

# Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy



July 2022

## **Executive Summary**

Government policy seeks to enable the 'twin transitions' of digitalisation and decarbonisation of our economy and society. These transitions can - and must be - complementary. For this to happen, digital and climate change policies need to move in tandem and this Statement sets out how this will be achieved in respect of data centres.

Data centres are core digital infrastructure and play an indispensable role in our economy and society. Data centres provide the foundation for all almost all online aspects of our social and work lives, including video calling, messaging and apps, retail, banking, travel, media, and public service delivery such as healthcare and welfare.

However, in the short term, there is only limited capacity for further data centre development, as the key state bodies, regulators and the electricity sector work to upgrade our infrastructure, connect more renewable energy and ensure security of supply. The capacity that will be available will be in regional locations and must assist in national ambitions to deliver an efficient, low-carbon energy system. By addressing these capacity constraints now, we can build the longer-term foundations for a net-zero-ready economy and society that will be a competitive and attractive hub for decarbonised digital services, enabling the industries and services of the future.

The capacity constraints experienced by our electricity system today, and the binding carbon budgets that require rapid decarbonisation of energy use across all sectors, necessarily mean that not all existing demand for data centre development can be accommodated. This Statement therefore sets out the principles that will ensure that the data centre infrastructure that can be accommodated contributes positively to our climate and digital ambitions. These principles are set out below. This Statement signals the Government's clear preference for data centre developments that are associated with strong economic activity and employment; make efficient use of our electricity grid, deliver renewable energy in Ireland.

These principles will be reflected in energy, enterprise and planning policy, regulatory and other decisions across Government Departments, local authorities, enterprise development agencies and other public bodies. The Government is committed to ensuring the principles are effective in prioritising future data centre development that delivers strong economic benefits, sustainable energy plans, and a willingness to promote Ireland's national decarbonisation objectives through a fully supportive planning system and other regulatory regimes.

### **Principles for Sustainable Data Centre Development**

A set of national principles that should inform and guide decisions on future data centre development.

#### **ECONOMIC IMPACT**

The Government has a preference for data centre developments associated with strong economic activity and employment.

#### **GRID CAPACITY AND EFFICIENCY**

The Government has a preference for data centre developments that make efficient use of our electricity grid, using available capacity and alleviating constraints.

#### **RENEWABLES ADDITIONALITY**

The Government has a preference for data centre developments that can demonstrate the additionality of their renewable energy use in Ireland.

#### **CO-LOCATION OR PROXIMITY WITH FUTURE-PROOF ENERGY SUPPLY**

The Government has a preference for data centre developments in locations where there is the potential to co-locate a renewable generation facility or advanced storage with the data centre, supported by a Corporate Power Purchase Agreements, private wire or other arrangement.

#### **DECARBONISED DATA CENTRES BY DESIGN**

The Government has a preference for data centres developments that can demonstrate a clear pathway to decarbonise and ultimately provide net zero data services.

#### SME ACCESS AND COMMUNITY BENEFITS

The Government has a preference for data centre developments that provide opportunities for community engagement and assist SMEs, both at the construction phase and throughout the data centre lifecycle.

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## **Context – The Twin Transitions**

The next decade will be transformational for our businesses, economy, and society. While there are many disruptions arising from geopolitical developments, changes in trade patterns and the lingering impacts of Brexit and COVID-19, two mega-trends are certain to shape our business environment. These are the "twin transitions" of pervasive digitalisation and the decarbonising of our economy. While these mega-trends are truly global, they have significant implications for Ireland's economy, industrial strategy, competitiveness and prosperity.

Data centre operations are at the epicentre of these transformational changes. As such, they merit and require specific policy focus, to ensure that our digital and low carbon opportunities are coherent and aligned. Both are critical to Ireland's economic future, and the success of our businesses.

The twin transitions are largely complementary – digital solutions can unlock decarbonisation opportunities, for example through smart energy devices and networks. Digitalisation also presents opportunities for reducing carbon emissions, increased remote working, reduced business travel and digitalisation of supply chains. Nonetheless, in Ireland as in other advanced economies, the speed and scale of our digital ambition has the potential to challenge our energy infrastructure as it undergoes a transformative decarbonisation.

For the digital and green transition to positively re-enforce each other, as envisaged by Government in *Harnessing Digital – The Digital Ireland Framework* and the *Climate Action Plan*, they need to move in tandem and be underpinned by a wider sustainable energy ecosystem.

EirGrid has projected that data centre demand will be a key driver of electricity demand in Ireland for the foreseeable future. All stakeholders, including data centre developers, recognise that this rapid growth in demand comes at a time when Ireland's electricity network is undergoing significant upgrading and investment to facilitate a low carbon future.

For existing, and new data centres, the coming years will require the sector to be flexible and innovative. This will be necessary so that the challenges posed to security of supply, decarbonisation and grid development are managed.

#### **CARBON BUDGETS AND CLIMATE ACTION PLAN 2021**

The Climate Action and Low Carbon Development (Amendment) Act, enacted in July 2021, sets out the framework for Ireland's transition to net zero emissions by 2050, and the associated governance arrangements for this target. The Act establishes a system of carbon budgeting comprising three five-year budgets that set an economy-wide limit on greenhouse gas emissions for each period.

In October 2021, the Climate Change Advisory Council, in accordance with the Act, submitted proposed carbon budgets to the Minister for the Environment, Climate and Communications. In April 2022, the Oireachtas approved this first set of carbon budgets which have now come into effect. The budgets will be supplemented by legally binding sectoral emissions ceilings, setting the maximum amount of greenhouse gas emissions permitted in different sectors over each five-year carbon budget. These sectoral ceilings are expected to be brought to Government for approval shortly.

In the case of the electricity sector ceiling, the Climate Action Plan 2021 set a target to reduce CO2eq. emissions from the sector to a range of between 2 to 4 MtCO2eq. by 2030, largely enabled by an increase in the share of renewable energy in electricity generation to up to 80 per cent by 2030. However, this will be very challenging to meet given that total electricity demand over the next ten years is forecast to grow by between 19 and 50 per cent, driven by a range of factors including large energy user demand growth and the electrification of heat and transport.

#### HARNESSING DIGITAL - THE DIGITAL IRELAND FRAMEWORK

Ireland's national digitalisation strategy, *Harnessing Digital - The Digital Ireland Framework*, is a high-level national framework to position Ireland as a digital leader, at the heart of European and global digital developments.

The Strategy sets out a pathway to drive and enable the digital transition across Ireland's economy and society. It seeks to assist people and businesses to fully realise the benefits of digitalisation. These include more flexible and remote working and new job opportunities; new markets and customers for businesses; more efficient and accessible public services for all; and empowerment and choice in how we learn or participate in social activities. The strategy places a strong emphasis on balance, inclusiveness, security and safety, underpinned by a coherent governance structure and a modern, cohesive, well-resourced regulatory framework.

Data centres, along with connectivity and cyber security, are important infrastructure enablers in an open modern economy, facilitating digital transformation of SMEs and associated productivity and competitiveness gains. Data can drive research and innovation and the training of AI systems in areas such as health, transport, agriculture, and the environment.

Digital technologies have a vital role to play in enabling decarbonisation including through the gathering and analysis of important data for mitigating and adapting to climate change and protecting and restoring biodiversity and ecosystems. They can also help to unlock carbon emission reductions in hard-to-abate sectors such as buildings, industry, and agriculture – through solutions such as aggregated energy system monitoring and management systems, renewables certification and product passports.

However, policy needs to ensure the positive benefits for sustainability are maximised and that digital technologies are used in a sustainable manner to ensure the energy and circular economy challenges from digitalisation are aligned with our climate objectives.

## **Data Centres are Core Digital Infrastructure**

Data centres represent a core digital infrastructure for both Ireland's and Europe's digital economies and for strengthening Ireland's position as a strategic international location for IT services. This is the infrastructure that lies behind all digital aspects of our social and work lives, including video calling, messaging and apps, retail, banking, travel, media, and public service delivery in areas such as healthcare and welfare.

Data centres enable digital economies through hosting critical software and data that allows the world's leading companies to run their businesses, organise their supply chains, pay their staff, and host video conferencing applications. These are the suite of technologies and services that have facilitated the digitalisation of our economy, our work lives and many of the online applications, services and platforms widely used across society. During the pandemic, they enabled business and communities to quickly move to a remote model. Data centres also host and deliver entertainment and content services into homes.

More broadly however, data centres are also the means by which Ireland's major technology companies process and store companies' most sensitive and strategic assets. They are also the means by which they are transitioning their businesses to the cloud, making Ireland critical to their global presence. Investments by technology multinationals in large, long-life assets such as data centres further secures the presence of the global technology sector in Ireland.

Ireland is home to a significant cluster of digital infrastructure and service providers. To maximise the benefits of technology advancements including from 5G, AI and virtual reality, Ireland will need to continue to facilitate sustainable data centre development and the associated technological and economic spillovers.

Digital Infrastructure such as data centres underpins our technology sector, which is increasingly cloud based. Ireland's technology sector accounts for €52 billion (16%) of gross value added and employs 140,000 people – equivalent to 6 per cent of total national employment with 40 per cent growth over the last five years.

A CSO publication, *Information and Communications Technology: A Value Chain Analysis* 2019, highlights the economic contribution of the ICT sector. In 2019, output for the ICT sector amounted to €128bn. Total exports of services from the sector were some €121.4bn from both foreign and domestic firms, with domestic ICT companies exporting 37 per cent of their output. Technology companies invested €46bn in fixed capital assets in 2019, with R&D investment of €1.392 bn.

Data centres are not a separate or optional economic infrastructure – they are integrated into our data-driven knowledge economy and information society. Digital infrastructure should be assessed in the context of the total economic value it gives rise to, including employment across the value chain, as well as its role in underpinning the evolving data economy. Our data-driven technology sector drives innovation, productivity, and overall economic activity. The data stored in Irish data centres underpins an increasing base of employment intensive businesses. Much like transport or energy infrastructure, data infrastructure facilitates activity and the commercial ecosystem around it.

According to IDA Ireland, companies that operate data centres in Ireland, including hyperscale data centres and smaller colocation providers, account for approx. 16,000 direct employees. However, when contractor numbers are factored in, that number reaches 27,000. Between hyperscale and colocation data centre providers, they provide hosting capability to a range of software, services and consumer companies that create tens of thousands of additional jobs here. In many cases, the ability to host data here and use Irish data centres to sell product or services is a critical part of their presence in Ireland.

These companies are responsible for very substantial economic value through payroll taxes, exports, corporation taxes and other expenditures such as capital expenditure, materials and services' inputs sourced in the Irish economy. In addition, the tech company presence here enables a substantially greater number of companies that require hosting infrastructure in Europe. Data centre investment and the wider technology multinational company base in Ireland has had a positive and supportive influence on the development of the indigenous technology sector. The strong presence of these companies in Ireland has had the effect of developing a cadre of senior technology executives in Ireland, some of whom have gone on to start or work in early-stage indigenous companies. A strong brand of Ireland as a technology-led economy gives indigenous companies credibility as they engage in international business opportunities. This includes high tech construction companies that build data centres in Ireland and have now grown into large export-oriented businesses constructing data centres across Europe.

Strong, reliable and cost-effective data infrastructure is necessary to maximise the opportunities for Irish and European businesses from digitalisation. Businesses hosting content and software in the cloud or adopting a software as a service (SaaS) business model, can seamlessly deliver their services anywhere in the world. This ease of delivery and customer assistance presents export opportunities for Irish technology companies. Importantly, due to real time communications as a result of data networks, the development and support of international customers can be performed from Ireland.

#### INTERNATIONAL CONTEXT

While Ireland hosts a key cluster of data centres and technology companies, the growth of the sector here is part of an enormous global digital transformation. Digital technologies are now a key communication platform for all types of global connection, commerce, and public services. The important economic and societal role of digital services such as video calls,

health information, vaccine booking systems, streaming services, and remote work technology became ever more apparent around the world during COVID-19. Data centres securely store and manage the data which now forms much of the world's information, commerce, and interpersonal connection.

Europe's data centre capacity is predominately based in 5 key clusters - Frankfurt, London, Amsterdam, Paris and Dublin. The Bloomberg NEF report, *Data Centres and Decarbonisation*, explains their dominant position; Frankfurt, London and Amsterdam have some of the largest internet exchanges, including The London Internet Exchange (LINX), DE-CIX in Germany, and AMS-IX in the Netherlands, exchanging huge volumes of traffic. Dublin has become a hub for hyperscale and co-location centres, given its success in attracting technology companies, temperate climate and large wind energy resources.<sup>1</sup>

Global data centre demand is increasing. A DLA Piper report, *The meteoric rise of the data centre: Key drivers behind global demand*, found the total value of investment in global data centre infrastructure more than doubled to USD \$59.5 billion while the number of transactions reached 117 in 2021, a 64% annual increase.<sup>2</sup> The European Data Centre market has been growing at around 12% annually for the last few years, driven by increased demand for computing and by a rapid migration of many business processes to the cloud.<sup>3</sup> Ireland is one of many countries, such as Singapore, the Netherlands, Germany and Norway, balancing data centre development with concerns on energy consumption, emissions and the opportunities and challenges of this type of infrastructure.

## **Electricity Grid Capacity and Energy System Transformation**

#### DATA CENTRE DEMAND PROFILE AND ELECTRICITY GRID CAPACITY

Ireland's electrical power needs are serviced by just over 10,000 MW of generation capacity, a 500 MW EWIC Interconnector to Britain, and 185,785 km of 400 kV, 275 kV, 220 kV, 110 kV, 38 kV, medium and low voltage transmission and distribution circuits, of which the high and medium voltages all serve data centres.

The last 4 years have seen annual increases in electricity demand usage of around 600 GWh from data centres alone – equivalent to the addition of 140,000 households to the power system each year. EirGrid predicts that if all contracted capacity were connected, data centres would make up between 25% and 33% of Ireland's electricity demand by 2030. These forecasts are based on data centre projects already contracted to connect to the

<sup>&</sup>lt;sup>1</sup> BloombergNEF, Data Centers and Decarbonization Unlocking Flexibility in Europe's Data Centers

<sup>&</sup>lt;sup>2</sup> <u>The meteoric rise of the data centre: Key drivers behind global demand | Actualités | DLA Piper Global Law Firm</u>

<sup>&</sup>lt;sup>3</sup> BloombergNEF, Data Centers and Decarbonization Unlocking Flexibility in Europe's Data Centers

electricity system, which are all located in the Greater Dublin region. New data centre projects, not yet contracted to the electricity system, would only further increase electricity demand. EirGrid is aware of up to 1GW of these prospective data centre projects. This would present additional challenges for grid capacity and the emissions targets set for the electricity sector in the Climate Action Plan.

In addition, many of these data centres require significantly large loads at a specific site. The average size of a data centre connection request to EirGrid is for a capacity of 80 MW. This has ramifications not only for the resilience of transmission network in those regions, but also to power system adequacy at a national level.

Despite significant success in accommodating a large data centre sector and helping to position Ireland as a technology sector 'hub', electricity grid development has not been able to keep up with the pace of demand growth in recent years. In the Greater Dublin region, the transmission system has been extended to cater for additional demand, in particular from data centres, with new substations and associated transmission circuits built. However, Dublin's transmission system has been pushed to its limit, with EirGrid advising the region will not be able to accommodate new requests for power from data centres until significant reinforcement of the transmission network is delivered, through the *Power Up Dublin* Plan. Substantial investment in infrastructure in Dublin and other constrained areas is required to address these challenges, and facilitate a smarter, more efficient grid for all users. Infrastructure delivery on this scale can be costly and challenging, and some aspects of this investment may have a long delivery timeline.

In its Shaping our Electricity Future 2021 roadmap, EirGrid signal that 300MW of additional new data centre connections could be accommodated on the transmission network contingent on the developments proposed in that plan, including transmission reinforcement. This identified 300MW capacity would ideally be subdivided across 3 or more projects, preferably located in parts of the west or south-west of the country that are close to the 220 kV network. The 300MW assumes a moderate growth rate for demand from currently contracted data centres. EirGrid advises that data centre demand beyond this would necessitate further significant reinforcements which would need to be balanced against wider grid investment and decarbonisation objectives.

Outside of Dublin, the locations that may be able to cater for projects of the size of a typical data centre include industrial areas near Cork or Limerick city, although capacity for new data centre development at these locations is necessarily finite. There are few or no remaining locations on the power system that could accommodate multiple large data centre without becoming constrained. Another option is that data centres in regional locations could be located near to renewable generation to reduce their burden on the grid and ensure that they consume renewable energy when available. While further network reinforcement might open up more regions to data centre development, this investment will need to ensure that network reinforcement also serves grid decarbonisation objectives through connection of renewables. Outside of Dublin, there may also be opportunities to develop additional grid capacity where private investment can co-deliver grid connection, electricity generation and

demand opportunities, perhaps alongside fibre optics / telecoms infrastructure, in strategically and environmentally suitable locations close to significant national infrastructure. For example, the availability of high-capacity transmission system infrastructure, renewable energy generation and existing gas grid in parts of the Midlands may make the region suitable for 'energy park' type developments.

The Government recognises that proximity between data centres and end-users has a practical impact, in terms of latency and speeds of data transfer. In some cases, expansion outside of Dublin would be difficult for digital infrastructure requiring proximity to the existing data centre cluster. Given the practical constraints on grid capacity, pragmatism and innovation on the part of data centre operators will be required.

#### DECARBONISATION

As outlined above, the Climate Action Plan aims to meet 80% of electricity demand from renewable sources by 2030. This represents an ambitious goal and any significant increase in electricity demand (such as from additional data centres) would require an increase in the amount of renewable capacity and enabling services to be installed.

For example, in order to meet the 80% renewable target, a data centre consuming on average 100 MW would require an additional c. 180 MW of offshore wind, or 230 MW of onshore wind, or 730 MW of solar, to match this extra demand with sufficient renewables, accounting for their intermittency. This assumes the data centre is located where it can access renewable sources. In current circumstances, this renewable generation requirement would be additional to c. 120 MW of non-variable generation (typically gas-powered) to provide for the data centre when weather conditions cause renewable output to be low. Given the intermittency of our renewables, flexibility of data centre demand to 'match' renewable generation will become increasingly important in future and can assist in meeting our decarbonisation objectives.

There may be options to develop sustainable off-grid power solutions in constrained or other areas – while maintaining the objective to connect to the national grid and enable the regional electricity system in the medium term. Where a 'behind-the-metre' generation solution is proposed with limited or no connection to the electricity system, it is essential that developments are consistent with a planned trajectory to net zero emissions, including through decarbonised gas if applicable and that they do not threaten energy security. 'Islanded' data centre developments, that are not connected to the electricity grid and are powered mainly by on-site fossil fuel generation, would not be in line with national policy. These would run counter to emissions reduction objectives and would not serve the wider efficiency and decarbonisation of our energy system. Growth in 'Islanded' data centres could result in security of supply risk being transferred from electricity to gas supply, which would be a significant challenge given Ireland's reliance on gas importation.

Many data centre operators have set themselves zero carbon objectives and are looking to power themselves completely through renewable energy. With prudent planning, this can act

as a catalyst for the decarbonisation of the wider electricity system and help to meet Ireland's world leading renewable energy objectives.

#### SECURITY OF ELECTRICITY SUPPLY

The National Energy Security Framework, published in April 2022, sets out the Government's response to the Ukraine crisis in relation to natural gas, oil and electricity. Separately, the Department of the Environment, Climate and Communications (DECC) is carrying out a review of the security of energy supply. At EU level, REPowerEU initiative sets out a range of measures and options to mitigate the geopolitical risks to EU energy security and expedite the transition to renewable energy.

The Commission for Regulation of Utilities (CRU) has advised that the power system is facing potential capacity margin shortfalls over the next few years – effectively meaning there is a likelihood that projected generation supply may not be enough to meet forecast demand at peak demand periods. DECC is working with key stakeholders, including EirGrid, ESBN and the CRU, as well as the wider electricity industry, to ensure this outcome is avoided. Government is alert to the risks to electricity security of supply; and the regulator, system operators and policy makers are undertaking a range of measures to mitigate such risks. The invasion of Ukraine by Russia has also highlighted the dependency on gas supply, and actions relating to the future security of gas supply are underway, under the auspices of the National Energy Security Framework, involving the above stakeholders and Gas Networks Ireland.

There are a range of factors that have contributed to this constrained supply and grid capacity situation. In addition to growth in demand, approximately 500MW of contracted capacity has failed in its commitment to deliver in the short term, over the period where many conventional generation units in Ireland are near their end of life or need to be closed due to emissions restrictions. This is coupled with a less attractive investment space for traditional fossil fuel generation due to global action on decarbonisation.

This confluence of risks is not directly caused by any one sector. However, these constraints must be recognised, and policy must prioritise the sustainability and reliability of our electricity system when considering the demand for further data centre growth and our other policy objectives.

To address these risks the CRU published on 23 November 2021 the "CRU Direction to the System Operators related to Data Centre grid connection processing" (CRU/21/124). This decision allows the data centre industry to continue to connect to the electricity grid, subject to certain conditions. New data centre connections are required to have on-site generation (and/or battery storage) that is sufficient to meet their own demand and, to assist in full decarbonisation of the power system, this generation should also be capable of running on renewably sourced fuels (such as renewable gas or hydrogen) when supplies become more readily available.

#### DEMAND FLEXIBILITY AND SYSTEM SERVICES

The Climate Action Plan 2021 commits to ensuring that 20-30% of system demand is flexible by 2030. Given economies of scale, it is appropriate that data centres make a higher proportional contribution to this target. Securing flexibility in demand from a data centre is more straightforward than getting the same flexibility from a similarly sized block of demand made up of a diverse set of small businesses, public facilities, and domestic users. As renewables grow in importance, a more flexible pattern of data centre demand can reduce the need for fossil-fuel generated electricity and help with decarbonisation.

While not without difficulty, this could be managed through a 'follow-the-renewables' model, where data storage load and the associated electricity demand are moved between data centre locations nationally and globally, depending on where renewable generation is available. This system would move data centre energy demand dynamically to use renewable energy to its fullest availability and reduce the carbon intensity of data.

In terms of the demand flexibility required, ESB Networks is developing an interactive mapbased tool which will give a 10-year outlook of the volume and nature of flexibility needed in different locations. This should provide transparency as to the likely market opportunity for flexibility, and the degree of activity that would be required of users in a given location. This tool is planned to be advanced by the end of 2022.

In the short term, a variety of solutions to improve efficiency and reduce carbon intensity will be required, alongside stringent management of overall demand ramping.

#### **CORPORATE POWER PURCHASE AGREEMENTS**

A corporate power purchase agreements (CPPA) is an arrangement whereby renewable electricity is procured through a direct contractual agreement with a renewable electricity generator. CPPAs have a role to play in decarbonising the electricity sector and ensuring demand growth from large energy users, such as data centres, reduces the cost of reaching renewable energy targets. Outside of the Renewable Electricity Support Scheme (RESS), a number of CPPAs have been executed by data centres in Ireland in recent years to finance renewable electricity generation projects. Data centre operators purchasing CPPAs that add additional renewables, and use our electricity grid efficiently, can play a positive role in Ireland's renewable energy transformation. However, the location of data centre demand in proximity to renewable generation will be key to this objective.

In addition, the EU framework is being strengthened through proposed revisions to the Renewable Energy Directive to promote CPPAs as a means of increasing Member States' and EU-wide rollout of renewable energy sources. The current energy crisis in Europe also highlights the potential for CPPAs to mitigate the impacts of energy price volatility for businesses, while also reducing their electricity emissions impact.

#### Figure 1: The CPPA Roadmap

The CPPA Roadmap, which was the subject of a public consultation launched by the Sustainable

## Energy Authority of Ireland (SEAI) in February 2021, sets out key principles to guide the development of CPPAs in Ireland, including:

- GHG emission reduction
- Lowering electricity costs
- Transparency and accuracy
- $\circ$  Innovation
- Community support
- Alignment with EU Green Deal

Policy seeks to exploit potential synergies in temporal and spatial matching of the contracted renewable electricity generation and corporate demand to achieve otherwise unattainable emissions reductions for the sector and electricity system. The CPPA Roadmap also provides a timeline of actions and follow up steps to assist in the implementation of these principles.

#### BALANCING GRID INVESTMENT EXTERNALITIES, COSTS AND POLICY OBJECTIVES

The CRU in its role as an economic regulator recognises that the electricity system is a capital-intensive system which requires long-term foresight and planning. Investments made in the electricity system are often sunk and irreversible. The energy consumer invests in the development of the electricity system through Use of System charges. When generation is procured to meet projected demand based on the latest Generation Capacity Statement estimations, this investment is delivered through the Capacity Remuneration Mechanism of the Single Electricity Market, with the energy consumer being the ultimate counterparty. In its decision of November 2021, the CRU highlighted that due to the rapid increase in data centre connections, as compared to other large energy user industries, the security of supply and financial risks to the energy consumer are increased. The CRU, as regulator of the grid operators, as well as policy makers, have to balance these risks in the interests of all electricity customers.

It is essential that the costs of new infrastructure are appropriately and fairly allocated, reflecting the drivers of peak capacity and ensuring that cross-subsidisation between electricity customers does not arise. Where demand from data centres is driving the need for infrastructure investments, the developer will be required to cover the fair costs of that investment. In some cases this might include contributing to grid backbone reinforcement. Value for money considerations and the long-term benefit of particular grid infrastructure for all users are critical when considering new grid investment, with priority given to projects that contribute to our national climate objectives and the low carbon transformation of our energy system.

The CRU is the regulator with responsibility for ensuring appropriate levels of investment in our electricity infrastructure, and for the subsequent proportionate allocation of costs for this investment, across all electricity customers. The regulator is currently undertaking a review

of the structure of charges that the electricity network operators (EirGrid and ESBN) levy for the use of their networks<sup>4</sup>.

The decarbonisation and transformation of our electricity grid is an opportune time to review electricity network tariff structures to deliver tariff structures that are in the best interest of consumers and are fit-for-purpose for the modern evolving electricity networks; and that help facilitate a low carbon future that is secure, competitive and cost-effective. The way in which the system operators charge developers for large new grid connections and assess grid costs may need to evolve to incentivise efficient use of the grid and available capacity. Similarly, the allocation of the PSO levy, which funds renewables, may need to be revised to ensure large energy users are paying appropriately for the additional renewable generation required to meet their demand, as part of a competitive, fair and proportionate distribution of these costs.

Growth in electricity demand increases the need for investment in our electricity grid and the development of renewables. Where this demand growth is driven by data centres, they should be required to pay their share of these investment costs. As set out in this statement, it will be the responsibility of policy makers and regulators to ensure that where additional costs are incurred, whether these costs are associated with grid development or on additional renewable capacity, they are allocated as efficiently as possible to ensure that data centre developers, and indeed all large energy users, pay their full share of any additional costs their deployment gives rise to. A work programme will be developed by the Department of Environment, Climate and Communications in this regard.

Finally, from an enterprise policy perspective, it is desirable to have a diversity of high valueadded manufacturing and service activity, a small but important cohort of which will be in energy intensive sectors. The provision of energy infrastructure and grid capacity has to facilitate decarbonisation across our economy as well as enabling a diversified range of industrial development. Therefore, a balanced approach is required, and this Statement articulates the Government's approach to ensuring that additional data centre development creates value and opportunity for our society and wider economy.

## **Decarbonising Data Centres and our Electricity System**

### DATA CENTRES CAN SUPPORT EFFICIENT ELECTRICITY INFRASTRUCTURE

Extensive planning is required when commissioning the infrastructure to provide for data centres' energy needs. Data centres are typically large facilities with extensive energy management capability. As such, they may have the potential to provide local flexibility

<sup>4</sup> CRU: The Electricity Network Tariff Structure Review. https://www.cru.ie/document\_group/theelectricity-network-tariff-structure-review/

services, assisting the secure and efficient operation of the local electricity system. "Flexibility services" means that a site can alter its electricity demand or generation, either by controlling its internal processes (e.g. heating and cooling demand), or using on-site storage or generation.

Some data centres have scope to flexibly reduce their electricity demand at times when the local or national power system is under pressure, either by shifting demand to other sites, or through the use of on-site storage or power back up facilities. Data centres can support the operation of the local system, in partnership with the transmission or distribution system operator. New data centre developments should consider this opportunity and the possibility of becoming a contributor to local network security, supporting the system operator's ability to connect other housing and business developments in the region. Close and cooperative engagement with the connecting authorities at an early stage is essential to assess and facilitate this.

The Government expects that data centres pro-actively prepare for the optimisation of computing loads according to the carbon-intensity of the energy available on an hour-by-hour or similar basis. Data centre operators can continue to invest in software that reduces computing loads, and can engage across sectors and stakeholders to assist policy makers in developing a robust carbon certification and labelling system for cloud computing services.

#### DATA CENTRES CAN SUPPORT RENEWABLE ENERGY

Many data centre operators are corporate leaders in decarbonising data, committing to net zero carbon and 100% renewable energy goals. They articulate these as fundamental priorities that lie at the heart of their respective business plans and long-term visions for future operations, both in Ireland and globally. Ireland's track record in decarbonising electricity through world-leading integration of intermittent renewables is part of what makes it attractive to large technology companies seeking a clear pathway to zero carbon data locations. Data centres also have stable and controllable energy needs, providing a good balance to the daily and annual fluctuations in household and other business energy demands, making good use of renewable availability at off-peak times. The Government's intention is to harness this ambition where possible to contribute to our national objectives, and to facilitate co-location, or co-investment through CPPAs (as outlined above), or alternatively in renewable energy, energy storage, 'energy parks' or other efficient and sustainable energy infrastructure.

Ireland has a potential renewable energy resource far in excess of domestic demand. Demand for renewable electricity can help unlock offshore wind opportunities, energy storage and green hydrogen generation. Enterprise policy seeks to ensure that value-added activities based in Ireland can use this opportunity to provide decarbonised products and services domestically and internationally. Digital services such as those delivered by data centres are well placed to transform renewable energy resources into valuable and sustainable economic and societal benefits. While there are significant challenges to fully decarbonising Ireland's electricity system in the short to medium term, there remains a significant opportunity to capture this level of ambition and for Ireland to retain a global leadership position in digital decarbonisation.

Policy measures can underpin and facilitate this shared objective and obligation. For example, the Sustainable Energy Authority of Ireland (SEAI) and stakeholders are considering measures required to deliver an enhanced reporting framework electricity emissions for Large Energy Users (LEUs), such as data centres under action 99 of Climate Action Plan 2021. Smart and transparent grid information would incentivise and enable LEUs to monitor and reduce the carbon intensity of their demand profile, promoting grid efficiency and maximising their use of renewables.

## DATA CENTRES CAN SUPPORT LOCAL ENERGY SYSTEM DECARBONISATION

Data centres generate waste heat as a biproduct of cooling processes. This waste heat could potentially be recycled to provide heat at low cost, and low-carbon impact, to the local/regional community. By coupling the waste heat from the data centre with additional distributed sources of energy, for example domestic and commercial heat pumps, there may be the potential to significantly reduce local emissions and costs in the surrounding community. The Tallaght District Heating System will be supplied by energy from a data centre and Government policy is to facilitate such use of waste heat, which will help data centres to become 'pro-sumers' (dynamic producers and consumers) of energy.

A District Heating Steering Group has been established, which draws together the expertise of key stakeholder organisations to inform the setting of targets and other key elements for the rollout of district heating at far greater scale.

#### WATER USE

Irish Water supplies approximately 608,000 megalitres of water annually, of which 0.13% (c.810 megalitres) is consumed across all known data centres.

When planning future demand, Irish Water looks at both domestic and non-domestic growth at a national level taking account of growth projections from the National Planning Framework (NPF), the Regional Spatial and Economic Strategies and local authority plans.

To inform its understanding of the Data Centre sector and future trends in water demand, Irish Water has engaged with customers and some of their representatives. Data Centres are becoming increasingly water efficient through technology advances in both IT and cooling design.

Due to the relatively small water volume used by data centres, the key infrastructure challenge is often the capacity of the water pipe network to serve the peak cooling demands at the site location, rather than water treatment capacity. Typically, Data Centres require peak cooling for short periods of the year when the temperature is above 25°C, often

coinciding with prolonged warm dry weather, when low flows and decreased water levels in rivers and lakes result in reduced water availability for public water supplies<sup>5</sup>. Irish Water engages with data centre developers through the pre-connection enquiry process to understand their needs and to incorporate solutions that seek to minimise water demand.

Irish Water have found that the provision of onsite water storage and water reuse can significantly reduce peaks in water demand, reducing pressure on water infrastructure and service levels to other customers. The installation of flow control valves can limit the peak flow used for cooling and refilling onsite storage tanks. These measures mean that modern data centres have relatively low annual average use, resulting in the consumption typical of commercial buildings with canteen and hygiene facilities. Irish Water has installed water demand logging technology that enables the utility to monitor and engage with operators on their long-term water consumption patterns.

#### **EU LEGISLATION AND INITIATIVES**

A number of emerging developments and initiatives at EU level can also assist in improving the energy efficiency and sustainability of data centre operations:

- The Energy Efficiency Directive 2012/27 (EED) mandates that large organisations complete energy audits every four years. The SEAI manages and oversees compliance with Ireland's obligations under Article 8 of the EED. Those obligated bodies must complete an energy audit every four years. On the 14 July 2021, the European Commission published the 'Fit for 55' package, which includes a proposal to recast the EED. This proposal, currently being negotiated, is proposing changes to the minimum energy audit criteria for obligated enterprises and will set out an EU-wide pathway to develop minimum requirements for monitoring and publishing the energy performance of data centres.
- Separately, ecodesign requirements ensure that energy-using equipment meets high efficiency standards, with the standards raised over time to drive product innovation and energy performance. The EU legislation on ecodesign is currently applicable to 31 product groups, with the currently proposed draft Sustainable Products Initiative likely to expand this further. Regulation 2019/424 sets out ecodesign requirements for servers and data storage products such as the equipment used in data centres. SEAI is the market surveillance authority for these regulations in Ireland.

#### Figure 2: The Climate Neutral Data Centre Pact

The Pact is a self-regulatory initiative with the industry aiming to be climate neutral by 2030. Its

<sup>&</sup>lt;sup>5</sup> National Water Resources Plan - Framework Plan (Irish Water, 2021)

signatories include leading data centres and cloud infrastructure and trade associations, including operators based in Ireland. The pact sees data centres as being integral to reaching the objectives of the European Green Deal. Representatives of the signatories and the European Commission meet biannually to review the initiative's status.

Participating data centres, larger than 50KW of maximum IT power demand, set targets to be climate neutral by 2030. These include the following energy efficiency targets;

- By January 1<sup>st</sup> 2025 new data centres operating at full capacity in cool climates will meet an annual PUE (power usage effectiveness) target of 1.3, and 1.4 for new data centres operating at full capacity in warm climates.
- Existing data centres will achieve these same targets by January 1, 2030.

Trade associations and data centre operators have committed to the creation of a new data centre efficiency metric. They have also committed to a circular economy in the reuse, repair, and recycling of electrical components, including server materials, with an ambition for reuse, repair, or recycling of 100% of their used server equipment. Along with PUE and Water Usage Effectiveness, a circular energy system aims to use waste heat in district heating and other potential uses.

### **Principles for Sustainable Data Centre Development**

The Government has agreed a set of national principles that should inform and guide decisions on future data centre development.

It is clear that, in the short to medium term, the capacity of Ireland's electricity grid, and our determination to decarbonise our electricity system, means that not all demand for data centre development can be accommodated. Within the constraints of sectoral emissions obligations, these principles set out the positive role that data centres can play, subject to meeting the requirements set out under the applicable planning and grid connection processes. These principles will be reflected in energy, enterprise and planning policy, regulatory and other decisions across Government Departments, local authorities, enterprise development agencies and other public bodies. The Government is committed to ensuring the principles are effective in prioritising future data centre development that delivers strong economic benefits, sustainable energy plans, and a willingness to assist Ireland's national decarbonisation objectives through a fully supportive planning system and other regulatory regimes. Data centre development that is not consistent with these principles would not be in line with national policy.

#### **ECONOMIC IMPACT**

The Government has a preference for data centre developments associated with strong economic activity and employment. In particular, it favours developments in regional locations, aligned with the National Planning Framework and Regional Spatial and Economic Strategies, which will embed the technology sector in locations and communities that can benefit from this investment, employment and spillover effects. In assessing economic impact, the totality of the Irish-based economic impact should be considered and factors such as associated total corporate employment, exports, wage levels, Irish materials/services purchased taken into account.

The availability of digital infrastructure should serve our national digitalisation objectives, drive innovation, productivity and skills across our economy aligned to the National Digital Strategy.

#### **GRID CAPACITY AND EFFICIENCY**

The Government has a preference for data centre developments that make efficient use of our electricity grid, using available capacity and alleviating constraints. Data centres should engage collaboratively with the respective system operators to understand capacity availability and required grid services across geographic locations, and where connection can be facilitated, provide grid services such as to best utilise available infrastructure to the benefit all electricity customers.

This is in line with the CRU Direction to the System Operators related to Data Centre grid connection processing (CRU/21/124).

#### **RENEWABLES ADDITIONALITY**

The Government has a preference for data centre developments that can demonstrate the additionality of their renewable energy use in Ireland. Developments should provide clear additionality in renewable energy delivery in Ireland, whether through new generation, repowering or otherwise increasing in-country renewable energy capacity – proportionate to the impact of their energy demand.

#### **CO-LOCATION OR PROXIMITY WITH FUTURE-PROOF ENERGY SUPPLY**

The Government has a preference for data centre developments in locations where there is the potential to co-locate a renewable generation facility or advanced storage with the data centre, supported by a CPPA, private wire or other arrangement. Where the combination of technologies at a generation facility is built to match the demand capacity factor (e.g. endeavouring to match the maximum import capacity with export capacity), the same infrastructure may be able to assist both demand customers and generation facilities (wind/solar/battery farm). This would make efficient use of grid investments, reduce curtailment and potentially enable significant decarbonisation of the data centre. The Government also encourages the co-location of downstream value-adding activities that can make use of carbon, excess heat and other outputs from the data centre activity, such as for horticultural activities or district heating schemes.

#### DECARBONISED DATA CENTRES BY DESIGN

The Government has a preference for data centres developments that can demonstrate a clear pathway to decarbonise and ultimately provide net zero data services. It is expected that data centres will align with the EU Climate Neutral Data Centre Pact energy efficiency and water use targets and set themselves targets to achieve zero-carbon electricity use at all hours. System operators will work with large energy users to facilitate accurate hourly emissions reporting, grid carbon-intensity transparency, and allow data centre to optimise computing loads to maximise use of renewables and minimise carbon emissions (as per Action 99 of Climate Action Plan 2021).

#### SME ACCESS AND COMMUNITY BENEFITS

The Government has a preference for data centre developments that provide opportunities for community engagement and assist SMEs, both at the construction phase and throughout the data centre lifecycle. Data centres should provide benefits for regional locations and their surrounding areas through place-making, community engagement and collaboration with local and regional stakeholders to ensure they offer value to the communities in which they locate.

Data centres are also construction projects, built environment and physical investments of scale. By necessity, they have an impact on the geography and communities in their vicinity. Data centre developers should make every effort to minimise the disruption of their construction on these communities.

## Conclusion

The Government is determined that the next decade will see significant transformation of our energy system, economy, and society to decarbonise, and make real progress towards achieving our climate action objectives. We must strike the right balance as to our capacity to accommodate the significant energy demands of digital infrastructure, as we progress the digitalisation of our economy alongside its decarbonisation. These twin transformations will be complementary and the resilience of our infrastructure and sequencing of investments requires prudent planning. In the short to medium term, serious energy infrastructure constraints will prevail and will necessarily limit the available capacity for additional data centre development. The Government is of the view that the principles for sustainable data centre development articulated here will facilitate the appropriate plan-led approach.

In addressing our energy system constraints and unlocking the full potential of Ireland's renewable energy resources, we are building the longer-term foundations for a net-zero-ready economy and society that will be competitive and attractive hub for decarbonised digital services and manufacturing industries. Digital infrastructure is the backbone of our knowledge economy and will continue to serve us well in delivering a future-ready low carbon, high value economy. Ireland will look to capture the value of investments in energy infrastructure, renewable resources, and global leadership in providing data services, as well as our innovative enterprise base, for the benefit and prosperity of society and future generations.