilkenny for instance measured 27 days of temperatures over 25 degrees in 2025.

- Climate change in Ireland will include decreases in summer precipitation, with increased frequency, duration and magnitude of summer drought periods - closely associated with higher temperatures.

- When we get those prolonged droughts, that's the exact same time as our rivers and waterways come under intense pressure. With low flows and higher temperatures which can lead to fish mortality, and it also exacerbates existing pollution loads, because there is less water to dilute the pollutants, like nitrogen for example.

- If data centres have direct abstractions from those waterways, withdrawing upward of half a million litres per day it can really exacerbate the impact of the drought.

- Similarly, if they rely on potable water for this, these periods often co-incide with hose pipe bans from Uisce Eireann.

- While Ireland is not generally known as a water stressed country, it's worth bearing in mind that the majority of the extant data centres are in the greater dublin area. which sources circa 85% of its water from just one source, the River Liffey.

- It has been consistently at capacity, or over capacity, with Uisce Éireann highlighting in April 2024 that demand for water in the GDA has increased beyond sustainable supply levels, putting considerable strain on the system.

Transparency

- An Forum Uisce did a piece of research on data centres and water and they highlighted the lack of transparency on water use by data centres

- If data centres have a private abstraction, they're not listed as data centres in the abstraction register, so you can't identify them

- They also highlighted that while some data centres publish their annual water use by data centre location, like meta in clonee, others like Google just collate global water use across all their data centres, so it's difficult to really interrogate this as a potential issue.

- The use of water by a data centre depends greatly on the type of cooling system the centre uses.

- Some of the Amazon data centres said in their planning application that they would use around 300,000 litres per year, and Meta reports that it used almost 400,000 litres in 2024.

- While the planning application sets out water use, if there is no specific reporting for that location it would be very difficult to monitor compliance with that.

- The usage of water, sources of the water, and seasonal fluctuation in those figures should be fully transparent per data centre location.

- Averages over a whole year, or the whole country are likely to downplay the impact of these water withdrawals during periods of drought.

- An additional complication is that where data centres use cooling water, they often then rely on disposing of that water to our wastewater treatment plants, which again, in the greater dublin area, are often over capacity. This adds an additional pressure to our wastewater infrastructure, potentially exacerbating pollution from them already being overloaded.

Recommendations

- Planning applications do consider water use, but in quite a narrow way. We need a far more robust cumulative impact, which is properly climate proofed, and considers when the water will be taken, not just averaging it out over the full year.

- Those private abstractions should be subject to the same rigorous assessment, and labelled as data centres in the abstractions register

- And we need far greater transparency about what water is being taken, when and from where.