

An Taisce
Data Centres
Policy Position

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The National Trust for Ireland

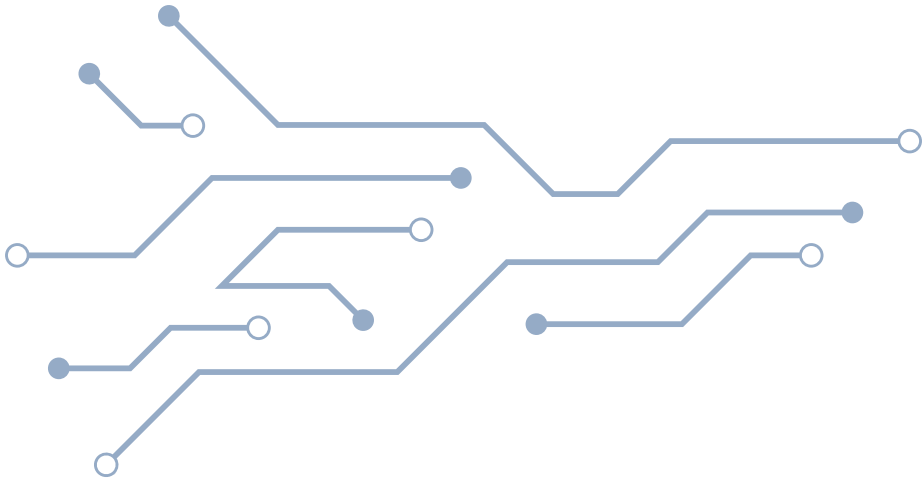


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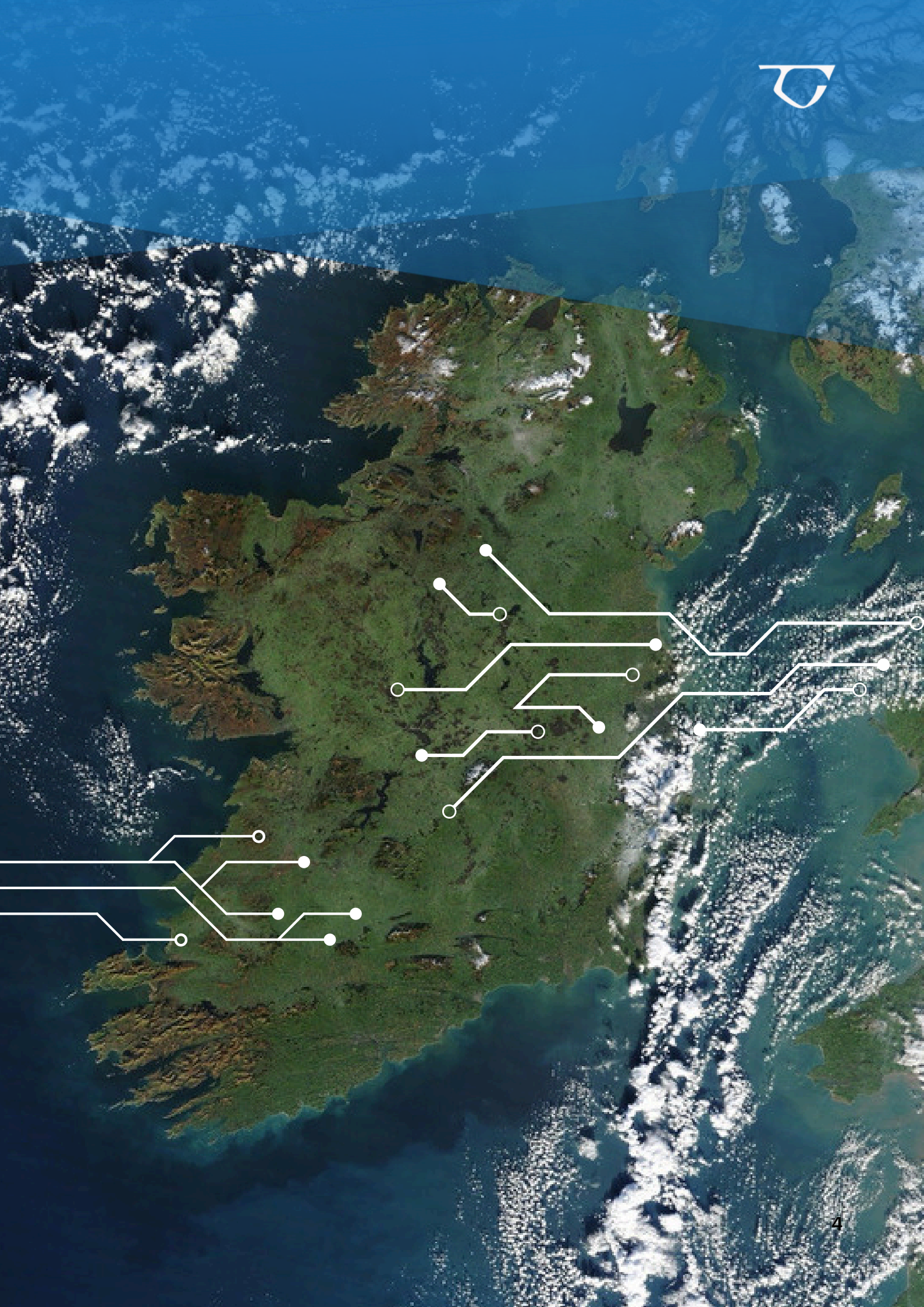
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While the use of data is undoubtedly a crucial part of modern life, like everything, it must be done within our planetary boundaries and our legally binding emissions reduction obligations.

Progress in decarbonising Ireland's electricity supply is being undermined by the energy-intensive trajectory of data centre development and the associated increase in emissions.



Why are data centres a climate and energy issue?

The annual growth in the storage and processing of electronic data is a major climate and resource consumption issue both globally and in Ireland. As of the end of 2024, there were 92 operational data centres in the Republic of Ireland, with the majority of these being located in the Greater Dublin Area.[1] Numerous others are at various stages of the planning and construction processes.

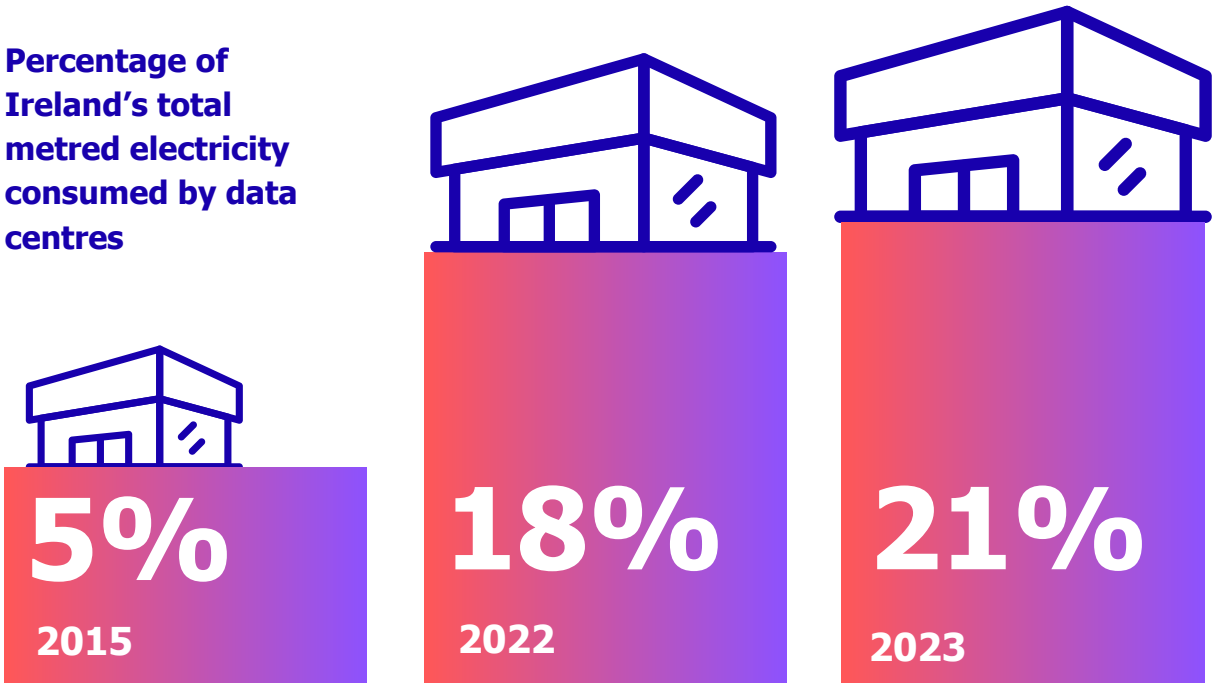
This proliferation of data centres has largely gone unchecked in Ireland, as has their power consumption, which increased 400% between 2015 and 2022, by 31% between 2021 and 2022 alone and 20% between 2022 and 2023. As of 2023 data centres consumed 21% of Ireland's total metred electricity.[2] This is up from 5% in 2015 and 18% in 2022, and it represents more electricity use than all urban households in Ireland combined. Data centre energy use is very high in Ireland relative to that in other European member states.

In 2022, for example, data centres used 18% of Ireland's electricity while data centres in the Netherlands, the next largest data centre power user in Europe after Ireland, used only 6% of the country's electricity.[3]

Such enormous power demand has a very significant carbon emissions impact and will utilise a very large amount of Ireland's growing renewables capacity.

Consequently, the rapid pace of data centre growth is contributing to our status as per capita climate laggards.

Percentage of Ireland's total metred electricity consumed by data centres



Data centres in a climate and carbon budget-constrained world

While the use of data is undoubtedly a crucial part of modern life, like everything, it must be done within our planetary boundaries and our legally binding emissions reduction obligations. Progress in decarbonising Ireland's electricity supply is being undermined by the energy-intensive trajectory of data centre development and the associated increase in emissions. This is entirely incompatible with the achievement of our national climate and environmental policy objectives. It is also incompatible with the achievement of Ireland's legally binding carbon budgets and sectoral emissions ceilings under the Climate Action and Low Carbon Development Act 2015 (as amended) (the Climate Act) and our EU emissions and renewable energy obligations and targets. In fact, we are already projected to overshoot these by a wide margin,[4] notwithstanding existing and planned data centre developments.

Data centre development and data centre electricity demand must therefore be considered within a carbon budget-constrained framework and within the physical constraints that exist, such as the inadequate state of the national electricity grid and the amount of land available for the generation of renewable power in Ireland. It has to be weighed up against more critical societal needs such as electricity for heating and transport. It is vital, in any consideration of the further expansion of data centres, that the real cost in terms of energy use, land use and emissions must be weighed against any economic benefits to Ireland.

The Climate Act legally requires us to comply with our national carbon budgets and corresponding sectoral emissions ceilings by legally binding deadlines. Under Ireland's carbon accounting, emissions from data centres' grid-generated power use fall under the sectoral ceiling for electricity while emissions from on-site generated power fall under the ceiling for the commercial built environment. To achieve carbon budget compliance, the sum of all emissions from all of the activities within a sector has to remain within the sectoral emissions ceiling.

To date, despite the known climate impacts of their significant power usage, data centres are being considered in isolation by planning authorities with wholly insufficient consideration given to cumulative impacts to the overall climate and energy demand. The cumulative impacts of new data centres on climate and carbon budgets needs to be considered in combination with all other recent and proposed data centre developments, regardless of their location in Ireland, as well as against the overall state of compliance with Ireland's legally binding carbon budgets.

For example, it is reasonable to look at the cumulative impact of an individual data centre on noise in the context of other locally proposed/recent developments as noise pollution is only experienced locally. It is, however, insufficient to simply look at the cumulative impact of this data centre on climate within the context of other local developments. The impact on carbon emissions is not spatially bound to the immediate surrounds of the site, and emissions combine cumulatively with other proposed and recent data centre developments to consistently undermine Ireland's progress towards adherence to our carbon budgets.

The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy is the only current national level policy on data centre development. While it supports the continued growth of the sector, it does not seriously consider the climate impact of data centre energy demand. Despite being repeatedly utilised as a basis, framework and justification for further data centre development, the Statement was never subject to Strategic Environmental Assessment (SEA) per EU Directive 2001/42/EC.

Furthermore, given the significant and wide-ranging climate and environmental implications of data centre development, we consider that the Statement falls within the ambit of the Aarhus Convention and should have been subject to public consultation, which, as far as An Taisce is aware, it was not.



Recommendations

An independent national review of current and projected data centre energy demand is urgently required, focusing on compliance with the legally binding constraints of the carbon budgets.

Such a review should inform a new national policy and regulations on the level of future data centre development, if any, that can be accommodated while achieving compliance with our national, European and international emissions reduction obligations.

Any new policy should undergo Strategic Environmental Assessment and be subject to full public consultation.

A conditional pause on all further data centre development, not just in currently grid-constrained areas, should be put in place until such a policy is enacted.

The pause would need to be continued if the review finds that data centre development cannot be accommodated within the constraints of our legally binding carbon budgets.

Otherwise, we seriously threaten our fair share commitment to mitigating GHG emissions under the Paris Agreement, and demonstrate to the public that the interests of large energy users are prioritised above societal and environmental needs.

Dilution of progress towards renewables targets and carbon budget compliance

Progress towards carbon budget compliance and the displacement of existing high emissions energy sources with renewables has been significantly diluted by the ongoing proliferation of high energy demand developments, data centres particularly.[5] We are effectively running to stand still. The higher the total electricity demand, the more renewable capacity is needed to ensure decarbonisation of the energy sector. Therefore, the more energy intensive developments, like data centres, that come onstream, the more difficult it will be to reach that goal.

Essentially, as renewable energy capacity is being added to the Irish system, it is being hoovered up by data centres and large energy users, leaving a deficit for all other energy users in terms of renewables availability, and addressing our existing emissions mitigation needs in line with the carbon budgets. Critically, the only thing the climate will actually respond to is a reduction in cumulative emissions. So, despite an increase in overall renewable energy capacity, unless that capacity keeps pace with or exceeds demand, we are not making significant progress towards achieving the decarbonisation of energy and actually reducing emissions.

Indeed, SEAI figures show that the share of renewables has not increased since 2020, largely due to the impact of data centres.[6]

They state in their 2024 National Energy Projections report: **"If the scale and pace of renewable energy growth cannot exceed that of electricity demand, as was the case in 2023, then renewables are just abating further increases in emissions rather than delivering the absolute reductions in greenhouse gas emissions required."** [7]

Similarly, research from Dr. Hannah Daly in University College Cork found that since 2017 the increase in data centre power demand has outstripped all the additional electricity generated from wind power in Ireland.[8]

Utilisation of corporate power purchase agreements

It is now common for data centre operators to enter into Corporate Power Purchase Agreements (CPPAs) with energy companies with the stated intent to "offset" data centre emissions by buying renewable energy.

While CPPAs do contribute to boosting the development of renewable energy, data centres with CPPAs are still increasing the overall demand for electricity - the higher the total electricity demand, the more renewable capacity is needed to decarbonise the electricity sector. It should be noted that any new renewable capacity added via new data centers' CPPAs (unless the CPPA provides for more renewable energy than the data centre needs) will simply cover that new data centre's demand rather than dealing with our existing mitigation needs in the power sector.

Recent research indicates that although half of the new wind energy capacity developed in Ireland between 2020 and 2023 was financed through CPPAs, that met just 16% of the new electricity demand from data centres between 2020 and 2023.[9]

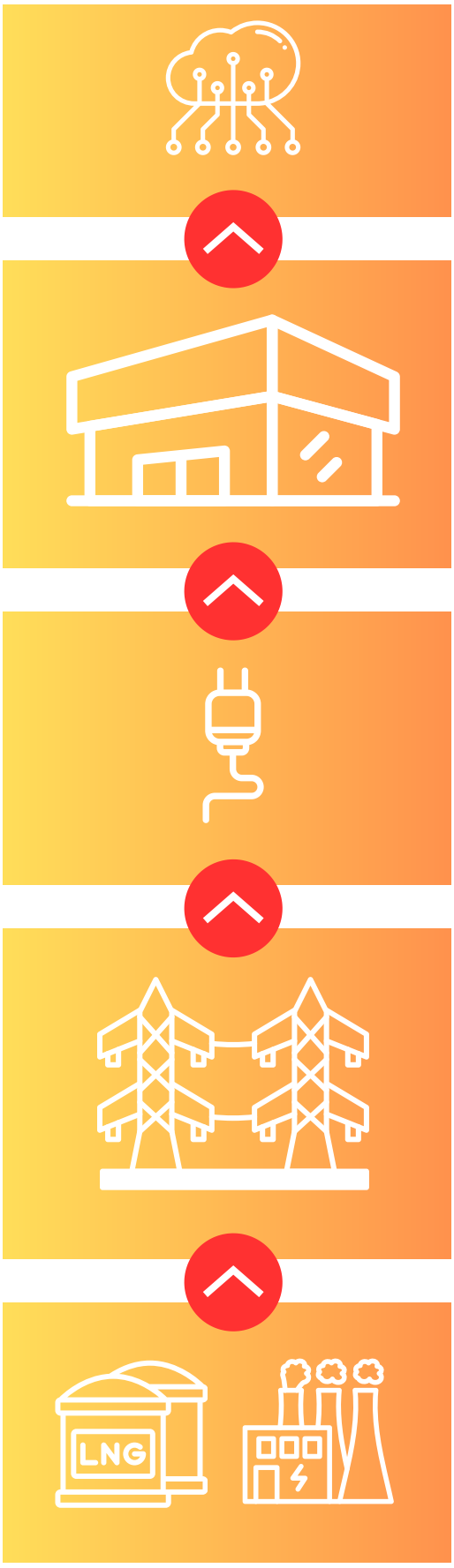
While CPPAs could, theoretically, provide a useful tool in decarbonising data centre energy demand (notwithstanding our concerns regarding carbon budgets, the use of on-site fossil fuel powered generation, etc.), to date in Ireland they are not currently effectively offsetting additional energy demands on foot of data centre development.

Any CPPA used by a data centre should provide an amount of power that at a minimum meets 100% of the data centre's peak power demand but ideally exceeds it.

Timing is a significant consideration in determining the efficacy of CPPAs. If demand grows faster than renewables can meet existing demand (as is currently happening in an Irish context) it will prolong fossil fuel use and exacerbate rising energy demand.

For CPPAs to be effective, the additional renewable capacity should be aligned temporally with the powering up of the data centre.

Storage is another serious consideration, if data centres require additional 24 hour a day renewables matching via CPPA, then data centres will either have to build battery or hydrogen storage, or power down at low renewables availability.



Recommendations

Any use of CPPAs by data centres (subject to the other recommendations in this policy) must be conditional on compliance with the following criteria:

- **Deliver new renewable capacity equal to at least 100 per cent of the centre's gross peak import requirement, and that capacity must be available from or before the date the centre becomes operational;**
- **Include electricity storage or verifiable demand response so that 24/7 hourly matching is achieved;**
- **Demonstrate additionality, showing that the project would not otherwise have been built, and make any surplus renewable output available to the national grid;**
- **Publish annual, third party verified data on generation profile and emissions displacement.**

Grid capacity, data centre gas connections, and fossil fuel lock-in

In recent years, the Commission for the Regulation of Utilities (CRU) and EirGrid have both expressed serious concerns regarding data centre energy use and the implications for Ireland's energy security.[10] The CRU went so far as to warn of the possibility of rolling blackouts due to data centre energy demand in particularly grid-constrained areas such as Dublin.

Given the precarious condition of the national grid, there is an urgent need for a review of data centre grid connection policies across the country as a result of their skyrocketing energy demand and implications for stable electricity supply.

In response to the serious concerns about grid capacity constraints, many recent data centre proposals have included plans for on-site gas fired power generation to provide some, or all, of the data centre's power demand.

Retreat to this "islanded" gas generation shifts, rather than solves, the problem - it will exacerbate lock-in to fossil gas which is wholly incompatible with our national and European climate targets.

Indeed, multiple groups have expressed concern about this, including the Climate Change Advisory Council, which said in a 2023 statement: "the recent growth in 'Islanded' data centres is of particular concern due to their potential to increase gas demand and associated carbon emissions."[11]





Recommendation

No permissions should be granted for data centres to establish fossil fuel powered generating systems or connections to the gas grid in support of their activities. In the future, on-site green energy generation and storage technologies (for example, biomethane, green hydrogen and battery storage) might become viable options and could be considered if that were to be the case.

Water use

Along with being high energy users, data centres also frequently use large volumes of water in their cooling systems. Data centres commonly use a water-cooled system, which distributes cool water to computer room cooling units which then provide air-conditioned air to the IT equipment.

A 1MW data centre using traditional cooling can use around 25.55 million litres of water per year.[12] This equates to 70,000 litres per day. For comparison, an Irish household uses on average 125,000 litres per year.[13]

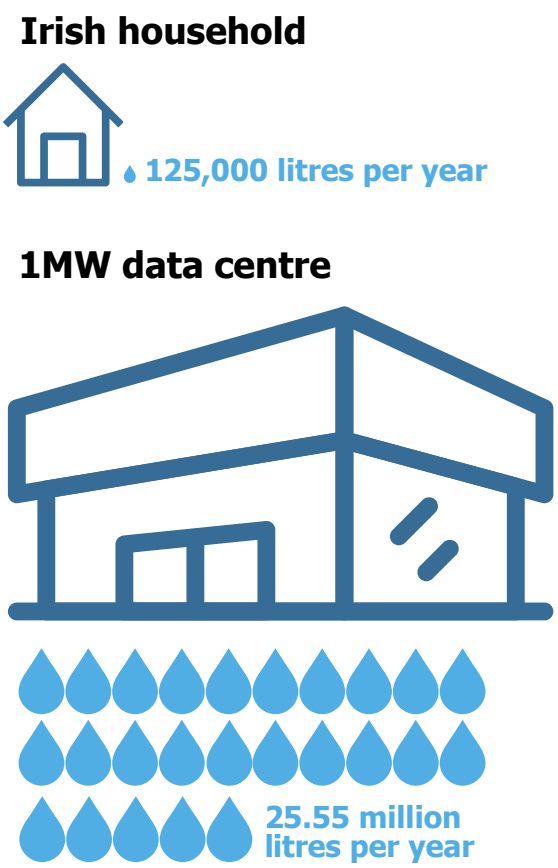
While we recognise that Ireland is more suitable for air cooled data centre systems due to our temperate climate, and many rely on this technology, these systems still require peak cooling using water, for short periods of the year when temperatures are above 25ºC. The Water Forum researched this issue[14], and identified that while there is a lack of available data on the water sources or use for individual data centres, it appears that at least some rely on potable mains water, supplied by Uisce Eireann. Others may rely on private abstractions, which must be registered if they exceed 25,000 litres per day.[15]

While Ireland currently experiences relatively low levels of water stress, the majority of Ireland's data centres are in the Greater Dublin Area (GDA), 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, and leading to calls for people to conserve water in January of 2024.

Wastewater facilities are also over capacity in the GDA, and some data centres rely on discarding used water to municipal wastewater treatment plants once it has been used for cooling,[16] albeit it is currently unclear how widespread this is in Ireland, and it requires further research to determine how big a pressure this may be.

The impact of both the increased demand for potable water and the potential requirement for additional wastewater treatment capacity within an already demonstrably constrained system (particularly in the GDA) must be a planning consideration in the development of new data centres.

Future changes to water availability as a result of changing rainfall patterns and drought conditions must also be a consideration, particularly as with new technology, certain data centres rely on water cooling when temperatures exceed a certain ambient temperature (25 degrees Celsius) and they can no longer rely on air cooling. This often coincides with heatwave and drought conditions, with concomitant water shortages. These issues require detailed consideration in data centre proposals.



Recommendation

Any planning decisions must ensure we are managing our water and wastewater in a sustainable manner. The resilience of the water and wastewater capacity for domestic and non-domestic users must be rigorously critiqued, and the capacity for our geographically constrained potable water and wastewater system factored in to any decision about connecting further data centres.

The impact of private abstraction from our waterways must also be assessed, particularly with a view to future droughts and the impact of such abstractions on the attainment of our Water Framework Directive objectives, and ecological health of our waterways.

Human health and wellbeing

Data centres with back up diesel generators present localised environmental pressures in addition to national carbon and energy impacts. Diesel back-up generators are a significant source of air and noise pollution.

Clean air is considered a basic requirement of human health preservation and well-being. Epidemiological studies have shown that even low levels of air pollution in industrialised societies are linked to adverse health outcomes[17]. Diesel generators are known to emit high levels of particulate matter, including fine particles known as PM2.5 and ultrafine particles.

These tiny pollutants penetrate deep into our lungs, causing respiratory issues, aggravating asthma, and increasing the risk of cardiovascular diseases[18]. Diesel generators also release nitrogen oxides, NOx, primarily in the form of nitrogen dioxide (NO2). Exposure to NO2 causes respiratory problems, lung inflammation, and increased susceptibility to respiratory infections[19]. Along with PM2.3 and NOx, diesel generators also release various toxic air contaminants, such as benzene, formaldehyde, and polycyclic aromatic hydrocarbons (PAHs).

Prolonged exposure to these substances has been shown to lead to cancer, neurological disorders, and other severe health complications[20].

Diesel generators may also lead to increased noise pollution[21], particularly in noise sensitive areas, with detrimental potential impacts on human health and wellbeing[22].

Noise emission levels depend on the size of the generators, small generators run at about 85 dBA (decibels), while larger generators run closer to 100 dBA per generator. Some data centers may rely on multiple generators at a time, increasing the decibel level.

Data centres themselves generate significant noise due to their operational nature. The primary source of noise is from the multiple servers, networking equipment, and cooling systems working together to maintain optimal conditions[23]. HVAC air conditioning units have been demonstrated to generate noise levels ranging from 55 to 85 dBA[24].

Data centre noise



85 dBA
Noise from small generator

100 dBA
Noise from large generator

55-85 dBA
Operational noise

Comparisons:

- For hearing health, WHO recommends road traffic noise be kept below 53 dBA during the day and 45 dBA at night.
- 50 dBA is the sound of electrical transformers from 30m away
- 80 dBA is the sound of a propeller plane flyover

Recommendations

- **The human health impact assessment components of Environmental Impact Assessments for data centres should cover particulate and NOx emissions from back-up generators, continuous and low frequency noise, and heat island effects.**
- **Data centres should be required to annually publish comprehensive data on environmental indicators including emissions (greenhouse gases and other pollutants), water use, noise, etc. All data must be verified by an independent third party.**

Data use efficiency

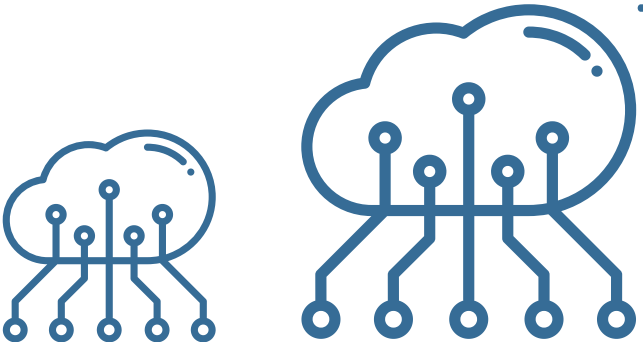
We also must consider what data we actually need. Recent research from the UK shows that a large chunk of stored data is not considered essential or valuable, classified as "Redundant, Obsolete or Trivial (ROT)" which is estimated to comprise 28% of stored data.

Additionally, 53% of stored data is unclassified and holds uncertain value for organisations, otherwise known as "dark data" and requires huge amounts of energy to store[25]. Another study demonstrated that over 80% of stored data is either dark or redundant[26].

Furthermore, the actual public interest value of very energy-intensive forms of data use such as cryptocurrency and artificial intelligence needs to be considered. Ireland, as a data infrastructure-intensive country, should lead independent research into the carbon impact of AI.

Value of data







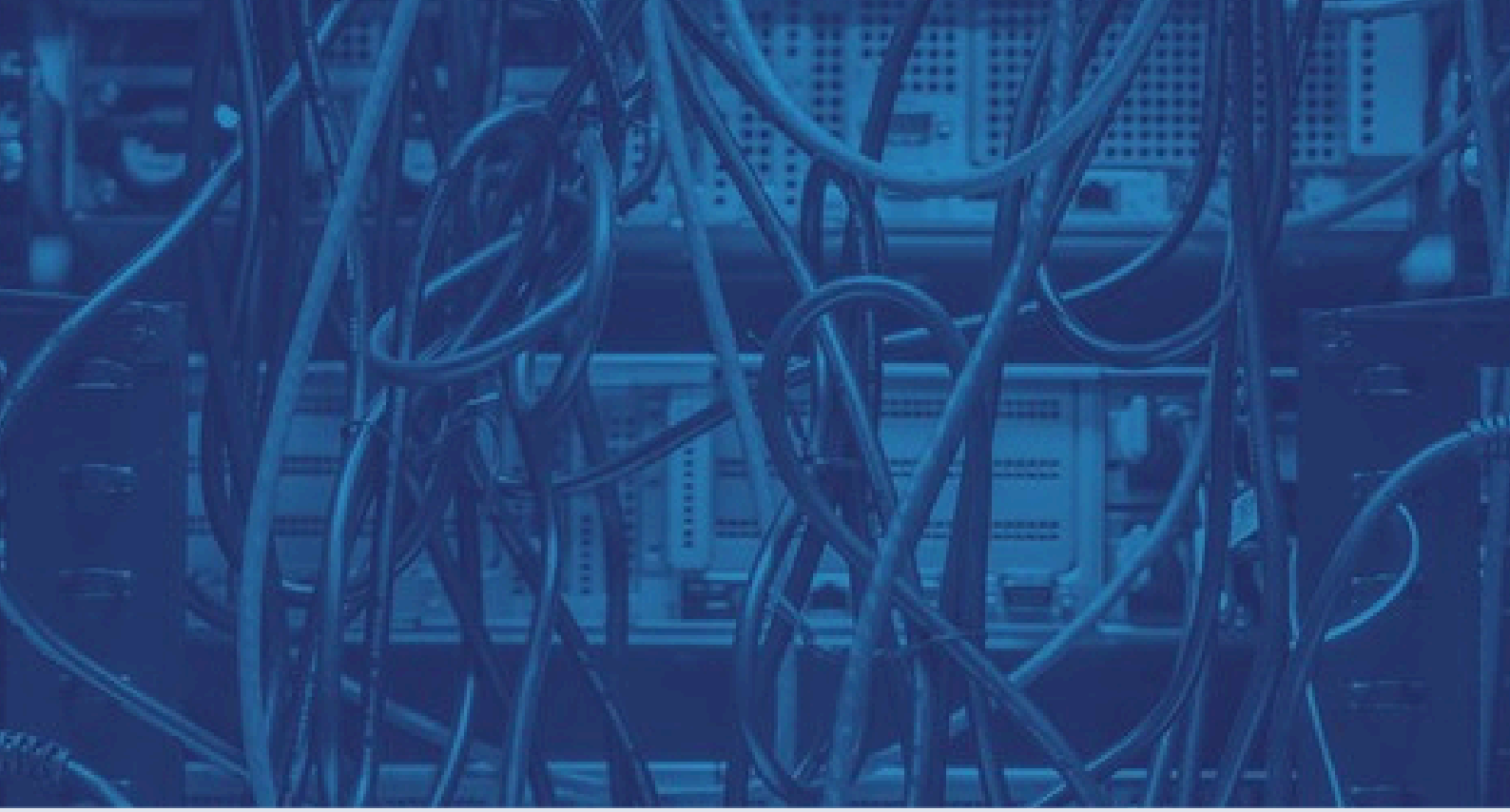
28%
of stored data is classified as 'Redundant, Obsolete or Trivial

53%
of stored data is unclassified AKA 'dark data' and could be redundant

Should we have a 'dark data' tax' to discourage digital waste?

Recommendations

- **Regulations should be introduced to ensure that the automatic AI features on websites and in apps should be opt-in only.**
- **An independent assessment should be carried out to determine how levels of dark and redundant data can be reduced. This could include a "dark data tax" modeled on the principle of the carbon tax, aiming to internalise the negative externalities of data storage, such as energy consumption and carbon emissions from data centers. The tax would be levied based on the volume of data stored that is not used for significant periods, incentivising businesses to optimise or eliminate this surplus data.**



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Photos: Canva.com



An Taisce was founded in 1948. It is an independent charity and one of Ireland’s oldest and largest environmental organisations.

Our core mission is to protect, preserve and celebrate Ireland's natural and built environment for present and future generations, and to ensure Ireland leads the way in defending a liveable planet.

Our vision is of an Ireland where our environment, natural and built, is actively prioritised and a lasting legacy of sustainability and resilience is ensured.

AnTaisce.org