An Coimisiún um Rialáil Fóntais
Commission for Regulation of Utilities

Large Energy Users connection policy

Proposed Decision Paper

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CRU Mission Statement

The Commission for Regulation of Utilities' (CRU's) mission is to protect the public interest in Water, Energy and Energy Safety.

The CRU is guided by four strategic priorities that sit alongside the core activities we undertake to deliver on the public interest. These are:

- ensure security of supply;
- drive a low carbon future;
- empower and protect customers; and
- enable our people and organisational capacity.

Public/Customer Impact Statement

A safe and secure supply of energy is essential for every aspect of our society and economy. It is important that households and businesses are confident that their reasonable demands for electricity can be satisfied. A major challenge facing every country, including Ireland, is how we maintain security of supply at reasonable cost, while decarbonising our generation of electricity and facilitating economic growth. This will be done by increasing Ireland's use of renewable energy, balancing our intermittent renewable resources with our demand profile, reducing reliance on fossil fuels, and reducing the harmful emissions they create. In response to the climate emergency, Ireland has set a legally binding target of a reduction in emissions of 51% by 2030 (compared to 2018 levels).

An additional challenge for Ireland is how we do this at a time when demand for electricity is due to rise sharply as forecast[1] by our System Operators (SOs). Recent and sustained growth in Large Energy Users such as data centres is having an impact on the ability of Ireland's electricity system to meet reasonable demands, that is not comparable to any other sector or industry. The share of electricity consumed by data centres has grown from 5% of total national demand in 2015 to 21% in 2023. Electricity demand from data centres in Ireland is projected to almost double within the next ten years based on already contracted data centre demand connections which are yet to be built and connected to the network. It is expected that data centres will represent 30% of national electricity demand in Ireland by 2030 if no additional data centres are contracted over and above what is already signed up. Data centres are also heavily concentrated around the Dublin area creating additional pressure on the local electricity network, which our SOs have indicated is constrained and in need of a multi-annual programme of upgrade[2].

Data centres are a core infrastructure enabler of a technology-rich, innovative economy. They help to make Ireland a location of choice for a broad range of sectors and value-added activities. Data centres underpin Ireland's digital sector, providing the foundation for many online aspects of our social and work lives. Government policy on data centres aims to enable the "twin transitions" of digitalisation and decarbonisation of our economy and society. There is an opportunity to match this demand with future available renewable resources such as offshore wind energy. The Programme for Government 2025[3] notes the

[1] EirGrid SONI – January 2024 – Generation Capacity Statement 2023-2032 – link here
[2] EirGrid – Powering Up Dublin – link here
[3] Government – December 2024 – Program for Government 2025 – link here

role of data centres in our economy. It also notes the development of a comprehensive plan to accelerate energy generation, connectivity, and planning processes. It states that the plan will emphasise renewable sources to provide certainty for industries making short and medium-term investments and that the plan will also guide the development of data centre infrastructure in alignment with our decarbonisation objectives and growing Ireland's knowledge-based economy.

The CRU has a key role in developing connection policy which sets the framework for determining the conditions under which demand customers can connect to the electricity or gas networks. However, given the step change in energy requirements seen over recent years and the scale of the infrastructure development required to support Ireland's digital economy, the CRU is of the view that a longer-term State-led approach for spatial planning and strategic development in addition to an updated LEU connections policy will be required. The CRU is committed to working with relevant Departments in order to support the delivery of the comprehensive plan referred to in the Programme for Government. This aligns with the commitments set out in the 'Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy' which states that the principles for sustainable data centre development set out within that statement "*will facilitate the appropriate plan-led approach*".

This proposed decision paper sets out conditions for new data centre customers seeking to connect to the electricity network in advance of the potential development of a State-led approach. It was drafted following an extensive consultation process and seeks to represent a fair and balanced response to issues identified and submissions made.

In summary, the main elements of the Commission's **proposed** decisions are:

- This policy applies to all data centres seeking to connect to the electricity network.
- Data centres connecting to the electricity network will be required to provide dispatchable (i.e. available when it is needed by the system) generation or storage onsite or nearby, which will participate in the electricity market.
- The ramping up of a new data centre's demand will be linked to the delivery of the required generation capacity.
- The System Operators should continue to take into account the location of any data centre connection applications and associated generation capacity in respect of whether it is in a constrained or unconstrained region of the electricity network.

- The System Operators will be required to publish regular information on existing and future grid network capacity to accommodate connections on the electricity network and to provide insight to new data centres and other developers.
- Data centres will be required to self-report to the System Operator annually in relation to their use of renewable energy and their sites' emissions. A summary of these reports will be published.

Section 3 of this paper provides more detailed information on all aspects of the proposed decision, including some aspects not covered above.

In addition to the proposed decisions outlined in the paper, the electricity and gas System Operators will be required to conduct a market intelligence exercise to gather information from the data centre industry on the level of interest in prospective data centre demand connections beyond that which is already currently contracted to connect to the electricity and gas networks, to identify whether any unused contracted capacity can be returned to the system, and to identify potential options for Ireland to deliver future connections. This may help to inform a medium-term State-led approach to planning for large energy demand customers.

The CRU is not proposing to introduce any new decisions relating to connections to the gas network as part of this review process but acknowledges that further policy analysis and work is required on this and outlines the parallel work underway relating to gas connections in Section 4.

Comments are invited from interested parties on this proposal until **Friday, 04 April 2025**. Responses to this proposed decision should be submitted via the online CRU consultation portal at link here. Responses received to this paper will be considered and a final decision will issue in due course.

Executive Summary

The purpose of this proposed decision paper is to set out a pathway for connection applications to the electricity grid which addresses risks in relation to security of electricity supply and network constraints while minimising, where possible, potential impacts on national renewable energy targets and carbon emissions.

Ireland has ambitious targets for renewable energy production and has had significant success in the delivery of renewable energy projects to date. In 2023, renewables accounted for 40.7% of Ireland's electricity supply[4]. Ireland has set targets to increase the proportion of renewable electricity to up to 80% by 2030, with targets of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW from offshore wind energy by 2030. Building on the 2030 target, Ireland also has a government policy target of up to 37GW of offshore wind to be developed by 2050. For renewable gas, Ireland has a target of 5.7 TWh (approximately 10% of current gas demand) for indigenously produced biomethane by 2030. The scale of these targets is a strong signal of Ireland's potential to become a global leader in renewable energy production. If delivered in line with Government targets, this level of renewable energy generation is beyond what is currently foreseen to be required to serve national energy demand, meaning that there is an opportunity to consider how best to use this surplus energy, for example through the delivery of more sustainable products and services in Ireland or for exporting to other countries.

Ireland is also a world leader in digital technologies, and the R&D and manufacturing of pharmaceuticals, biotechnology and ICT infrastructure and devices. In recent years many data centres have invested in setting up and expanding their operations in Ireland, providing employment opportunities and data services for other enterprises. Data centres are an important component of Ireland's digital sector, providing the foundation for almost all online aspects of our social and work lives. Harnessing Digital - The Digital Ireland Framework notes that data centres are "*a core infrastructure enabler of a technology-rich, innovative economy, which makes Ireland a location of choice for a broad range of sectors and value-added activities, such as business collaboration, online commerce, banking, and supply chain management.*"[5]

[4] SEAI – September 2024 - First Look: Renewable Energy in Ireland 2023 – link here
[5] Department of the Taoiseach – February 2022 – Harnessing Digital The Digital Ireland Framework – link here

The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy[6] published in July 2022 set out the Government policy aims of enabling the "twin transitions" of digitalisation and decarbonisation of our economy and society, recognising the value of renewable energy and digital technologies to Ireland. The Statement refers to striking "*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*" and notes the principles within the statement will facilitate the appropriate plan-led approach. The twin transitions provide an opportunity for Ireland to match this demand with future ambitions for renewable energy deployment such as offshore wind energy. There may also be opportunities for data centres to enter into offtake arrangements for biomethane within sustainable production limits and taking into account other demands for biomethane and renewable gases. Approaches such as these would need to consider wider decarbonisation of the economy as set out in Climate legislation and Government policy.

Challenges

In recent years, there has been a step-change in electricity demand growth driven by Large Energy Users (LEUs), largely driven by the increase in data centre developments. Ireland's total electricity demand has grown by 24% from 24.6TWh in 2015 to 30.5TWh in 2023. In the same period the electricity consumption used by data centres rose from 5% of total demand to 21%, accounting for 85% of the overall growth in electricity demand.

EirGrid has forecast an increase in electricity demand of 43% (median scenario) over the next 10-year period out to 2032, predominantly driven by anticipated growth in data centre demand and new technology load already contracted by the SOs, and an increased uptake of electric vehicles and heat pumps, particularly later in the decade[7]. Data centre and new tech load electricity demand is projected to almost double from 7.1TWh in 2023 to 13.3TWh in 2032, amounting to 30% of all electricity demand in 2032.

As electricity demand increases, the amount of electricity supply required from new and existing generation also increases. The significant increases in electricity demand over recent years has coincided with a challenging environment for the delivery of grid infrastructure and new generation facilities. The pace at which new electricity demand is

[6] DETE – July 2022 - Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy – link here
[7] EirGrid SONI – January 2024 – Generation Capacity Statement 2023-2032 - link here

being sought by data centres is faster than the pace of network infrastructure delivery and the development of new generation capacity. Ireland's target of 80% renewable electricity in 2030 requires a large proportion of new generation to be from renewable projects such as wind and solar.

Development of the electricity network is the responsibility of Ireland's designated electricity System Operators (SOs): EirGrid and ESBN. It is their combined role and responsibility to develop this critical national infrastructure on the basis of expected future needs. This is determined by the SOs based on a range of inputs such as expected population and economic growth, renewable energy targets, targets for electrification of heating and transport, etc.

In the absence of targets or reliable projections for the level of data centre growth potentially being sought by the industry in Ireland, it is challenging for the SOs to plan and develop the associated infrastructure requirements. The SOs' network development plans developed as part of the overarching Price Review process[8] are developed to deliver upon government and sector plans and policies including renewable targets, to meet security of supply requirements and to meet the increasing demand for electricity including the need to meet the electricity supply requirements for national housing targets. The plans submitted by EirGrid and ESB Networks as part of the PR6 process contain no plans to cover significantly increased LEU demand outside of organic economic growth and Government targets such as those for electrification of transport. Due to the size and scale of data centre demand, in the absence of information relating to the potential size, quantity, timing and location of these projects, the planning of the network to meet this demand is extremely challenging. Unlike with other areas of national policy (e.g. housing, electrification of heat and transport, etc.), there are no national policy targets for data centres in Ireland. For example, in recent years there has been a high concentration of data centre demand in and around Dublin with approximately 50% of the electricity produced in the Dublin/ Meath region today consumed by data centres[9]. This is in addition to the increase in demand associated with other factors such as population growth in a region where the ability to build additional network to connect new customers is very challenging. The concentration of large demand in a relatively small geographical region has resulted in a lot of the available network capacity being fully utilised. This gives rise to constraints within the region, i.e. the limited ability to bring electricity from

[8] The CRU sets Price Reviews on a five yearly basis, which determines the revenues that the network companies can recover from electricity customers through network tariffs. The network tariffs recover the cost of building, safely operating and maintaining the electricity system in Ireland.
[9] CRU calculations based on Central Statistics Office data

where it is generated to where it is consumed, and a need for significant upgrade of the network in the Dublin area in particular.

These elements give rise to the following risks:

- **Security of supply** - the availability of sufficient energy to meet the reasonable needs of all demand customers.
- **Network constraints** - the ability of electricity network to deliver power from where it is generated to where it is consumed, within system security standards.
- **Government targets** – the ability of the network to meet other demand needs/government targets e.g. housing, electrification of heating and transport.
- **Emissions and renewable energy impact** - the ability of Ireland to meet its renewable energy targets, sectoral emissions ceilings and carbon budgets.

Future approaches

In the medium term, some of the challenges around generation capacity are expected to reduce as Ireland builds towards its renewable energy targets. This will be supported by the build out of the necessary electricity grid infrastructure (at both transmission and distribution levels) to support the increased generation and to improve security of supply and grid network resilience in Dublin and other regions. As this infrastructure is being developed, there is a significant opportunity for a more coordinated approach for the development of generation and large demand customers such as data centres. In March 2024 the Department of Enterprise, Trade and Employment, published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy[10]. This sets out how in the longer term, routes to market for Ireland's abundant clean renewable energy will be considered, as well as assessment of regional development opportunities in areas central to the production of offshore wind energy.

The role of data centres in our economy is highlighted in the Programme for Government 2025[11], which outlines an ambition to facilitate data centre growth in the context of efficient grid usage and a reduction in carbon emissions, among other factors. It also notes the development of a comprehensive plan to accelerate energy generation, connectivity, and planning processes. It states that the plan will emphasise renewable sources to provide certainty for industries making short- and medium-term investments and that the plan will also guide the development of data centre infrastructure in alignment with our decarbonisation objectives and growing Ireland's knowledge-based economy. The CRU is of

[10] DETE – March 2024 - Powering Prosperity Ireland's Offshore Wind Industrial Strategy – link here
[11] Government – December 2024 – Program for Government 2025 – link here

the view that this plan can facilitate a more strategic State-led approach, balancing economic development, spatial planning, environmental considerations and infrastructure provision, and is committed to working with relevant Departments in order to deliver on this ambition. To inform such a medium-term approach, the CRU will require the electricity and gas SOs to conduct a market intelligence exercise to gather information from the data centre industry on the level of interest in prospective demand connections beyond that which is already currently contracted to connect to the electricity and gas networks, to identify whether any unused contracted capacity be returned to the system, and provide recommendations to CRU on if/how such demand could be accommodated by the State.

This proposed decision paper provides additional clarity on the pathway for LEU connections to the electricity network where they can be accommodated. Connection policy sets the process for customers to request a new or changed connection on the electricity network and the conditions for access. It does not deliver additional infrastructure or resolve constraints in and of itself, nor does it set Government policy relating to economic or industrial policy development.

Proposed decision

On 21 June 2023 the CRU published a call for evidence paper (CRU202357) to commence this review process, followed by the publication of a consultation paper (CRU2024001) on 15 January 2024. This proposed decision paper sets out the Commission's proposed decisions in relation to its Large Energy Users (LEUs) connection policy review.

The outcome of this work will inform any resulting CRU decision, including any new direction under Section 34 of the 1999 Act, that will apply to all new connection contracts for new or additional capacity captured under the scope of the decision. It is intended that direction CRU/21/124 will be superseded by a new direction to the SOs following completion of this review.

The table below provides a summary of the Commission's proposed decisions in this paper.

Area	**Commission Proposed Decision**
Category of applicant to which the policy applies	This policy should apply exclusively to all data centres seeking to connect to the electricity network. The CRU is seeking feedback from respondents as to whether there should be a minimum level in terms of Maximum Import Capacity (MIC) below which this policy, or elements thereof, should not apply and, if so, what would be a reasonable minimum level of MIC e.g. 500kW or 1 MW.

Location	The SOs should take into account the location of the requested data centre connection and associated generation in respect of whether it is in a constrained or unconstrained region of the electricity network. The SOs are required to publish regular up to date locational information (existing and outlook) in relation to the availability of capacity on the network and network constraint. The format of this will be determined through further engagement with the SOs.
Treatment of onsite or proximate generation and/or storage	Data centres connecting to the electricity network will be required to provide dispatchable onsite or proximate generation and/or storage capacity which matches their MIC (subject to derating requirements), with this generation required to participate in the wholesale electricity market. Participation in a mature stable market like the Single Electricity Market (SEM) can provide a revenue stream which can contribute towards offsetting the initial capital outlay required on the generation assets over the asset lifetime. Data centres providing onsite or proximate dispatchable generation as required under this decision will not be required to meet Mandatory Demand Curtailment (MDC) provisions. The ramping up of a new data centre demand connection towards full MIC is linked to achieving delivery of dispatchable onsite or proximate generation and/or storage in the wholesale market. The onsite or proximate generation must build up in a stepwise manner in line with demand, ensuring that the de-rated generation capacity matches the sites MIC, at a minimum.
Demand flexibility	There is no additional requirement for demand flexibility provisions on all new data centre connections, however the System Operators can require demand flexibility provisions from data centres on the local system as deemed necessary on a case-by-case basis. This may help facilitate the contribution to demand flexibility targets as envisioned under the National Energy Demand Strategy (NEDS).
Renewable energy targets and emission requirements	Data centres are required to self-report to the System Operator annually in relation to their use of renewable energy (directly or through Corporate Power Purchase Agreements (CPPAs)) and their sites' emissions, and the System Operators will annually publish information summarising the information provided by the data centres.

Connection applications will be assessed by the SOs against the requirements of this connection policy prior to the issuing of a connection offer. Some of these requirements may be reflected in the connection agreement as contractual requirements. Where the SO is not satisfied by reference to the assessment criteria that a connection offer can be made to an applicant consistent with the needs of the electricity system, the application will not be processed by the SO, accordingly, the application will terminate.

Renewable energy targets and emissions reductions

Under the provisions of Section 15 of the Climate Action and Low Carbon Development Act 2015 (the Climate Action Act), the CRU and System Operators are required to "perform its functions in a manner consistent with" the furtherance of the national climate objective.

The CRU Large Energy User Connection Policy Review Call for Evidence and the Consultation sought feedback on measures to achieve net zero emissions from LEUs at the time of connection or over a transition period, and requirements that could be placed on applicants under this policy.

The CRU considers that the current provisions under the Climate Action Act do not provide a sufficient legal basis to allow the CRU to explicitly mandate specific emissions reduction and offsetting measures (e.g. to require that connection applicants put in place arrangements to ensure that emissions associated with a demand connection are fully abated from the time of connection or on a set trajectory).

Under Section 9 of the Electricity Regulation Act 1999, the CRU does have a basis however to take account of renewable energy policy in the development of electricity connection policy, namely, to promote the use of renewable energy. This is reflected in the new self-reporting requirement on data centres as captured in the summary table of proposed decisions above.

Gas connections

The CRU is cognisant that there is considerable interaction between gas and electricity networks and a coordinated approach to connections to the electricity and gas networks has merit.

The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy clearly states that islanded data centres (i.e. those connected to the gas network that are not connected to the electricity grid and are powered mainly by on-site fossil fuel generation) are not considered to be in line with Government policy. The Government Statement also raised the potential for security of supply risk being transferred from the electricity to the gas system. Gas Networks Ireland (GNI), as the Gas Transmission System Operator and Distribution System Operator, is the statutory body responsible for security of supply on the gas network. It is GNI's responsibility to monitor security of supply and capacity availability on the gas network and to develop gas infrastructure or take other actions to ensure gas security of supply risks do not eventuate. This is an important consideration for GNI in the context of evaluating any connection applications it receives.

The CRU consulted upon areas such as the use of biomethane and green hydrogen to reduce the emissions impact of LEU gas-fired demand. However, the CRU considers that the provisions under the Climate Action Act and Gas Act 1976 do not provide a sufficient legal basis to the CRU for measures in relation to islanded data centre gas connections and emissions provisions. The CRU is not proposing to introduce any new decisions relating to connections to the gas network as part of this review process. The Government's Energy Security in Ireland to 2030 - Energy Security Package (published in November 2023) outlines that DECC are leading an action "*to review gas connection policy and introduce gas demand flexibility measures*" in 2025. The National Energy Demand Strategy further reinforces this by assigning an action to GNI to *"Undertake assessment to identify flexibility products & services on the gas network ..."*. GNI are working on the development of an interruptible gas capacity product for large energy users which supports the maintenance of gas supply/demand balance. CRU is actively engaging with GNI as a separate workstream to this review in order to progress this work.

Potential evolution of policy

The CRU expects that Government policy, regulatory policy, changes to legislation, renewable energy generation and grid infrastructure developments in the coming years will support the future evolution of LEU connection policy, in line with the ambitions outlined in the Programme for Government 2025. The table below provides an illustration of the potential evolution from the current (proposed) to future potential considerations.

	Current arrangements as per this policy decision	**Future potential evolutions of policy**
Location	Developer led with information provided on locations where capacity is available/restricted[12].	Introduction of strategic development/spatial strategy for LEUs, subject to Government Policy, with coordinated provision of supporting utilities and infrastructure.
Generation adequacy	Requirement to provide onsite or proximate generation, and for this to participate in the wholesale electricity market.	To be reviewed pending potential spatial strategy, build-out of renewables and future system needs, and a Government/State-led approach.

[12] The proposed decision includes the requirement for enhanced publication of network information. This includes capacity maps and network development plans which provide a 10-year horizon.

Renewable Energy & Emissions	Mandatory self-reporting for data centres on renewable energy use and site emissions.	Transition to real-time requirements for net-zero energy use, as supporting networks and market systems facilitate this.

Given the step change in energy requirements seen over recent years and the scale of the infrastructure development required to support Ireland's digital economy, the CRU is of the view that the scale of potential LEU development requires a longer-term State-led approach encompassing spatial planning, targets-based and plan-led infrastructure development, which drives synergies between environmental and enterprise policy. This will help to ensure that the utility infrastructure required to meet the growing demands will be planned in a coordinated and efficient manner, and will provide certainty to the investment community in relation to planning of future projects.

Next Steps

This paper sets out the CRU's proposed decisions following the review of the LEU connection policy. Comments are invited from interested parties on this proposal until **Friday 04 April 2025**. Responses to this proposed decision should be submitted via the online CRU consultation portal at link here. Responses received to this paper will be considered and a final decision will issue in due course.

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Glossary of Terms and Abbreviations

Abbreviation or Term	Definition or Meaning
CRU	Commission for Regulation of Utilities
CAP23	Climate Action Plan 2023
CHP	Combined heat and power, is the simultaneous production of electricity and heat.
Climate Action Act	The Climate Action and Low Carbon Development Act 2015
Electricity DSO	Distribution System Operator (ESB Networks DAC)
Electricity TSO	Electricity Transmission System Operator (EirGrid plc)
Gas TSO and DSO	Gas Transmission System Operator and Distribution System Operator (Gas Networks Ireland DAC, GNI)
GCS	EirGrid's All-Island Generation Capacity Statement 2022 - 2031
GWh	GigaWatt-hours
LEUs	Large Energy Users
MW	Megawatts
MVA	Megavolt-Amperes
NG	Natural Gas
SFO	Secondary Fuel Obligation
SOs	System Operators (being the Electricity Transmission System Operator, EirGrid plc, the Distribution System Operator, ESB Networks DAC, and the Gas TSO and DSO, Gas Networks Ireland DAC)

Abbreviation or Term	Definition or Meaning
The 1999 Act	The Electricity Regulation Act 1999
XLEU	Extra Large Energy User (XLEU)

1. Introduction

1.1. Commission for Regulation of Utilities

The CRU is Ireland's independent energy and water regulator. The CRU was originally established in 1999. The CRU's mission is to protect the public interest in Water, Energy and Energy Safety. The work of the CRU impacts every Irish home and business. The sectors the CRU regulates underpin Irish economic competitiveness, investment and growth, while also contributing to our international obligations to address climate change.

The CRU is committed to playing its role to help deliver a secure, low carbon future at the least possible cost, while ensuring energy is supplied safely, with empowered and protected customers paying reasonable prices and the delivery of a sustainable, reliable and efficient future for energy and water.

Further information on the CRU's role and relevant legislation can be found on the CRU's website at www.cru.ie.

1.2. Legal context

The legal framework within which the CRU has regard to when preparing this proposed decision is as follows:

- Section 34 of the Electricity Regulation Act 1999 (the 1999 Act) provides that the CRU has the power to issue Directions to the Electricity TSO and DSO in relation to the terms and conditions offered to parties seeking to connect to and use the distribution and transmission systems. Those Directions may provide for a range of purposes set out in Section 34(2), and the electricity SOs shall comply with such Directions. Under Section 34(2), Directions given by CRU may provide for, inter alia, those matters which the CRU considers necessary or expedient for the purpose of making an offer for connection to or use of the transmission or distribution system.
- Section 34(4)(a) of the 1999 Act provides that the electricity SOs are not required to enter an agreement with a person for connection to or use of the transmission or distribution system where they have demonstrated to the satisfaction of the Commission that it is not in the public interest to provide additional capacity to meet the requirements to be imposed by that agreement.

- Sections 9(4) and 9(5) of the 1999 Act require the CRU in the carrying out of its duties to have regard to a range of matters, the most pertinent of which for the purposes of this Decision are contained at section 9(4)(a)(ii), to secure that all reasonable demands by final customers of electricity for electricity are satisfied, section 9(4)(a)(v), to promote the continuity, security and quality of supplies of electricity, and section 9(4)(a)(vi), to promote the use of renewable, sustainable or alternative forms of energy.
- Section 9(3) of the 1999 Act provides that it is the duty of the CRU to carry out its functions and exercise the powers conferred on it under the Act in a manner which, in relation to electricity, does not discriminate unfairly between holders of licences, authorisations and the system operators, or between applicants for authorisations or licences.
- The responsibilities and functions of the electricity SOs, arising under the European Communities (Internal Market in Electricity) Regulations 2000 (SI No 445 of 2000), including the duty to operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical and efficient electricity systems with a view to ensuring that all reasonable demands for electricity are met.
- Regulation 28 the European Communities (Internal Market in Electricity) Regulations 2005 (SI No 60 of 2005) sets out the CRU's duty in respect of the security of supply of electricity. Regulation 28(5) provides that the CRU shall take such measures as it considers necessary to protect security of supply.
- Section 8(2) of the Gas Act 1976 provides that the gas SO shall carry out its obligations under this Act in accordance with the Natural Gas Market Directive and having regard to the need to ensure the safety and security of the transmission, distribution and supply of natural gas.
- Section 10A of the Gas Act 1976, requires the gas SOs to offer and enter into agreement with parties for access to gas subject to terms and conditions specified in directions issued by the CRU.
- Section 10A(5) of the Gas Act 1976, provides that an operator shall comply with any direction made by the Commission under subsection (3) or (4) within such time period as may be specified by the Commission in the direction.
- Section 10A(4) of the Gas Act 1976, provides that the Commission may by direction provide for—
    - (e) the terms and conditions upon which applications for an agreement are to be made and the period of time within which an offer or refusal pursuant to an application is to be made by the operator;

- (h) any other matters which the Commission considers necessary or expedient for the purpose of making an offer for third party access, or connection to a facility.

- Section 10A(7) of the Gas Act 1976, provides that subject to subsection (7A), an operator may refuse to enter into an agreement under subsection (2)—

  (a) on the basis of a lack of capacity in its facility save where it is economical for the operator to make the necessary enhancements to the capacity of the facility in accordance with such conditions as may be specified by the Commission in a direction made under subsection (4);

  (b) on the basis of a lack of connection to that facility save where the person making the request is willing to pay for such a connection in accordance with such conditions as may be specified by the Commission in a direction made under subsection (4); (c) where, to enter into an agreement under this section would be likely to involve the operator in a contravention or a breach of—

  (i) this Act, the Electricity Regulation Act 1999, the Gas (Amendment Act 2000, or the Gas (Interim) (Regulation) Act 2002;

  (ii) regulations made under any of the aforesaid Acts;

  (iii) the conditions of any licence granted or consent given to the pipeline operator under this Act or the Gas (Interim)(Regulation) Act 2002;

  (iv) the code of operations (within the meaning of section 13 of the Gas (Interim)(Regulation) Act 2002) of the operator; or

  (v) a public service obligation imposed on the operator by an order made under section 21 (1) of the Gas (Interim) (Regulation) Act 2002, or

  (d) the person making the application does not undertake to be bound by the terms of the code of operations of the operator referred to in paragraph (c)(iv) in so far as those terms are applicable to that person.

- Section 10A(7A) of the Gas Act 1976, provides that the transmission system operator shall not be entitled to refuse the connection of a new storage facility, LNG facility or industrial customer on the grounds of possible future limitations to available network capacities or additional costs linked with necessary capacity increase. The said operator shall ensure sufficient entry and exit capacity for the new connection within a reasonable timeframe.
- Section 6C of the Climate Action Act provides for the preparation of Sectoral Emissions Ceilings which set out the maximum amount of greenhouse gas emissions that are permitted in different sectors of the Irish economy.

- Under the provisions of section 15 of the Climate Action Act, the CRU and System Operators are required to perform their functions in a manner consistent with, inter alia, the approved climate action plan and the furtherance of the national climate objective.
- Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, including its recitals, which provide guidance on the operation of the internal market in electricity.
- The principle of equal treatment arising under European law, which provides that individuals or undertakings in comparable situations must not be treated differently or that individuals or undertakings in non-comparable situations must not be treated in the same way, save where such differential or similar treatment (as the case may be) can be objectively justified (i.e. that the measure taken is in pursuit of a legitimate aim and that it is proportionate).
- The principle of proportionality arising under European law, which provides that any measure must be suitable for the purpose of attaining the desired objective and go no further than is necessary for achieving that purpose.
- The recast Energy Efficiency Directive (Directive (EU) 2023/1791) raises the EU energy efficiency target, making it binding for EU countries to collectively ensure an additional 11.7% reduction in energy consumption by 2030, compared to the projections of the EU reference scenario 2020.
- Directive (EU) 2023/1791introduces an obligation for the monitoring and reporting of the energy performance of data centres. A European database will collect and publish data, which is relevant for the energy performance and water footprint of data centres with a significant energy consumption.
- Directive 2024/1711 aims to put the consumer at the centre of the clean energy transition and can broadly be split into measures that seek to enhance electricity consumer protection, measures intended to further empower electricity consumers in the market and measures that allow more flexibility to accommodate the increasing share of renewable energy in the grid. Directive 2024/1711 amends Article 31 of Directive 2019/944, focusing on the responsibilities of Distribution System Operators (DSOs) to provide enhanced and transparent network information.
- Regulation (EU) 2024/1747 amends Regulations (EU) 2019/942 and (EU) 2019/943 as regards improving the Union's electricity market design. The amendments to Article 50 of Regulation (EU) 2019/943 require Transmission System Operators (TSOs) to provide significantly enhanced and transparent network information.

1.3. Ireland's climate targets

Ireland has ambitious energy targets which have been set in the context of the European Green Deal[13], with Regulation (EU) 2021/1119 of the European Parliament and of the Council[14] establishing the objective of the EU becoming climate neutral in 2050 at the latest, as well as the target of at least 55% reduction in greenhouse gas emissions by 2030 compared to 1990 levels.

Ireland's Climate Action and Low Carbon Development Act 2015 (the Climate Action Act)[15] provides the statutory framework for Ireland to meet its international and EU climate commitments and commits Ireland to a legally binding path to net-zero carbon emissions no later than 2050, and to a 51% reduction in emissions by 2030.

Under section 15 of the Climate Action Act, the CRU and System Operators must, in so far as practicable, perform their functions in a manner consistent with, inter alia, the most recent climate action plan, the furtherance of the national climate objective and the objective of mitigating greenhouse gas emissions.

Sectoral Emissions Ceilings

The Climate Action Act provides for the preparation of Sectoral Emissions Ceilings which set out the maximum amount of greenhouse gas emissions that are permitted in different sectors of the Irish economy during a specific time period. In September 2022, the Government published Ireland's Sectoral Emissions Ceilings, these are shown in Table 1 below. The indicative annual Sectoral Emissions Ceiling for the Electricity sector is 3 $MtCO_2eq$ by 2030, with a total carbon budget of 60 $MtCO_2eq$ for Electricity up to 2030. The target for the electricity sector is to reduce emissions by 75% between 2018 and 2030. In relation to LEUs connecting to the gas network, the most relevant Sectoral Ceilings are those for Industry and Built Environment (Commercial), which have an overall target of reduction in emissions by 35% and 45% respectively between 2018 and 2030.

[13] European Union – December 2019 - Communication from the Commission COM (2019) 640 The European Green Deal – link here
[14] European Union – June 2021 - Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') - link here
[15] Climate Action and Low Carbon Development (Amendment) Act 2021 – July 2021 – link here

($MtCO_2eq$)		Indicative emissions		Indicative emissions (5-year budget)	
Sector	**2018 (baseline)**	**2025**	**2030**	**2021-2025**	**2026-2030**
Electricity	10	6	3	40	20
Transport	12	10	6	54	37
Built Environment - Residential	7	5	4	29	23
Built Environment - Commercial	2	1	1	7	5
Industry	7	6	4	30	24
Agriculture	23	20	17.25	106	96
LULUCF	5				
Other	2	2	1	9	8

Table 1: Sectoral Emission Ceilings for each sector in $MtCO_2eq$

The Environmental Protection Agency (EPA) published Ireland's Greenhouse Gas Emissions Projections 2023-2040[16] in June 2023. This provides an assessment of Ireland's progress towards achieving its emission reduction targets. Two emissions projections scenarios were presented which show two potential outlooks depending on policy development and implementation. One of the key findings by the EPA in this report is that Ireland is not on track to meet the 51 per cent emissions reduction target (by 2030 compared to 2018) based on these projections which include most 2024 Climate Action Plan measures. The first two overall carbon budgets (2021-2030) are projected to be exceeded by a significant margin of between 17 and 27 per cent, with Sectoral Emission Ceilings projected to be exceeded in almost all cases, including Agriculture, Electricity, Industry and Transport.

The EPA described how for energy industries sector preliminary analysis shows that there was a significant drop of almost 24% in emissions from electricity generation between 2022 and 2023. This was caused by a reduction in fossil fuel usage and an increase in net imports from interconnectors. Emissions from the Energy Industries sector are projected to decrease by between 57 and 62 per cent over the period 2022 to 2030. Tables 2 and 3 below show the projected sectoral performances against the target reduction for the sectoral emission ceilings and carbon budgets. These show how it is projected in the With Additional Measures (WAM) scenario that the electricity sector is expected to not meet the emissions reduction target.

[16] EPA – May 2024 - Ireland's Greenhouse Gas Emissions Projections 2023-2050 – link here

Sectors	Emissions 2018 (Mt CO_2 eq)	Projected Emissions 2030 (Mt CO_2 eq)	Percentage Reduction 2030 vs 2018	Target Reduction 2030 vs 2018
Electricity	10.3	3.5	-66%	~-75%
Transport	12.3	8.7	-29%	~-50%
Buildings (Residential)	7.0	4.2	-40%	~-40%
Buildings (Comm and Public)	1.5	0.6	-60%	~-45%
Industry	7.0	5.3	-24%	~-35%
Agriculture	23.2	19.1	-18%	~-25%
Other*	2.1	1.6	-25%	~-50%
LULUCF (no ceiling currently)	4.2	4.9	17%	N/A
Total with LULUCF**	67.6	48.0	-29%	**-51%**

Table 2: Assessment of Achievement of Sectoral Targets under the With Additional Measures (EPA)

Sectors	Projected Emissions 2021-2025 (Mt CO_2 eq)	Sectoral Ceiling 2021-2025 (Mt CO_2 eq)	Projected Emissions 2026-2030 (Mt CO_2 eq)	Sectoral Ceiling 2026-2030 (Mt CO_2 eq)
Electricity	41	40	24	20
Transport	58	54	49	37
Buildings (Residential)	30	29	24	23
Buildings (Comm and Public)	7	7	5	5
Industry	33	30	30	24
Agriculture	113	106	100	96
Other*	9	9	8	8
LULUCF (no ceiling currently)	23		25	
Total with LULUCF**	314	295	267	200

Table 3: Assessment of Achievement of Sectoral Ceilings under the With Additional Measures (EPA)

Climate Action Plan

The Climate Action Plan 2024 (CAP 24)[17] is the latest update to Ireland's Climate Action Plan 2019. This plan includes measures to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030. CAP 24 is the third annual update to Ireland's Climate Action Plan. The plan implements the carbon budgets and sectoral emissions ceilings and

[17] DECC – December 2023 - Climate Action Plan 2024 – link here

sets out a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero no later than 2050.

Table 4 below sets out the key targets in CAP 24 for the electricity sector.

National Target	2025	2030
Renewable Electricity Share	50%	80%
Onshore Wind	6 GW	9 GW
Solar	Up to 5 GW	8 GW
Offshore Wind	-	At least 5 GW
New Flexible Gas Plant	-	At least 2 GW
Demand Side Flexibility	15-20%	20-30%

Table 4: Climate Action Plan 2024 - Department of the Environment, Climate and Communications

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

In July 2022 the Government Statement on the *Role of Data Centres in Ireland's Enterprise Strategy* was published[18]. This set out the Government policy aims of enabling the *"twin transitions*" of digitalisation and decarbonisation of our economy and society. It described how these transitions must be complementary and for this to happen digital and climate change policies need to move in tandem. This statement described how data centres are core digital infrastructure and play an indispensable role in our economy and society. The statement also references the limited capacity and the requirement that those accessing the available capacity must assist in national ambitions to deliver an efficient, low-carbon energy system. The statement noted that '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 as they would run counter to emissions reduction objectives and would not serve the wider efficiency and decarbonisation of our energy system.

[18] DETE – July 2022 - Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy – link here

The Government Statement on the *Role of Data Centres in Ireland's Enterprise Strategy* set out national principles that should inform and guide decisions on future data centre development. These principles are:

- **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 CPPA, private wire or other arrangement.
- **Decarbonised Data Centres by Design** - The Government has a preference for data centre 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.

The statement also described how 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 CRU is committed to enabling the twin transitions of the digitalisation and decarbonisation of our economy and society as outlined in the Government policy statement, within the context of our legislative mandate.

1.5. LEU energy demand and decarbonisation of Ireland's energy systems

In recent years, there has been a step-change in electricity demand growth driven by Large Energy Users (LEUs), largely driven by the increase in data centre developments. In the period from 2015 to 2023 the electricity consumption used by data centres rose from 5% of total demand to 21%, accounting for 85% of the overall growth. Data centre and new tech

load electricity demand is projected to almost double from 7.1TWh in 2023 to 13.3TWh in 2032, increasing from 21% of national electricity demand in 2023 to 30% in 2032.

The CRU Call for Evidence (CRU202357) and Consultation on LEU Connections Policy (CRU2024001) described Ireland's recent and projected electricity and gas use and looked in particular at the impact of LEUs upon this. The Generation Capacity Statement (GCS)[19], is an annual report from EirGrid and System Operator Northern Ireland (SONI). The GCS examines the balance between electricity demand and supply on the island of Ireland for the following 10 years. Figure 1 below, from the GCS document, shows the breakdown of electricity demand across different sectors (using EirGrid's median demand scenario). There is expected to be continued growth in data centre demand in the coming years, with EirGrid forecasting electricity demand to increase by 43% (median scenario) over the next 10-year period out to 2032, with the largest growth projected to come from data centres and new technology load, and the increased uptake of EVs and heat pumps. EirGrid noted in the GCS that by 2030, 30% of all electricity demand is expected to arise from data centres and new technology loads that are already contracted to connect. It is noted in the GCS that the existing contracted demand exceeds EirGrid's high demand forecast scenario, however it is assumed that not all this future contracted demand is fully used, and some attrition will occur.

[19] EirGrid SONI – January 2024 – Generation Capacity Statement 2023-2032 – link here

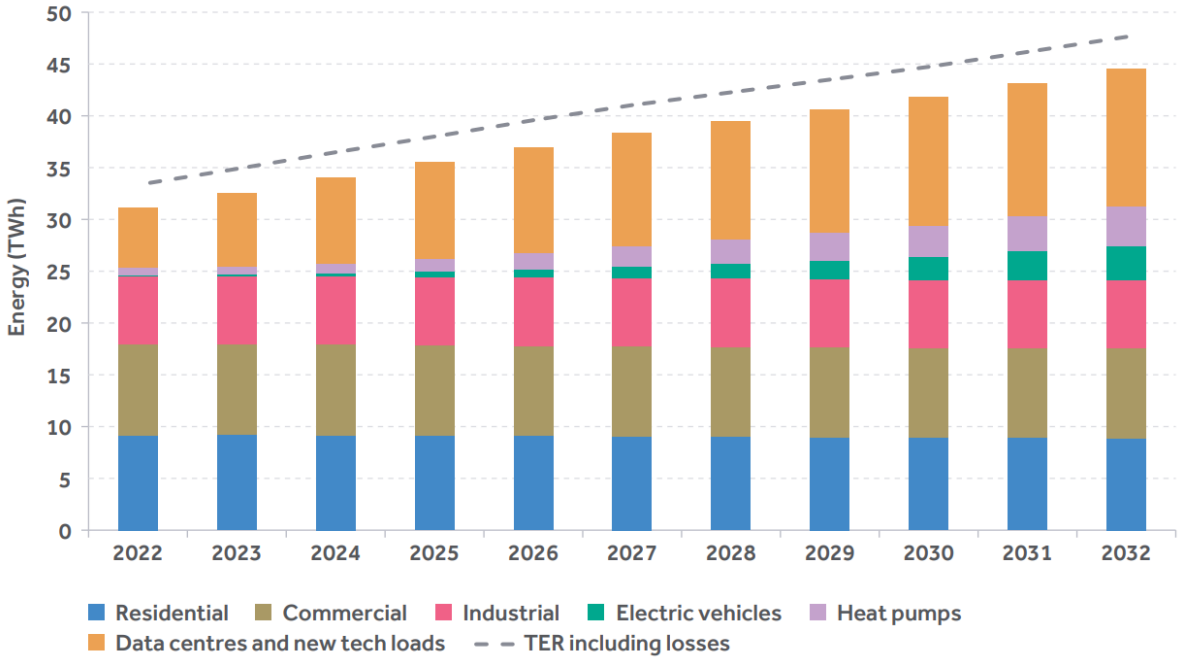

Figure 1: Ireland Median electricity demand scenario illustrating the approximate split into different sectors (EirGrid GCS 2022-2031)

The CRU Review of LEU Connection Policy Call for Evidence and Consultation described how Ireland's electricity and gas systems are in transition. These described how the Climate Action Plan 2023 describes indigenous biomethane production of up to 1 TWh by 2025 and envisages a target of up to 5.7 TWh by 2030. GNI described in the Network Development Plan 2023[20] that annual gas demand is expected to increase up to 2025/26 and then decline for the remaining years of the period towards 2031, this is shown in Figure 2 below. Peak day gas demand is predicted to grow over the ten-year period and is driven by the requirement for dispatchable gas-fired electricity generation to meet the growing electricity demand on days of low available renewable energy, shown in Figure 3 below.

[20] GNI – 2024 – Network Development Plan – link here

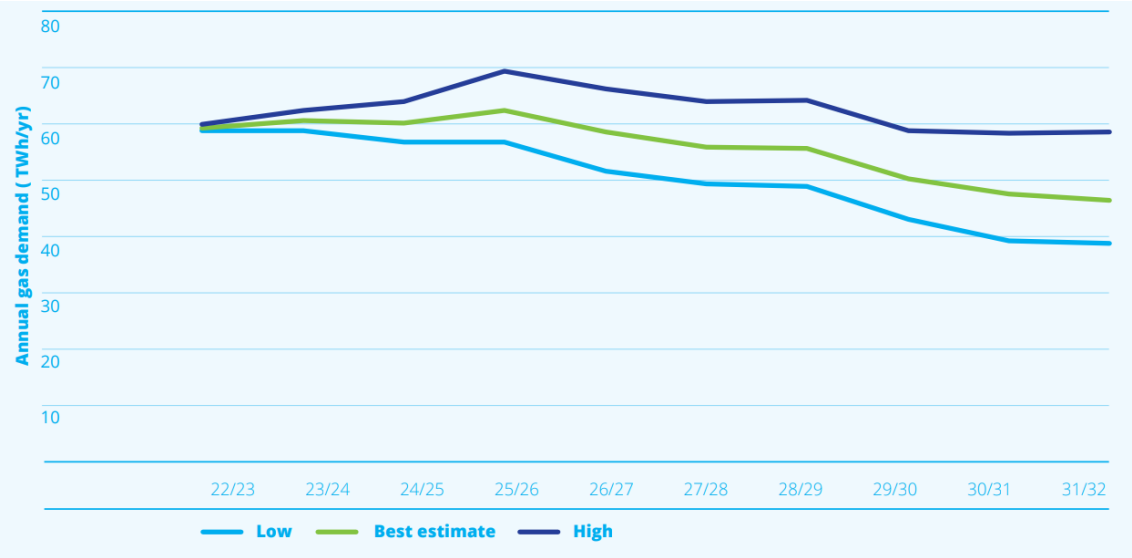

Figure 2: Total annual ROI gas demands (Gas Forecast Statement - GNI)

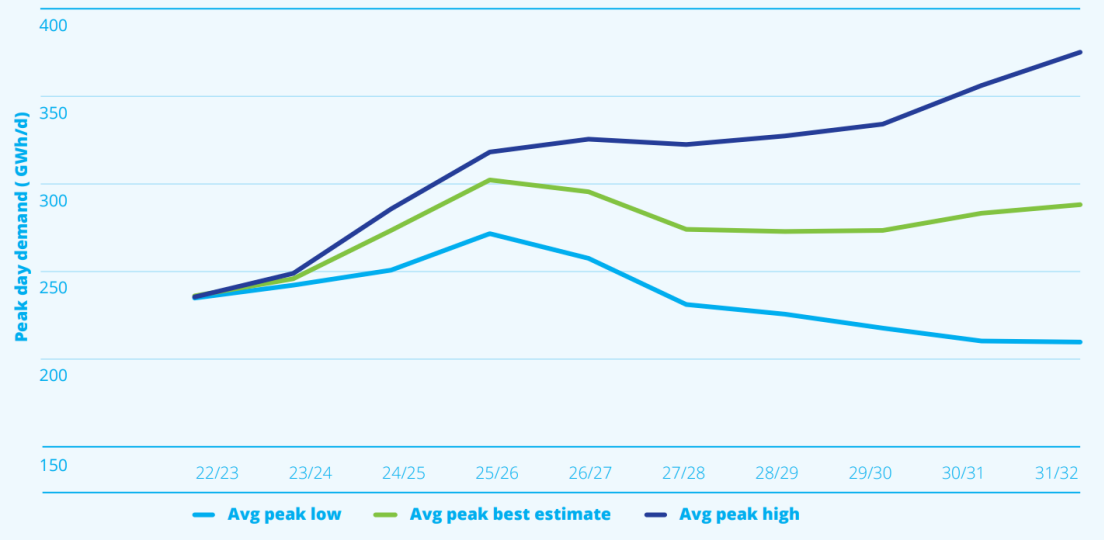

Figure 3: ROI average winter peak day gas demand forecast (Gas Forecast Statement - GNI)

The declining long-term trend of emissions intensity of electricity generation and the growing renewable installed capacity were also described. The Call for Evidence and Consultation described different potential measures to decarbonise the natural gas grid such as renewable gases like biomethane and green hydrogen, and a renewable gas certification scheme. GNI recently published Pathway to a Net Zero Carbon Network[21] which sets out a vision for the realisation of a decarbonised gas network. In consultation CRU2024001 an example was provided to illustrate what generation capacity a limited renewable fuel supply

[21] GNI – June 2024 – Pathway to a Net Zero Carbon Network – link here

could support. Table 5 below approximates the possible capacity of gas generation that could be supported by the biomethane volumes determined in SEAI's Heat Study[22]. The analysis shows that if there is 3.7 TWh of biomethane availability and we assume that a generation plant is running 10% of the time, then approximately 2.1GW of generation can be supported using biomethane. However, if the same amount of biomethane is used for a generation plant running 90% of the time, only 235MW of generation can be supported. This shows how the number of run hours of gas generation greatly impacts the MW capacity that can be supported using only biomethane, considering the three different biomethane volume values. This analysis assumes the gas generation is 50% efficient and that all available biomethane goes to generation.

Available biomethane (TWh)	% of hours running	Installed Gas Generation Capacity (MW)
2.7	10%	1541
2.7	50%	308
2.7	90%	171
3.7	10%	2112
3.7	50%	422
3.7	90%	235
5.1	10%	2911
5.1	50%	582
5.1	90%	323

Table 5: Illustrative example of gas generation capacities based on heat study biomethane volumes

1.6. Background to review

As part of CAP23, the CRU was assigned the action (EL/23/24) as the lead organisation to "Complete and Publish Electricity Demand Side Strategy and Implementation Plan". Following extensive consultation, the final National Energy Demand Strategy decision (CRU202467) was published on 15 July 2024 and it has since entered its implementation phase. One area of the NEDS is a review of the connection policy for New Demand Connections, with an initial focus on new LEUs, which was commenced in parallel with the NEDS consultation.

On 21 June 2023 the CRU published a Call for Evidence on Review of Large Energy Users Connection Policy (CRU202357). This Call for Evidence paper described how Ireland has

[22] SEAI – February 2022 – Sustainable Bioenergy for Heat – link here

seen significant growth in demand in recent years, with LEUs contributing significantly to this growth. It highlighted risks that continuing to allow LEUs to connect to the electricity and gas networks in accordance with previously established arrangements may significantly challenge Ireland's ability to meet the Sectoral Emissions Ceilings and climate targets.

On 15 January 2024 the CRU published a Consultation on the Review of Large Energy Users Connection Policy (CRU2024001). This consultation paper and the different options explored built upon the Call for Evidence. A wide range of potential solutions, and contributory/supporting measures have been identified, including use of a transition period, location of LEUs, non-firm demand connections and demand flexibility. The outcome of this work has informed this CRU proposed decision paper and helped feed into any new direction that may apply to connection applications captured under the scope.

In the intervening period, CRU has engaged intensively with stakeholders, including ongoing and regular dialogue with relevant government departments on a range of issues for mutual consideration, in order to inform the development of this proposed decision.

1.7. Purpose of Paper

The purpose of this proposed decision paper is to set out a potential pathway for connection applications to the electricity grid which address risks in relation to security of supply and network constraints while minimising, where possible, potential negative impacts on national renewable energy targets and carbon emissions. Stakeholders are asked to provide their views on this potential approach. The outcome of this work may inform any resulting CRU decision that may apply to connection applications captured under the scope.

1.8. Related Documents

- **CRU/21/060** - CRU proposed Direction to the System Operators related to Data Centre grid connection
- **CRU/21/124** - CRU Direction to the System Operators related to Data Centre grid connection processing
- **CRU/202357** – Review of large Energy Users connection policy – Call for Evidence
- **CRU/202356** – Energy Demand Strategy Project - Call for Evidence
- **CRU/2023148** – National Energy Demand Strategy – Consultation

- **CRU/2024001** - Review of large Energy Users connection policy – Consultation

1.9. Structure of Paper

This paper is structured as follows:

- **Section 1** provides an introduction to the CRU and background information to this paper;
- **Section 2** describes constrained regions on the electrical system and security of supply;
- **Section 3** sets out the proposed decision on electricity connections;
- **Section 4** sets out the proposed approach to gas connections;
- **Section 5** sets out the proposed direction to the SOs;
- **Section 6** future potential evolution of LEU policy;
- **Section 7** sets out a summary of questions;
- **Section 8** sets out the next steps; and
- **Appendix A** sets out a high-level summary of feedback to the Consultation on LEU connections policy CRU2024001.

2. Constrained regions of the electrical system and security of supply

Security of electricity supply, in a general sense, refers to the electricity system having the appropriate capabilities to maintain supply to consumers. These capabilities are in the form of adequate generation, storage, demand response and network capacity, which in combination meet electricity demand. Constraints on the electricity system arise when the network cannot deliver the electricity from where it is generated to where it is consumed. This can be as a result of having insufficient network capacity or can arise due to the need to meet certain safety and security standards on the system.

2.1. CRU 2021 Data Centre Direction

Following extensive engagement between the CRU and EirGrid on security of supply matters and the role of data centres in this context, EirGrid sent a letter to CRU dated 27 May 2021, which outlined their concerns. In response to this, in June 2021 the CRU published a consultation paper (CRU/21/060). This consultation considered a number of mitigation options, these were:

1. Do nothing.
2. Moratorium on data centre connections.
3. Connection measures.

In November 2021 the CRU published a decision paper (CRU/21/124) setting out that the connection measures approach outlined in the consultation would be taken. The CRU was of the view that imposing a moratorium on data centre connections at that time would have been disproportionate. The connection measures approach entailed the CRU issuing directions to the electrical SOs with criteria against which data centre connection applications to the electrical system should be assessed. This action was in response to an evolving, significant risk to electricity security of supply in Ireland and network constraints issues identified by the SOs. This was following extensive engagement with EirGrid as the electricity TSO. The CRU identified risks that continuing to allow data centres to connect to the electricity network in accordance with previously established arrangements would have significantly impacted the CRU's ability to comply with its statutory obligation to protect the security of supply of electricity by ensuring that the electricity system can meet the reasonable demands of all

consumers, including the demands of existing data centres. Decision paper CRU/21/124 described how many data centres had or were seeking to access extremely large loads at a specific site. It described how to put this demand load in context, an example of data centre with a load of 60 Megavolt Amperes (MVA) would be comparable to the load usage of a large town/small city such as Kilkenny being added to the electricity grid in a relatively short timeframe.

Decision paper CRU/21/124 set out the following assessment criteria for the System Operators to assess applications for the connection of data centres:

- The location of the data centre applicant with respect to whether they are within a constrained or unconstrained region of the electricity system.
- The ability of the data centre applicant to bring onsite dispatchable generation (and/or storage) equivalent to or greater than their demand, which meets appropriate availability and other technical requirements as may be specified by the relevant SO, in order to support security of supply.
- The ability of the data centre applicant to provide flexibility in their demand by reducing consumption when requested to do so by the relevant SO in times of system constraint through the use of dispatchable on-site generation (and/or storage) which meets appropriate availability and other technical requirements as may be specified by the relevant SO, in order to support security of supply.
- The ability of the data centre applicant to provide flexibility in their demand by reducing consumption when requested to do so by the relevant SO, in times of system constraint, in order to support security of supply.

This review aims to provide further clarity on requirements for connections and a pathway for future connections.

2.2. Regional constraints on electrical system

Data centre demand in Dublin

In recent years many data centres have invested in the setting up and expansion of their operations in Ireland, providing employment opportunities and data services for other enterprises. Data centres, as a class of energy user, have the ability to connect to the electricity grid and ramp up their operations far more quickly than most other LEUs. In the

Generation Capacity Statement (GCS) for 2023-2032[23], EirGrid describes how, in Ireland, there is approximately 2,000 MVA of demand capacity that they have contracted to data centres and other new technology loads at the transmission level, and a further 300 MVA contracted at the 110kV distribution level. The GCS sets out that demand from data centres and other new technology loads is expected to continue to rise as these customers build out towards their contracted load, with almost all of this in the greater Dublin region. This uniquely rapid increase in demand from these types of demand customers in the general Dublin region has placed significant pressures on the local system and generation capacity requirements.

Short circuit issue in Dublin region

In a report from October 2023[24] EirGrid noted short circuit current/fault levels in the Dublin region as a challenge. EirGrid indicated that this is a safety and system security issue and is related to the amount of generation connected in the Dublin area and the topology of their transmission network. EirGrid set out how Dublin has a high concentration of synchronous generators, with the highly meshed Dublin network. It was also described how the current fleet of generation in Dublin is connected to the 220 kV network, contributing to the difficulty in connecting additional generation in Dublin. It was stated that given these risks, in 2024 EirGrid will investigate the technical scarcity or need related to short circuit current/fault levels in Dublin. It was suggested that any solutions to the high short circuit levels in Greater Dublin are likely to require remedies that have a very long lead time to implement. EirGrid stated it could involve either delivery of 220 kV or 400 kV circuits to provide more network to allow for sectionalising for power to be transferred around Dublin or connection of new generation to the new 400 kV circuit or moving existing generation to 400 kV voltage level rather than 220 kV voltage level. This high short circuit level issue presents further complexity for the network in the Dublin region and is likely to impact on the ability to connect additional large-scale demand and generation in this region.

EirGrid's Powering up Dublin programme

EirGrid's Local Security of Supply multi-year plan 2023-2027[25] identifies the infrastructure delivery actions and activities that EirGrid will undertake during the period to contribute to the resolution of security of supply issues in the greater Dublin region. Within this document

[23] EirGrid SONI – January 2024 – Generation Capacity Statement 2023-2032 – link here
[24] EirGrid – October 2023 - PR5 Balanced Scorecard and Incentive Multi-Year Plan 2024-2028 – link here
[25] EirGrid – February 2023 - PR5 Balanced Scorecard and Incentive Multi-Year Plan 2023-2027 – link here

EirGrid reference the Powering Up Dublin programme[26] which is an integrated programme of works to update and transform the Dublin Area electricity transmission network. This programme plans to install up to 50km of cables across the city, through six cable and six station projects. The Powering Up Dublin programme plans to replace and upgrade older infrastructure that is reaching the end of its life, helping to improve the overall resilience of the power system. These Powering Up Dublin works are separate to any solutions to the short circuit issues in Greater Dublin outlined above.

As part of the Powering Up Dublin programme, the requirement to build a number of bulk supply points in the Dublin region has been identified. In ESBN's Distribution System Security and Planning Standards document[27] a bulk supply point on the network is defined as a major interface point between the transmission and distribution system. A bulk supply point could be a 38kV or 110kV station, with these nodes typically having different kVA capacities. The drivers of these projects are the need for capacity and transmission circuits to supply the increasing demand that ESBN has forecast on the distribution network, and to provide additional resilience in the Dublin region. ESBN's forecasts for new demand on the electricity distribution network are based on detailed studies informed by explicit targets set out in national policy, localised growth analysis, contracted demand, housing trends (including capacity for EVs and heat pumps), local or regional private and public investment plans, energy efficiency trends and engagement with relevant stakeholders. These forecasts do not include provision for new data centres on the electricity distribution network in these areas.

Rest of Ireland

Outside of the Dublin region in their Shaping our Electricity Future V1.1[28] paper EirGrid described how they have updated their assumptions in relation to the growth of large energy users, putting in 300 MVA of LEU demand in addition to that already contracted connecting outside of Dublin and the Mid-East, stating they have assumed 75 MVA of LEU demand in the Galway, Limerick, Cork, and Waterford areas[29]. As described in Section 2.1 a data centre with a load of 60 MVA would be comparable to the load usage of a large town/small city being added to the electricity grid in a relatively short timeframe. Due to the scale and relative speed of increase of potential demand like this in relation to local system conditions outside of the

[26] EirGrid – Powering Up Dublin – link here
[27] ESBN – July 2021 - The Distribution System Security and Planning Standards – link here
[28] EirGrid – July 2023 - Shaping Our Electricity Future Roadmap: Version 1.1 – link here
[29] Since the publication of Shaping our Electricity Future, additional data centre demand has been contracted outside the Dublin region in line with the requirements set out in CRU/21/124.

Dublin region, the addition of LEUs such as data centres may potentially exacerbate existing constraints or create constraints in previously unconstrained parts of the system and therefore detailed analysis of any such connection applications is required. The location and proximity of an LEU to renewable and/or conventional generation may alleviate some of these challenges.

The network development plans included in the Price Review 6 (PR6) submissions by the SOs are developed to deliver upon government and sector plans and policies including renewable targets, to meet security of supply requirements and to meet the increasing demand for electricity. In the absence of national policy targets relating to data centre growth, the SOs have not included plans in PR6 to cover significantly increased LEU demand outside of organic economic growth and Government targets such as those for electrification of transport, housing etc.

2.3. Data Centre Demand

In the European Commission Joint Research Centre report titled Energy Consumption in Data Centres and Broadband Communication Networks in the EU[30] the energy consumption of data centres and telecommunication networks in the European Union (EU-27) was estimated for 2022. Figure 4 below shows how Ireland is the fourth highest among the EU 27 countries in terms of the amount of electricity used by data centres in absolute terms. Using the same data, Figure 5 below shows how Ireland has by far the highest share of national electricity use by data centres (in % terms) compared to the other EU 27 countries. The report describes how data centres represent 18% of national electricity use in Ireland in 2022, while in the Netherlands it is 5.2%, in Germany it is 3%, and in France it represents 2.2% of national electricity use. This demonstrates Ireland's success to date in connecting data centres in an organic, developer-led environment. In 2022, the share of electricity used by data centres had increased to 21%, and this is expected to continue to grow with EirGrid's GCS for 2023-2032 describing how in their median scenario 30% of all electricity demand in Ireland is expected to come from data centres and new technology loads by 2030. The unique pace at which data centre demand grows, by comparison to other demand types, and by comparison to the speed at which the supporting grid can be delivered, is also notable.

[30] Joint Research Centre – February 2024 - Energy Consumption in Data Centres and Broadband Communication Networks in the EU – link here

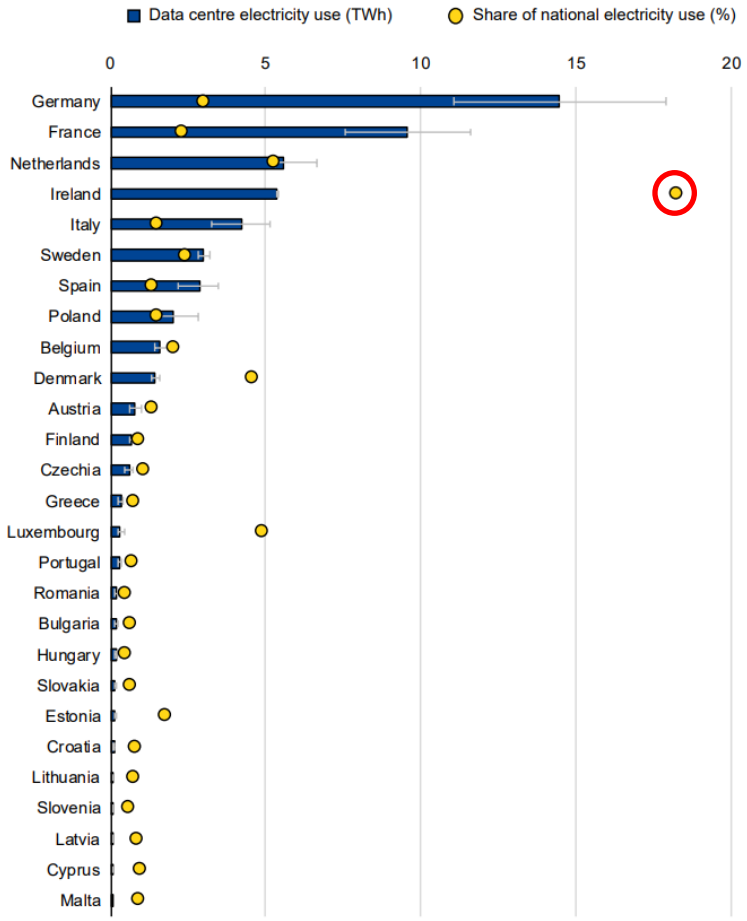

Figure 4: Estimated data centre electricity use by country, 2022 (JRC)

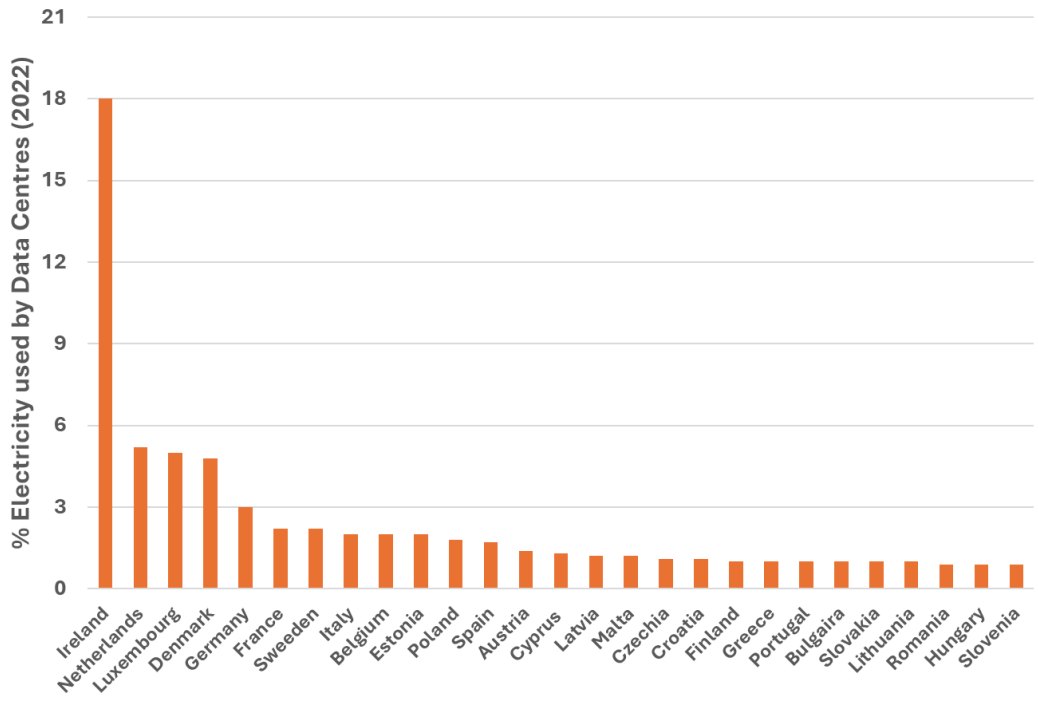

Figure 5: Estimated percentage of electricity used by data centres by country in 2022 (JRC)

2.4. Generation capacity

In the GCS for 2023-2032 EirGrid describes a challenging outlook for Ireland with capacity deficits identified during the 10 years to 2032, in the absence of mitigation measures being taken and new generation being procured. EirGrid describes how the deficits will increase up to 2025 due, *inter alia*, to deteriorating availability of power plants, as well as increasing electricity demand. Any projected capacity deficits in the short to medium term mean that there is a greater chance of reduced reliability of electricity supply. This capacity shortfall creates another challenge in facilitating new LEU demand connections onto the system.

The CRU notes the mitigation measures that have been implemented under the Security of Supply Programme of Work[31] and also notes that additional capacity auctions will help to address the capacity needs which have been projected by EirGrid. Significant volumes of capacity have been procured over the last number of years, and the T-4 2028/29 auction held in December 2024, as per the final auction results, procured a further 606MW (derated) of new capacity (560MW of which is in Ireland). This capacity is due to be delivered by 30 September 2028; however, the SEM Committee has introduced incentives for early delivery in order to encourage new capacity to deliver up to one year early (i.e. from 30 September 2027 for the capacity procured in this auction). Additional Capacity Auctions will also be held in order to serve capacity needs beyond September 2028.

The demand growth projections published by EirGrid in the GCS do not include data centre demand beyond that already contracted by the SOs, and include considerations of the expected use/uptake of contracted capacity based on historic trends. In addition, the pace at which new generation capacity can be planned, procured and delivered by developers does not match the pace in demand growth from data centres. Therefore, in the absence of measures to address this, such as those outlined in this proposed decision, the continued connection of significant LEU demand could present a significant risk for generation adequacy in Ireland.

The short circuit current/fault levels in the Dublin region, as discussed above, also have the impact of limiting the maximum capacity of generation which can currently be installed in the Dublin region.

[31] CRU – April 2024 - Electricity Security of Supply Programme of Work Update – link here

2.5. Network Planning

In order to ensure continued security of supply to existing and new customers, connection policy needs to take the constraints and limitations of the existing network conditions into account. In Section 6 we outline the recommendations from the National Energy Demand Strategy that can unlock new opportunities for data centres and LEUs to contribute to flexibility and security of supply.

Until significant reinforcement works are delivered by EirGrid and ESBN, the ability to accommodate a significant increase in demand on to the electricity network in the Dublin region is likely to be very restricted, notwithstanding the fact that electricity demand from data centre and new tech loads is projected to continue to grow significantly over the coming years from 7.1TWh in 2023 to 13.3TWh in 2032 (from 21% in 2023 to 30% of national electricity demand in 2032), as new data centres which have already received electricity network connections offers from EirGrid and ESB Networks are constructed and connected (EirGrid GCS). EirGrid have a number of documents which identify planned network reinforcement works, e.g. the All-Island Ten-Year Transmission Forecast Statement[32] and the Powering Up Dublin programme referred to in Section 2.2. The reinforcement works that have been identified are based on the GCS and include assumptions relating to demand growth and achieving Ireland's 2030 energy and climate targets. It should be noted that, even with the completion of these reinforcement works, available additional capacity for large new demand connections may still be limited.

Capacity at Bulk Supply Points

Bulk supply points are the major interface points between the transmission and distribution networks. The nationwide electricity transmission system carries high volumes of electricity at high voltages from large generators and storage facilities to bulk supply points near main towns and cities. From these, it connects with the distribution system and directly with some large industrial customers. In their Networks for Net Zero publication[33] ESBN states that it has identified the need for three new 220 kV bulk supply points in Dublin to meet future electricity demand requirements on the distribution system. This is primarily driven by population growth and electrification of heating and transport, with new large energy user data centre sites not included in these projections for Dublin's load growth. The future demand requirements are driven by a combination of expected increased demand by existing customers (e.g.

[32] EirGrid SONI – 2023 - All-island Ten-Year Transmission Forecast Statement 2022 – link here
[33] ESBN – January 2023 – Networks for Net Zero – link here

households with EVs or heat pumps), new housing connections to meet future population growth as well as other new demand connections.

In the context of an already constrained electricity network in certain locations, the capacity available at any bulk supply point or substation can be considered to represent a limited public resource. National Government policies supported by explicit policy targets, such as those relating to housing and electrification of heat and transport require access to some of this electrical capacity in order to be delivered successfully. Demand capacity is currently allocated by EirGrid and ESBN on a first-come-first-served basis on a non-discriminatory basis and, in recent years, a significant amount of capacity in the Dublin region has been allocated to data centre growth. Arising from risks about security of supply and network constraint issues identified by the SOs, the CRU/21/124 Direction has led to a reduction of the rate at which data centre connections in the Dublin region have been approved. This is based on the assessment criteria set out in Section 2.1, i.e. whether an applicant is within a constrained or unconstrained region of the electricity system, and whether they can supply the required capabilities to support security of supply.

In the development of this proposed decision paper, ESB Networks has highlighted risks that, in the absence of an adequate policy response, the potential level of data centre demand could significantly impact its ability to accommodate demand connections required to support Government policy targets such as 550,000 new homes by 2040 (Project Ireland 2040 - National Planning Framework, 2018[34])), 680,000 heat pumps and 945,000 EVs by 2030, major electrified rail projects explicitly identified in the National Development Plan[35] (e.g. DART+, Metroink etc) and other social infrastructure. For example, in West Dublin the new Castlebaggot 220 kV Station was initially designed to support housing growth, relieve pressure from the Inchicore Bulk Supply Point and support industrial growth in Grange castle Business Park as well as future demand needs of the entire West Dublin/Kildare region. However, due to the first come first served connection approach this new capacity at Castlebaggot was almost entirely used by data centres applications, leaving limited capability to support other demand needs in the area. This raises a question as to the allocation of capacity at substations and the timing of demand applications. For instance, where network infrastructure upgrades have been identified to deliver future needs at a specific location, should this capacity be reserved to ensure the successful delivery of national priorities, such as housing, infrastructure and enterprise, in a balanced manner. The CRU is of the view that it does not have sufficient statutory powers to prioritise certain government policy objectives over others

[34] An updated National Planning Framework is currently being developed.
[35] Government – October 2021 - National Development Plan 2021-2030 – link here

under current legislation. The Netherlands Authority for Consumers and Markets (ACM) has recently developed and implemented a prioritisation framework[36] for the distribution of capacity on the electricity grid, which was facilitated by the introduction of national legislation[37]. Parties that contribute to identified social goals can thus be given priority for a connection to the electricity grid.

Operational security

EirGrid noted in their feedback as part of this review that operational issues have arisen regarding the technical performance of data centres on the system. Their observations are that the collective response of data centres to system faults is exacerbating disturbances on the power system via disconnection and automatic reconnection of their demand, and that this behaviour is already presenting some technical challenges. EirGrid has advised that, without mitigation measures, further connection of demand with these characteristics will potentially increase associated risks to the secure operation of the power system. In order to alleviate these risks, EirGrid is engaging with stakeholders in order to develop, in due course, mandatory Grid Code standards, which will ultimately be transposed to the Distribution Code, including fault ride-through capability, to ensure the SOs can securely accommodate the projected growth of demand of data centres. The CRU notes this ongoing work in relation to future standards being developed around system security, including in particular fault ride-through capability.

Strategic Development

The previous sections have outlined the significant growth in data centre demand, and the projected growth out to 2032, and highlighted that Ireland is an outlier compared to other EU countries in the context of the percentage of national electricity demand consumed by the data centre sector. Consideration needs to be given to the implications of increasing demand from new data centres and the opportunities and risks this may present, in particular the risk of one industry representing such a large proportion of Ireland's electricity demand and the speed at which data centre demand can grow by comparison to other industries, and by comparison to pace of grid infrastructure delivery. In light of Government policy to support the "twin transitions" of digitalisation and decarbonisation of our economy and society, and the scale of data centre demand growth relative to the size of Ireland's electricity system, the CRU is of the view that the step-change in energy requirements from LEUs requires a more strategic

[36] Association of Netherlands Municipalities (VNG) – 2024 - Prioritization framework for grid capacity article – link here
[37] Netherlands – 1998 - Electricity Act, 1998 (Netherlands) – link here

approach to infrastructure development. While this policy seeks to provide clarity on the pathway to connections in the near term, a longer-term approach is required to provide clear investment signals. This could consider spatial planning for data centres, facilitating more coordinated, timely and efficient delivery of supporting utilities (e.g. energy, communications, water etc.) and infrastructure. In March 2024 the Department of Enterprise, Trade and Employment published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy[38]. This strategy includes 40 actions that will be implemented in 2024 and 2025 and was developed as part of close ongoing collaboration between the Department of Enterprise, Trade and Employment and other government departments and agencies within the Offshore Wind Delivery Taskforce (OWDT). The CRU also notes the Government's Digital Connectivity Strategy for Ireland[39] which sets out the targets to be achieved by the telecommunications sector in providing digital connectivity across the State and to identify the key enablers that will be implemented to ensure these targets are met. A State-led cross-departmental plan, as noted in the Programme for Government 2025, could give collective consideration to the various Government Strategies and polices in a coordinated manner in the context of consideration of a potential future State-led approach to development.

Future Demand

In the absence of policy targets or reliable projections for future data centre growth in Ireland, it is challenging for the energy system operators to plan and develop the required and associated infrastructure.

The SOs have highlighted that the connection of data centres at continued pace and scale presents a potential risk to the supply of electricity to existing customers and the ability to meet the needs for which the network developments have been planned. If unmitigated, this could result in more areas becoming constrained as new demand connects and existing demand grows. In particular, risks arise where capacity that is being developed to meet future projections for 'organic economic growth' and Government policy targets (housing, electrification of heating, EV infrastructure, etc.) could be taken up by data centres, leaving insufficient capacity for these other needs. While the CRU is of the view that it does not have sufficient Statutory powers to prioritise certain government policy objectives over others under current legislation, the CRU must balance this with the requirement to have regard to ensuring that all reasonable demands by final customers of electricity for electricity are satisfied. For example, allowances should be made for the expected demand growth of existing households

[38] DETE – March 2024 - Powering Prosperity Ireland's Offshore Wind Industrial Strategy – link here
[39] DECC – December 2022 - Digital Connectivity Strategy – link here

as they move to the use of EVs and heat pumps, and the universal obligation to connect households must also be accounted for.

The network development plans included in the Price Review 6 (PR6) submissions by the SOs are developed to deliver upon government and sector plans and policies including renewable targets, to meet security of supply requirements and to meet the increasing demand for electricity including the need to meet the electricity supply requirements for national housing targets. The plans submitted by the electricity SOs as part of the PR6 process contain no plans to cover significantly increased LEU demand outside of organic economic growth and Government targets such as those for electrification of transport.

In order to better understand the scale of potential medium-term demand from prospective data centres, to help inform System Operators, CRU and Government of the risks and potential consequences of seeking to meet such potential demand, and to help inform the potential development of a State-led approach to enable the continued future development of the data centre sector in Ireland, the CRU will ask the electricity and gas SOs to conduct a market intelligence exercise to:

1. Gather information from industry and other relevant stakeholders to understand the expectations for future data centre demand over the next 15 years including timelines, scale (MW size), ramp rates, demand profile (continuous demand or time varying), location preferences, proposed generation and the facility's ability to provide flexible demand.
2. Understand, for existing data centre connections, where there is excess or unused but contracted capacity, if can this capacity be returned to the system.
3. Once stakeholder information from the market intelligence exercise is received, the System Operators shall review the information to assess the scale of projected demand to determine what level of analysis may be required. The System Operators will be expected to engage with the CRU and relevant Government Departments to advise on next steps.
4. Carry out an analysis of this information to identify energy system needs, such as energy supply and energy transmission capacity required, for Ireland to deliver future data centre connections, with reference to existing regulatory and/or SO frameworks for delivery and any new options which could be considered.

The SOs will report their findings to the CRU and it is envisaged that the initial information gathered will be provided to the CRU in advance of the full assessment being carried out. The

CRU expects that the SOs will publish a market intelligence survey call in March/April 2025, and provide initial information gathered to the CRU in Summer 2025. The CRU notes the significant interactions between the electricity and gas networks, in particular where dispatchable or back-up generation is being sought, therefore these interactions should be captured in the assessment. The CRU is not seeking information relating to potential new connections for islanded data centres as these are not in line with Government policy. The CRU notes that the information from industry can be provided on a confidential basis, and should be capable of being shared with the CRU and the relevant Government Departments, notwithstanding any legal obligations public bodies are subject to in relation to the disclosure of information.

The data and analysis provided to CRU may be used to inform future policy development, e.g. a potential State-led strategic approach to delivery of utility infrastructure for data centres in the medium term, and to highlight any risks arising in relation to accommodating organic economic growth. This work will be carried out in parallel with this ongoing review and will be focussed on informing the medium-term approach.

Q1. Comments are invited from interested parties in relation to the topics covered in Section 2 Constrained regions of the electrical system and security of supply.

3. Proposed decision on electricity connections

The aim of this policy review is to provide a pathway for new large demand connections to the electricity and gas systems which respects security of supply and system constraints, promote renewable energy targets, while minimising, where possible, the impact on national carbon emissions. Under the provisions of Section 15 of the Climate Action and Low Carbon Development Act 2015 (the Climate Action Act), the CRU and System Operators are required to act in a manner consistent with the furtherance of the national climate objective. There are a range of considerations that contribute to the implementation of Sectoral Emissions Ceilings (SECs) including Government policy, regulatory policy, and planning and environmental conditions.

The CRU notes that the criteria around connection policy are within the remit of CRU and the system operators. Following legal review, the CRU considers that the current provisions under the Climate Action Act do not provide a mandate to CRU to deliver a connections policy which requires explicit emissions reduction and offsetting measures (e.g. the CRU consulted upon the potential option of requiring demand sites to take such actions as would be required to deliver net zero emissions operations at the time of connection). In the absence of such legal basis, the CRU intends to take more limited actions in respect of emissions, such as to require regular reporting on renewable energy use and emissions by data centres to system operators, a summary of which will be published by the system operators.

As described in Section 2.1 above, in June 2021 the CRU published a consultation paper (CRU/21/060) on security of supply matters and the role of data centres in this context. This consultation considered a number of mitigation options, these were:

1. Do nothing.
2. Moratorium on data centre connections.
3. Connection measures.

In November 2021 the CRU published a decision paper (CRU/21/124) setting out that connection measures approach would be taken. The CRU was of the view that imposing a moratorium on data centre connections at this time would have been disproportionate. The CRU identified risks that continuing to allow data centres to connect to the electricity network in accordance with previously established arrangements would have significantly impacted the CRU's ability to comply with its statutory obligation to protect the security of supply of electricity by ensuring that electricity system can meet the reasonable demands of all

consumers, including the demands of existing data centres. Consistent with the approach taken in decision CRU/21/124 the CRU remains of the view that imposing a moratorium on data centre connections at this time may be disproportionate and proposes to take an approach based on “connection measures”. This decision sets out connection measures that should be taken. The outcome of this work will inform any resulting CRU decision, including any new direction under section 34 of the 1999 Act, that will apply to all new connection contracts for new or additional capacity captured under the scope of the decision. It is intended that direction CRU/21/124 will be superseded by a new direction to the SOs following completion of this review.

Gas connections are discussed separately in Section 4 below.

3.1. Category of applicant on electricity system to which this policy applies

Consultation background

An important part of this review process is to define the category of applicant on the electricity system to which this policy will apply. It was explored in the Call for Evidence (CRU202357) and Consultation (CRU2024001) papers that this definition/scope could be based on a number of different factors. In both papers, it was described how all demand connecting to the electricity and gas systems has a part to play in meeting Ireland’s Sectoral Emission Ceilings. Both papers also noted that electrification of heat and transport is a key requirement to decarbonise these sectors, and this needs to be facilitated to support wider decarbonisation targets. For demand connections to the electricity network, a number of different factors which could potentially be taken into consideration were described, such as demand size, location, whether connected to the transmission or distribution system, and class of user. The CRU set out its initial view in the Call for Evidence that this review should focus on the larger end of the LEU category, for electricity customers at Extra Large Energy Users (XLEUs) e.g. DG10, DTS-T. In consultation CRU2024001, the CRU set out its view that this approach would benefit from further consideration in advance of the final decision and invited additional stakeholder feedback.

Respondents to the consultation put forward a broad range of views, with some favouring using a single definitional criterion, while others favoured using some combination of criteria. This included criteria like capacity (MW), energy use (MWh), metering group, provision of

demand flexibility, provision of grid support, national interests, load profile, location, whether distribution or transmission connected, and voltage level. Some respondents favoured focusing on the larger end of LEUs, while others favoured capturing a wider range of demand (some suggesting all LEUs, others suggesting all demand). The CRU notes the broad range of views provided.

Some respondents raised concerns that requirements applying to all LEUs could result in unintended consequences, creating a barrier to electrification of LEUs, including industrial processes and transport hubs. This could serve to undermine the pathway to decarbonisation targets across different sectors.

LEU impact

Under the Climate Action Plan 2023 (CAP23), the CRU has been assigned as the lead organisation to "Complete and Publish [an] Electricity Demand Side Strategy and Implementation Plan" (EL/23/24). This measure specified that LEUs will be expected to make a higher proportional contribution to the flexibility target. As part of this work, the CRU undertook the review of LEU connection policy in parallel with the publication of a National Energy Demand Strategy. The initial focus of this review of LEU connection policy was on the basis that the connection of LEU demand can have a greater impact on the system than smaller demand sites. This impact is exacerbated in a small islanded system such as Ireland's. There has been a sustained and significant increase in LEU demand, in particular data centres, over the past number of years in advance of and following direction CRU/21/124. There is expected to be continued rapid growth in electricity demand from data centres in the coming years, with EirGrid forecasting electricity demand to increase by 43% (median scenario) over the next 10-year period out to 2032, largely driven by data centres and new tech load already contracted by the SOs, and an increased uptake of electric vehicles and heat pumps, particularly later in the decade. This is reflected in EirGrid's latest GCS and in Figure 1. In the GCS EirGrid describes how the largest growth comes from contracted data centres and new technology load, and increased uptake of electric vehicles and heat pumps, particularly later in the decade. The GCS demand growth figures include the requirements for delivery of targets for the electrification of heat and transport as set out in the Climate Action Plan, but does not account for additional data centre demand other than that already contracted (i.e. continued growth over the coming years, resulting in projected growth of data centres and new tech loads to account for 30% of the national electricity requirement by 2032. Even in the absence of new data centre demand connections, the demand growth for data centres already contracted by the SOs is expected

to be significantly greater than that required for heating and transport. This context informs the availability and capacity on the system to accommodate new demand connections, and what requirements may be needed to achieve this.

Data centres

In terms of specific types of users, data centres have been identified as disproportionately contributing to rapid demand growth in the most recent GCS. This is further evidenced by historical growth in the last number of years as shown in Figure 7 below which shows the share of total electrical consumption in Ireland represented by data centres increasing from circa 5% in 2015 to circa 21% in 2023. As outlined in Decision Paper CRU/21/124, the TSO considers data centres to be a distinct class of demand side energy user due to their energy usage characteristics and strong influence on the electricity system. Data centres, like other LEUs, have relatively large energy consumption, however most LEUs ramp up their operations and energy use slowly over time. Data centres as a class, tend to ramp up towards their full Maximum Import Capacity (MIC) far more quickly than other LEUs. Data centre applications are also often clustered in specific locations, e.g. West Dublin. The scale and speed of electricity demand growth already contracted to the data centre sector is significantly beyond that arising from more general growth in the economy or even that arising from the delivery of Government policy targets to electrify the heating and transport sectors. Consequently, data centres have been identified as disproportionately contributing to the predicted rapid demand growth in the GCS. Decision paper CRU/21/124 described how a data centre with a load of 60 MVA would be comparable to the load usage of a city such as Kilkenny being added to the electricity grid in a relatively short timeframe.

The typical load profile of a data centre is flat compared to the profile of many LEUs in other industries such as in production/manufacturing. The SOs have identified risks that connecting demand users with the energy usage profile of data centres in areas that are already constrained could result in the system becoming overloaded. Further, the constant demand profile of data centres does not match the generation profile of our intermittent renewable resources. This mismatch necessitates further infrastructure investment in order to accommodate data centre demand, and to match generation and demand profiles in order to optimise the use of our renewable energy resources. A plan-led approach can help to coordinate the required investments, utility and infrastructure needs to match this demand with future ambitions for renewable energy deployment such as offshore wind energy, while ensuring continued decarbonisation of the economy.

Figure 6 below shows the unique speed and scale of growth in data centre metered electricity consumption since 2015 based on data collected by the Central Statistics Office (CSO)[40]. This shows the share of total electrical consumption in Ireland represented by data centres increasing from circa 5% in 2015 to circa 21% in 2023. In the GCS for 2023-2032, EirGrid describes how, in Ireland, there is approximately 2,000 MVA of demand capacity that the SOs have contracted to data centres and other new LEUs at the transmission level, and a further 300 MVA contracted at the distribution level.

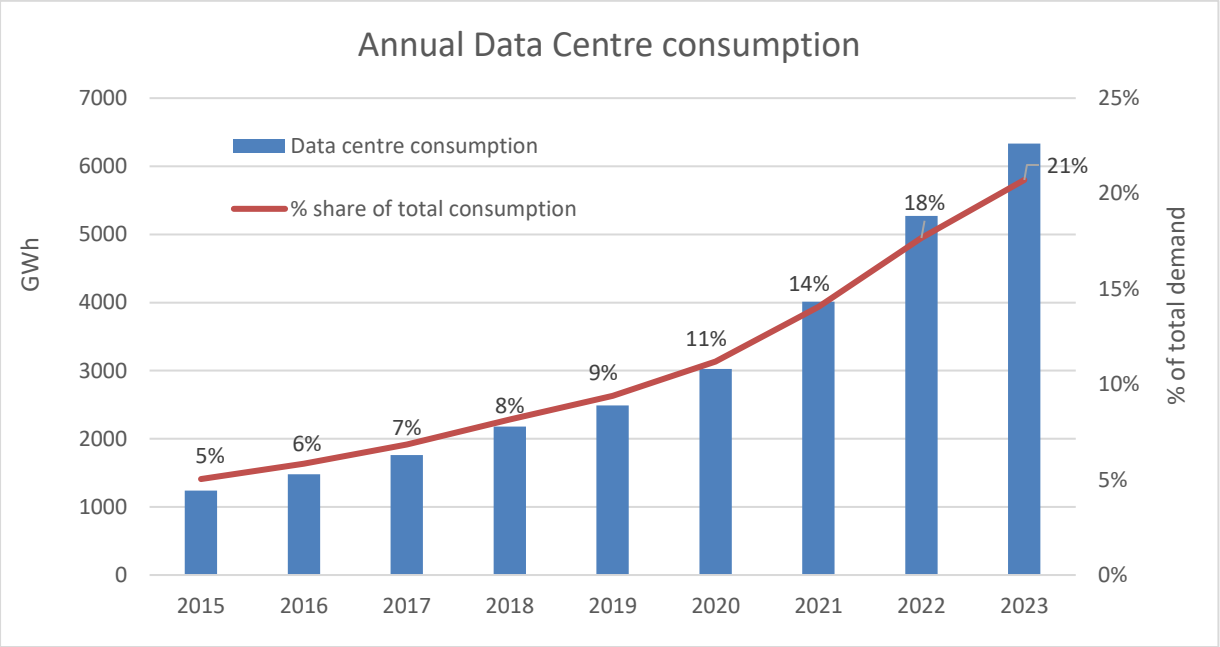

Figure 6: Data centre metered electricity consumption 2015-2023 (CSO)

Almost all of this data centre load is located in the Dublin region, as described in EirGrid's Generation Capacity Statement. In order to assess the scale of demand in this region, the CRU has examined metered electricity consumption data[41] published on the CSO website which is available on a per county basis. We have focussed our analysis on the Dublin/Meath area given the concentration of data centres in this region and have made the following assumptions:

- The total data centre metered electricity consumption is concentrated in the Dublin/Meath area. This is based on the concentration of data centres in this region.

[40] CSO – July 2024 - Data centres metered electricity consumption 2023 – link here
[41] CSO – July 2024 - Metered electricity consumption 2023 – link here

- The county data for Dublin/Meath does not capture the data centre metered electricity consumption. (The CSO states that a small number of large energy users have not been classified by county for confidentiality reasons. We note that some data centre demand may still be included which, if removed, would result in a calculation which would demonstrate a higher proportion of demand being from data centres).
- The total electricity consumption in Dublin/Meath region is reflected by adding the relevant county totals and the total data centre metered electricity consumption data.

Based on these assumptions, we get the below illustrative results shown in Figure 7. This analysis suggests that circa 48% of metered electricity consumption in the Dublin/Meath region in 2023 is attributable to data centre load. This graph shows how data centre load has rapidly ramped up representing an ever-greater proportion of metered electricity consumption in the Dublin/Meath region. The relatively rapid increase in demand from these types of customers in the general Dublin/Meath region has placed significant pressures on the local system and generation capacity requirements. The continued contracted ramp up of this contracted data centre demand will exacerbate these local and system wide pressures.

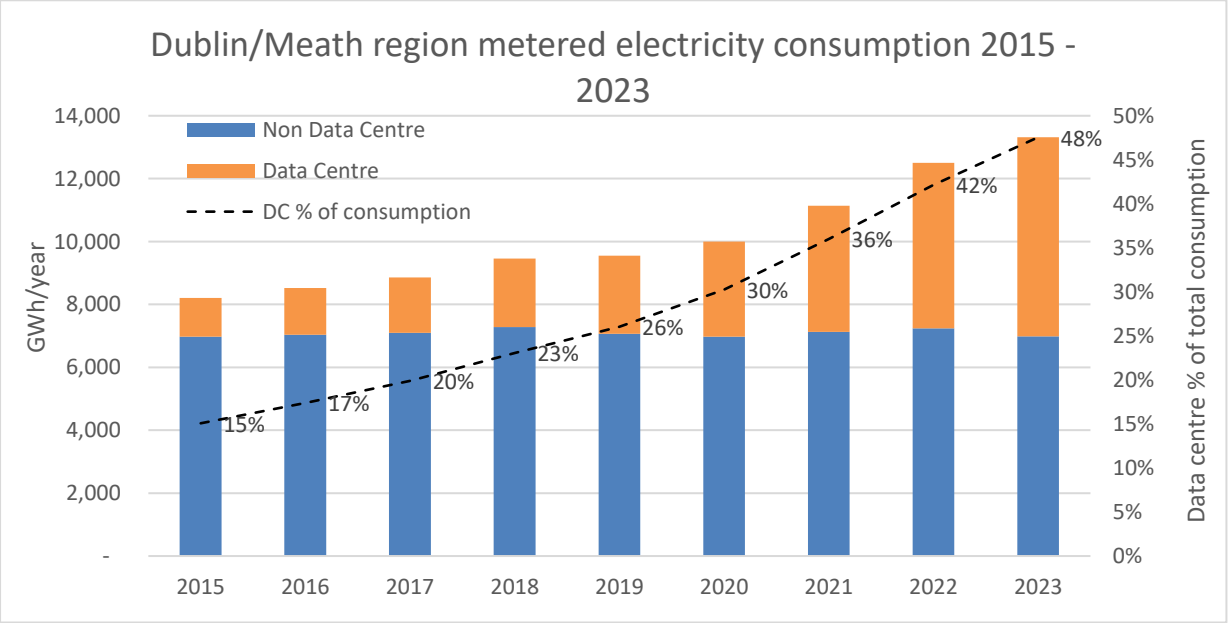

Figure 7: Illustrative graph of Dublin/Meath region and data centres metered electricity consumption

Section 2.3 of this paper describes how Ireland is fourth highest among the EU 27 countries in terms of the amount of electricity used by data centres, with Ireland having the highest percentage share of national electricity use by data centres compared to the other EU 27 countries. This is shown in Figures 4 and 5 in Section 2.3. The European Commission Joint Research Centre report titled "Energy Consumption in Data Centres and Broadband Communication Networks in the EU" described how data centres represented 18% of national electricity use in Ireland in 2022, while in the Netherlands it is 5.2%, in Germany it is 3%, and in France it represents 2.2% of national electricity use. In the GCS for 2023-2032, EirGrid estimates in the median demand scenario in Ireland that data centres and new tech loads will account for 30% of Ireland's national electricity requirement by 2032 (Figure 8 below).

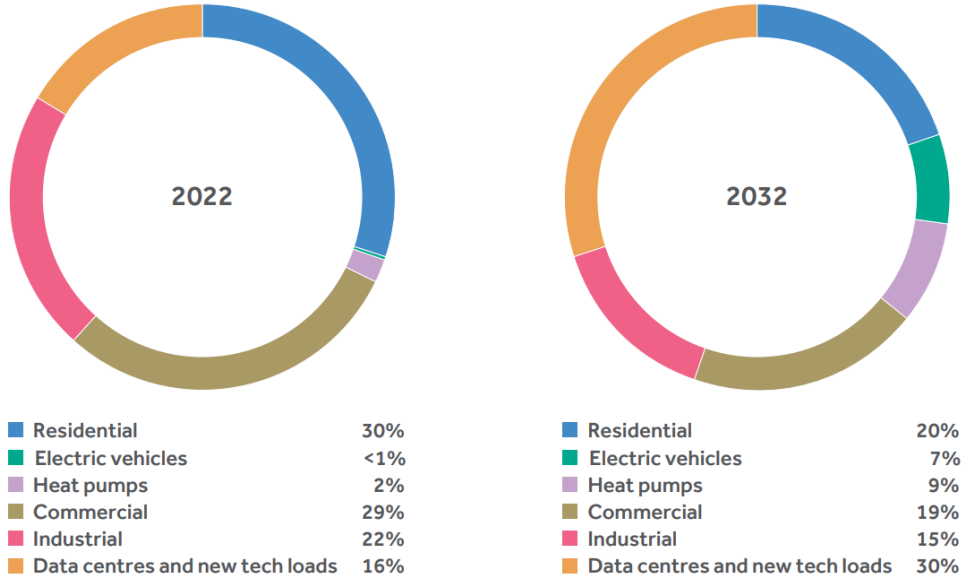

Figure 8: Ireland median demand sectoral proportion of energy requirement (EirGrid, GCS 2023-2032)

Like other LEUs, data centres tend to have a relatively large energy requirement, however they tend to ramp up their operations and energy use more quickly. The large volume of data centre applications to connect to the electricity network in Ireland over the past number of years, combined with their scale and the speed at which they ramp up has created significant challenges for Ireland's electricity system. As set out in Section 1.4, the cumulative impact of the scale and speed of this type of electricity demand growth is far greater than that arising from typical growth in the general economy or arising from the delivery of explicit Government policy targets like electrification of heat and transport.

This type of demand has had an impact on parts of the local distribution system due to the scale and speed of the demand growth in areas of the network that were not designed for large loads, creating challenges for the DSO to manage. It is also the case that electricity usage is generally diversified, i.e. different customers or user types tend to use electricity at varying times of the day. The broad effect of this is that all customers do not simultaneously use significant levels of the MIC allocated. By comparison, data centres tend to have a higher utilisation of their allocated MIC with a low degree of variability. This has implications for network equipment maintenance and lifetime, as well as how the system is planned.

The large number of data centre connections, and the speed of their demand growth, combined with the typical scale of MIC applied for by this class of user has been a major challenge for the electricity grid in facilitating this additional electricity demand with equivalent generation and electricity infrastructure in a relatively short period of time. In CRU decision paper CRU/21/124 it was described how the TSO considers data centres to be a distinct class of demand side energy user due to their energy usage characteristics and strong influence on the electricity system.

As described above data centres by contrast to many other LEUs have tended to exhibit distinct characteristics in the context of the Irish energy system:

- Rapid rate at which contracted demand ramps up.
- Large flat energy profile (not diversified).
- Concentrated geographic dispersal.
- Unprecedented cumulative scale of energy demand from a particular sector.

It is clear therefore that data centres are having a unique impact on the Irish electricity system, and on the ability of the system to meet reasonable demands, that is not comparable to any other sector or industry, or indeed all other industries combined. Notwithstanding their contribution to the economy recognised in this document, in the absence of data centres, Ireland would be experiencing much more modest electricity demand growth, broadly consistent with population growth, general economic development and the general development of industrial demand.

In light of the above, the CRU proposes to use the criteria of “class of energy user” in defining the category of user on the electricity system to which this policy will apply. The CRU proposes that this policy should apply exclusively to all data centres seeking to connect to the electricity network. Further, the CRU is of the view that applying the policy to a broader scope of LEUs could create a barrier to electrification of existing large energy users.

The CRU considers that there may be a minimum level in terms of MIC below which this policy, or elements thereof, may not apply. The CRU notes that in Article 12 of the recast Energy Efficiency Directive (Directive 2023/1791) it describes a requirement of owners and operators of data centres with a power demand of the installed information technology (IT) of at least 500kW, to make certain information publicly available. Article 12 of the Energy Efficiency Directive also states that Member States shall encourage owners and operators of data centres in their territory with a power demand of the installed IT equal to or greater than 1 MW to take into account the best practices referred to in the most recent version of the European Code of Conduct on Data Centre Energy Efficiency. The CRU notes that there is a risk that setting a threshold below which this policy, or elements thereof, does not apply could result in a high number of applications below that threshold which could give rise to security of supply or network constraint risks when aggregated. The CRU would welcome feedback from respondents as to whether there should be a minimum level in terms of MIC below which this policy, or elements thereof, may not apply and, if so, what would be a reasonable minimum level of MIC, for instance in line with Article 12 of the Energy Efficiency Directive at 500kW or 1MW.

The CRU is of the view that a strategic State-led approach to economic development and coordinated infrastructure delivery can address some of the challenges being faced in terms of grid capacity and security of supply in the medium to long term. In particular, an understanding of the future scale of data centre demand, as outlined in Section 2.5, may help to facilitate this approach.

Proposed decision

The Commission has made a proposed decision that this policy should apply exclusively to all data centres seeking to connect to the electricity network.

3.2. Requirement for onsite or proximate generation and/or storage

Consultation paper CRU2024001 described how any requirements will have to take into account a number of challenges including electricity grid infrastructure limitations and available generation. In feedback to previous papers (CRU202357 and CRU2024001) a number of

respondents raised concerns in relation to the potential uncertainty introduced unless there is sufficient clarity provided upfront on what the terms of a connection agreement are. It was described how, for project planning and investment, certainty is required at the project initiation stage, with any requirements well defined.

Section 2 on constrained regions of the electrical system and security of supply sets out some of the system and capacity challenges faced by the electricity system, and the location specific characteristics of some of these. In section 3.1 the scope of demand connection applicants for this policy is defined. The scale and development pace of new data centre demand presents an infrastructure delivery timing challenge. Data centres tend to have relatively large energy requirements, however non data centre LEUs tend to ramp up their operations and energy use slowly over time. In contrast, data centres, as a class, tend to ramp up to their full MIC far more quickly. The CRU is of the view that allowing data centres to connect to the electricity network without requiring them to contribute to system adequacy may impact on the security of supply of the electricity system with the potential to impact all users. The CRU also recognises the importance of timely connections to the grid and the opportunities that data centres can provide in supporting the needs of the system and wider society.

The CRU considers that it is necessary and proportionate to issue directions to the SOs that will promote and maintain the continuity, security, and quality of supply of electricity and ensure that system security standards are not breached. At the same time, where possible, the CRU considers it is necessary to facilitate the continued connection of data centres that can provide support equivalent to their own demand and in turn help to support the stability of the electricity grid. The CRU proposes that data centres will be required to provide onsite or proximate generation and/or storage which matches their MIC (subject to derating requirements outlined below), with this generation being separately metered and required to participate in the wholesale electricity market.

Onsite or proximate generation

The CRU recognises that it can be challenging in certain space constrained locations to accommodate generation onsite. The CRU proposes to allow data centre applicants the flexibility to request the siting of this generation either onsite or proximate to site (i.e. connected to the Transmission or Distribution system close to the demand connection). The System Operators will be empowered to decide on whether proposed siting of generation assets meets the required system needs as assessed by the SO. The requirement to bring onsite or proximate generation is primarily to address risks around generation adequacy and

security of supply and should be assessed in a similar manner to other generation participating in the market.

Participation in wholesale electricity market

The CRU proposes that a data centre will be required to provide onsite or proximate generation that will participate in the wholesale electricity market (Single Electricity Market) as a standalone generator separately metered. This would entail participation in the energy and capacity markets e.g. Day Ahead Market (DAM), Balancing Market, Capacity Remuneration Mechanism (CRM) and being subject to market rules such as the Trading & Settlement Code and the Bidding Code of Practice. It is envisaged that this approach would involve a new data centre providing 100% operational capacity to match their MIC and participation of this generation in the wholesale electricity markets. The scale and speed of new data centre demand presents an infrastructure development timing challenge, with the potential for this significant new demand to connect faster than the required generation capacity or network capacity can be delivered. Requiring a data centre to provide onsite or proximate generation which participates in the wholesale markets would help contribute to their operational electricity needs while maintaining the continuity, security, and quality of supply of electricity for the wider system. The CRU notes that the existing CRM facilitates the signing of new contracts up to 2028 and that new State aid approval for a capacity mechanism will be sought to cover the period thereafter. This generation will be de-rated by a certain de-rating factor[42] depending on its technology type and size to account for unavailability. The de-rating to be applied for the purposes of connection requirements will be informed by the de-rating curves that are published in capacity auction information packs as part of the CRM auctions in the wholesale electricity market (SEM). This could involve using the most recent CRM T-4 capacity auction information pack and using these de-rating curves to inform the sizing of onsite or proximate generation in relation to the sites MIC. Depending on the size of the site's MIC, it may be required that this generation is provided in the form of a number of separate dispatchable generator units. It is envisaged that any technologies used for onsite or proximate generation should be sufficiently futureproofed in terms of facilitating low/zero emissions going forward e.g. if using gas generation, the equipment should be compatible with being run on hydrogen or biofuels.

This onsite or proximate generation will be centrally dispatched by EirGrid, so these generation assets can be run efficiently and according to system requirements, and the data

[42] An example is where gas generation might have a de-rating factor of 0.85. In this case a data centre with an MIC of 100MVA would require approximately 118MW of generation capacity.

centre sites can take advantage of renewable electricity during periods of high availability. This centrally dispatched approach will help facilitate the optimum low emissions solution on a whole system operational basis where possible via existing market structures. These arrangements will leverage the existing market settlement systems, providing a participant with remuneration from the wholesale electricity markets for providing these services to the system. Participation in a mature stable market like the SEM will provide a revenue stream which can contribute towards offsetting the initial capital outlay required on the generation assets over the asset lifetime.

The CRU notes that there may be timing challenges in relation to the delivery of onsite or proximate dispatchable generation capacity versus the connection of the LEUs demand. The CRU proposes to link the ramping up of a new LEUs demand connection towards full MIC to achieving delivery of onsite or proximate generation and its participation in the wholesale markets. The de-rated capacity of the onsite or proximate generation must build up in a stepwise manner in line with demand, ensuring that the de-rated generation capacity matches the sites' MIC at a minimum for the duration of the connection.

In relation to the performance and availability of the onsite or proximate generation, it is envisaged that reliability of service will be a contractual requirement. If the performance and availability of the onsite or proximate generation falls below this minimum expected reliability, the SOs will have the discretion to reduce the MIC of the related data centres demand connection. The CRU welcomes feedback from respondents on how these minimum availability and reliability requirements could be set.

In terms of the facilitation of storage in the market and scheduling systems, the ongoing Future Power Markets workstream by EirGrid, SONI and SEMO includes a Scheduling and Dispatch Programme (SDP). This programme includes facilitating the participation of energy storage such as batteries in the TSOs' scheduling and dispatch system. Once these provisions are implemented, storage will be able to participate more readily in the wholesale electricity market.

Figure 9 below sets out an illustration of what these arrangements may look like for an LEU site.

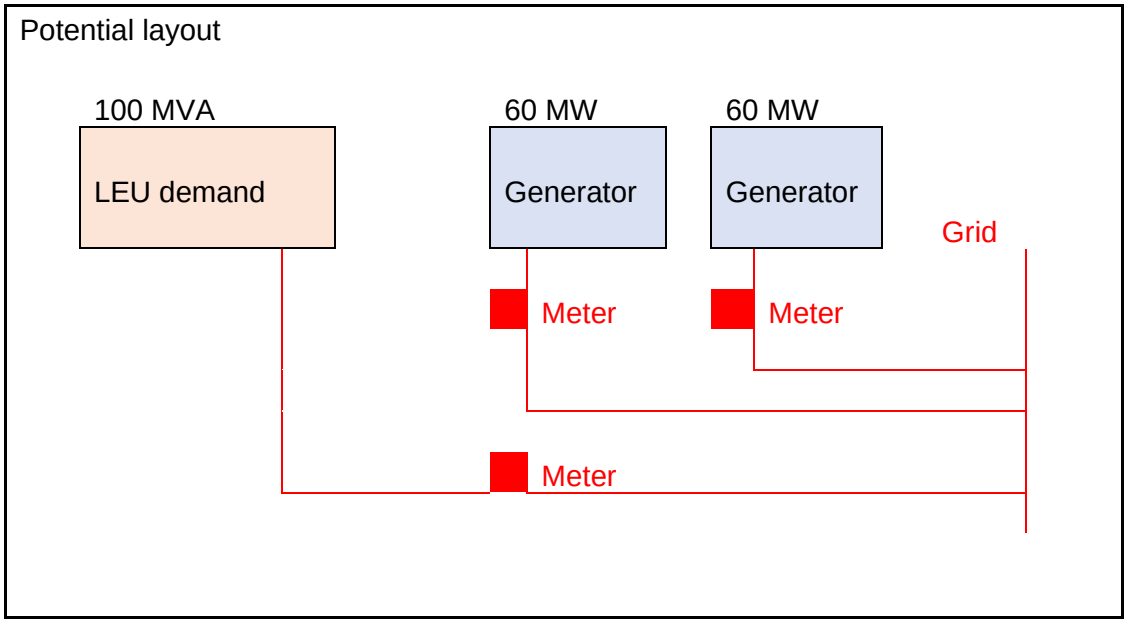

Figure 9: Indicative diagram onsite or proximate generation arrangements

Mandatory Demand Curtailment

At present a small number of flexible demand sites have capacity that can be called on to prevent system alerts. Also, for emergency situations, some sites can be required to curtail their demand requirements. These measures can be called upon during a System Emergency State[43]. EirGrid describe how a System Emergency State is issued when there is a high risk that not all electricity demand can be met. When the power system is in this state, the SOs will take pre-planned actions to protect the integrity of the grid, this may include implementing controlled outages or a temporary reduction in electricity supply for some users. When System Alert State is issued there is no immediate impact for users of electricity. It warns of the potential for temporary electricity supply issues in the near future, so that the SOs and those in the wider electricity sector can take pre-planned actions to protect the integrity of the grid. For example, there were 8 System Alert States in 2022 and 3 System Alert States in 2023. There were no System Emergency States during this time.

Currently, in a System Emergency State, the SOs may instruct relevant LEUs who are subject to mandatory demand curtailment (MDC) provisions to reduce and/or remove their demand in full from the system. LEUs due to their scale can have the most significant impact on reduction of demand, whilst at the same time minimising electricity customer impact through reducing the number of customers whose electricity supplies may be affected. MDC will be prioritised over the disconnection of other demand customers where practicable, but only in situations where notice of at least 60 minutes can be provided to the relevant LEU

[43] EirGrid - Grid Alerts – link here

site. LEU sites subject to MDC provisions that receive an MDC instruction and who have not complied with that request within the applicable timeframe may be prioritised for disconnection (without additional notice) in advance of implementation of emergency load shedding or planned rota load shedding. In the CRU's view, the requirement for data centre connections to bring onsite or proximate dispatchable generation capacity which matches the sites' MIC means that these sites will contribute to the security of the system. In light of this contribution to the system, the CRU proposes that any data centres providing onsite or proximate dispatchable generation as described in this section will not be required to meet MDC provisions. However, if the performance and availability to the market of the onsite or proximate generation falls below the contractually required reliability, the SOs will have the ability to reduce the MIC of the demand site. This should be set out by the SOs within connection agreement terms & conditions. The CRU notes that all demand is subject to potential load shedding requirements in emergency conditions as described in ESBN's DSO load shedding plan[44] and data centres may choose to sign up to MDC where appropriate to assist in managing any potential disruptions to supply.

Interactions with the gas network

In consultation paper CRU2024001 a number of respondents raised concerns in relation to the interaction of potential future non-firm/interruptible gas connections with non-firm/flexible electrical connections. Respondents stated that it would be untenable for a gas interruption to be called at the same time as when an LEU is required to reduce their network electricity demand and go to their own on-site generation, which may use gas. It was suggested that there would need to be co-ordination between EirGrid, ESBN and Gas Networks Ireland for any provisions like this.

In the context of gas-fired generation, the requirement for proximate in the market generation has been developed on the basis of current gas connection policy. GNI are working on the development of an interruptible gas capacity product for large energy users which supports the maintenance of gas supply/demand balance. CRU is actively engaging with GNI in order to progress this work. Careful consideration would be required with regard to the potential interactions of the requirement for onsite or proximate generation with any interruptible gas capacity product.

[44] ESBN – October 2022 – Distribution System Operator load shedding plan – link here

Proposed decision

The Commission has made a proposed decision that data centres connecting to the electricity network will be required to provide dispatchable onsite or proximate generation and/or storage capacity which matches their MIC (subject to derating requirements), with this generation required to participate in the wholesale electricity market.

The Commission has made a proposed decision that any data centres providing onsite or proximate dispatchable generation as required under this decision will not be required to meet MDC provisions.

The Commission has made a proposed decision to link the ramping up of a new data centres demand connection towards full MIC to achieving delivery of dispatchable onsite or proximate generation and/or storage in the wholesale market. The onsite or proximate generation must build up in a stepwise manner in line with demand, ensuring that the de-rated generation capacity matches the sites MIC at a minimum.

3.3. Location

Section 2 '*Constrained regions of the electrical system and security of supply'* sets out some of the system and capacity challenges faced on the electricity system, and the location specific characteristics of some of these. CRU2024001 discussed the locational aspect of LEUs, describing how the CRU sees merit in locating new LEUs close to renewable generation and storage, and being located outside of constrained areas on the grid. In feedback to consultation paper CRU2024001 respondents acknowledged the benefits of locating LEU demand in close proximity to renewable generation and/or storage. A number of respondents raised concerns in mandating any locational provisions citing factors such as availability of land, labour, access to fibre optical network, local grid, water supply and road network. For data centres the latency of fibre infrastructure and proximity to other data centres were cited as important factors.

As outlined in Section 2, the CRU recognises the challenges of connecting in constrained areas or areas where there are short circuit issues, and where the connection of large demands in these areas in advance of infrastructure development poses a risk to system security standards and supply to new and existing customers. Due to the impact of local and

regional system conditions on any new data centre demand connections, and vice versa, the CRU proposes that the SOs should take into account the location of the requested connection (to include the demand and the associated onsite/proximate generation) in respect of whether it is in a constrained or unconstrained region, in considering whether a connection offer can be made. The CRU notes that a connection application seeking a certain level of demand and associated generation could have an effect on the constraint status of an area if it were to proceed. In some cases the requirement to bring onsite or proximate generation may add to the constraint, e.g. in areas where there are high short circuit levels on the existing network, the addition of synchronous generation can exacerbate safety risks. Therefore, there may be areas of the network where further connections may not be available in the absence of reinforcements and upgrades. Given the uncertainty of future demand requirements, this may require further network development plans in addition to those already in place. As noted in Section 2, the CRU will ask the SOs to gather information from the data centre industry on the level of interest in prospective demand connections and provide recommendations to CRU on if/how such demand could be accommodated by the State.

Publication of network information

In order to provide more clarity to potential connection applicants on the areas of the electricity network that are constrained and the areas where the SOs are planning network reinforcements, the CRU is of the view that the SOs will need to provide accessible information in relation to locations that are constrained or likely to become constrained. This includes information on the network capacity currently available across the electricity networks and that which will become available under network development plans.

The amendments introduced by Regulation (EU) 2024/1747[45] to Article 50 of Regulation (EU) 2019/943 require Transmission System Operators (TSOs) to provide significantly enhanced and transparent network information. TSOs in European Member States are now required to publish detailed data on the available capacity for new connections with a high level of spatial granularity. This includes information on capacity currently under connection requests and the possibility of flexible connections in congested areas. Directive 2024/1711[46] also amends Article 31 of Directive 2019/944, focusing on the responsibilities of Distribution System Operators (DSOs). DSOs are now required to publish transparent and detailed information on available capacity for new connections, updated at least quarterly.

[45] EU – June 2024 - Regulation 2024/1747 – link here
[46] EU – June 2024 - Regulation 2024/1711 – link here

This information must be presented with high spatial granularity and include details on capacity under connection requests and the possibility of flexible connections in congested areas.

There are a number of examples of where useful network information is publicly available. UK Power Networks' resource Network Infrastructure & Usage Map[47] provides a geospatial view of network infrastructure, including substation sites, overhead lines, towers and poles as well as usage of the network, including demand headroom capacity, connected generation and demand. The Belgian TSO Elia has an online interactive map showing available capacity on its network[48]. The map gives a simplified indication of the grid hosting capacities that are still available on top of capacity reservations, allocations, and planned low voltage connections, and takes into account planned grid infrastructure development. The Western Australia SO Western Power has an online network capacity planning tool[49]. Another example is the Finnish SO Elering connections capacity e-Grid map[50].

There is currently information available on ESB Network's existing Demand Capacity Heatmap[51] which provides up to date information on the availability for new demand capacity at different voltage substations on an interactive map interface. An equivalent heatmap for Ireland's transmission system has not yet been developed. In terms of future network development, EirGrid publishes the All-Island Ten-Year Transmission Forecast Statement[52] which provides information on potential demand and generation opportunities on the transmission system. ESB Networks has also published Network Scenario Headroom Reports[53] which is the first step in their plan to publish a Distribution Network Development Plan which is due to follow in Q2 2025. This will have a 10-year time horizon for the development of the electricity distribution network and can signal future capacity changes.

The CRU proposes to require the System Operators to make detailed information relating to network capacity on the electricity system easily accessible so that there can be greater visibility to the investment community in relation to good appropriate locations for development. The CRU expects that this information would include the following:

- Heatmaps/information illustrating current and projected capacity availability at different nodes/substations accounting for the capacity which will be taken up by

[47] UK Power Networks – Open Data Portal – link here
[48] Elia – Grid Hosting Capacity – link here
[49] Western Power - Network capacity mapping tool – link here
[50] Elering - Connection capacities on e-Gridmap – link here
[51] ESBN – Availability Capacity Heat Map – link here
[52] EirGrid SONI – 2023 – All island 10 year Transmission Forecast Statement 2022 – link here
[53] ESBN – Capacity Workbooks – link here

projected organic economic growth (e.g. electrification of transport and housing, planned new housing development and other social needs).

- Forward looking heatmaps/information illustrating capacity which is due to become available based on network development plans accounting for the capacity which will be taken up by projected organic economic growth, and the associated timelines for additional capacity and future network delivery.
- Greater visibility of network development plans.

Given the interaction between capacity availability on the distribution and transmission systems, there is a need for interaction between ESB Networks and EirGrid in relation to developing and publishing the required information. The granularity of information should be sufficient to help inform potential new connection applicants (demand and generation) in terms of viable areas for connection. This information should be provided on a sufficiently regular basis to ensure it is up to date to inform potential connection applicants, for instance on a monthly and quarterly basis, with the potential for more frequent updates closer to real time if warranted. The Belgian TSO Elia describe how their online grid hosting capacity tool reflects all reserved/allocated capacities on the transmission and distribution grid.

The CRU will request proposals from the System Operators outlining a plan for delivery of the requirements set out above and under Directive (EU) 2024/1711 (Article 2) & Regulations (EU) 2024/1747, the integration of information provision for the transmission and distributions systems, and what network information can be made available in the near term. Feedback on this is welcome as part of responses to this proposed decision.

Flexible connections

The Electricity Market Design Directive (EU) 2024/1711[54] sets out a number of different provisions including the requirement for Member States to develop a framework for the TSO and DSO to offer the possibility of establishing flexible connections in areas where there is limited or no network capacity availability for new connections (inserting Article 6a into Directive (EU) 2019/944). The Department of the Environment, Climate and Communications published a consultation[55] on 15 October 2024 to seek views to assist in the transposition of these into Irish law, including whether the CRU as the regulatory authority, or another competent authority, shall develop this framework and have authority over this provision.

[54] EU – June 2024 - Regulation 2024/1711 – link here
[55] DECC - Consultation on the Electricity Market Design Directive – link here

Proximity to renewable generation and storage

As described in consultation CRU2024001 the CRU sees merit in locating new LEUs close to renewable generation and storage. Arrangements such as energy parks and clusters can allow the location of anchor client demand facilities on the same site as or proximate to renewable generation and storage, and reduce the need for the use of electricity network infrastructure. These types of arrangements may help facilitate new LEU connections while respecting security of supply and system constraints while minimising, where possible, the impact on carbon emissions. A number of respondents to consultation CRU2024001 outlined different projects that could be included under the scope of energy parks or clusters. Some energy park projects are already in development while others have identified barriers to full implementation, depending on the type of project envisaged. In addition to the strategic approach to spatial strategy outlined in Section 2.5, the CRU notes the relevant recommendations and actions listed in Section 6 from the National Energy Demand Strategy (NEDS) decision. These include the identification of barriers and to publish a roadmap for the facilitation of co-location of energy supply and demand.

Proposed decision

The Commission has made a proposed decision that the SOs should take into account the location of the requested data centre connection application and associated generation in respect of if it is in a constrained or unconstrained region of the electricity network.

The Commission has made a proposed decision to require the SOs to publish regular up to date locational information (existing and outlook) in relation to the availability of capacity on the electricity network and network constraint. The format of this will be determined through further engagement with the SOs.

3.4. Demand flexibility

In the Call for Evidence (CRU202357) and Consultation (CRU2024001) papers the use of demand flexibility in the context of this review of LEU connection policy was explored. It was described how effective demand flexibility is a key element in supporting the electricity system and supporting a higher proportion of renewable energy on the system. As part of

the 2023 Climate Action Plan (CAP23), a key measure to manage electricity demand flexibility and growth is that the CRU will deliver an Electricity Demand Side Strategy (known as the National Energy Demand Strategy (or NEDS), which was published in July 2024) and Implementation Plan (action number EL/23/24), with the aim of 20 to 30% of electricity demand to be flexible by 2030 (15-20% flexibility by 2025), facilitating active participation by citizens and businesses in the energy market. The Climate Action Plan specified that LEUs will be expected to make a higher proportional contribution to the target.

It was described in Call for Evidence (CRU202357) and Consultation (CRU2024001) papers how demand flexibility can mean a site increasing or decreasing demand from the grid in response to certain signals/information. This could be facilitated by load-shifting, i.e. an LEU moving tasks/workloads to different times, or it could mean using onsite storage or back up generation to supply onsite load or feed into the grid. The use of demand flexibility on the electricity network can help support system operation and security while contributing to decarbonisation by facilitating renewable generation. Another example may include shifting load from a peak demand time, helping to provide security of supply while also negating the need to call upon a carbon intensive peaker unit. There may be significant opportunities to participate in demand flexibility measures which may provide additional revenue streams for data centre applicants while supporting system needs.

National Energy Demand Strategy (NEDS) decision

In the NEDS decision paper, published in July 2024, the CRU determined that demand flexibility will be defined as the percentage of average daily demand (MWh) that can be flexed up or down. Table 6 below sets out the CRUs definition of demand flexibility as per the NEDS decision paper.

Definition	Explanation
% of average daily demand (MWh) that can be flexed up or down	Numerator (measure of flexibility): Volume of energy in MWh that can be flexed up or down Denominator (measure of total demand): Average daily consumption in MWh.

Table 6: Definition of demand flexibility - NEDS decision

The NEDS decision paper describes the assumption that at least 20% of new LEU demand may be expected to deliver flexibility (above that which is already contracted) in line with flexibility targets. It was noted, however, that there is still considerable uncertainty around how demand flexibility will develop; there will need to be a concerted and coordinated effort to elicit demand flexibility from various cohorts.

Dispatchable demand flexibility schemes

It is envisaged that a new formalised scheme(s) and related product(s) will be implemented by the SOs to facilitate dispatchable demand flexibility from LEUs on a regular operational basis. Some schemes have been launched, such as ESBN's "Beat the Peak, Business"[56]. ESBN are also developing lighthouse projects and flexibility products targeted at LEUs under the NEDS. The design and development of these projects and products is ongoing and ESBN will be engaging with industry on their development. It is envisaged that these schemes will be built upon iteratively and flexibility markets will be put in place. These markets and products could be activated based on system conditions. This demand flexibility could be provided through low carbon solutions such as battery storage charged by renewable energy sources. A number of areas are currently under development by the System Operators.

Long Duration Energy Storage (LDES)

On 26 October 2023 EirGrid published a Call for Evidence on the Market Procurement Options for Long Duration Energy Storage (LDES)[57]. This set out the growing system need for LDES and potential procurement methods to provide a sufficient financial incentive for its connection. This described how LDES enables a number of benefits such as increasing the penetration of renewables, reducing carbon emissions, reducing the level of renewables dispatch down and reducing generation costs. This Call for Evidence closed on 1 December 2023. A summary document providing a summary to the Call for Evidence was published in March 2024[58]. A recent LDES workstream update[59] stated that a LDES consultation document is in progress.

ESBN Demand Flexibility Product

As part of meeting CAP23 action number EL/23/24, ESBN is working closely with the CRU under the NEDS. As part of the Distribution Markets and System Operation (DMSO) programme ESBN are seeking to enable and incentivise the demand flexibility and response

[56] ESBN – Beat the peak business – link here
[57] EirGrid – October 2023 - A Call for Evidence on the Market Procurement Options for Long Duration Energy Storage (LDES) – link here
[58] EirGrid – March 2024 – Response Call for Evidence on Long Duration Energy Storage – link here
[59] EirGrid SONI SEMO – October 2024 - Future Power Markets Industry Workshop – link here

to support Ireland's national targets, while securely and efficiently managing the electricity distribution network during this period of rapid change. In their consultation document[60] published on 20 December 2023 ESBN outline a proposal for a medium-term demand flexibility product to be procured in locations where there is a defined system need, as part of an overall programme to meet identified capacity requirements. It is described how medium-term demand flexibility can be taken to mean the ability to deliver demand reduction, demand shifting or inject power at or near their full contracted capacity for a minimum of 4 hours each day over specified hours, on the majority of business days over a minimum of 3-6 months of the year. ESBN describe how the product has been designed to meet the specific network need arising at this time and to support the delivery of the 2025 and 2030 demand flexibility targets. On 12 July 2024 the CRU published a Decision Paper which approved ESBN's recommended approach[61]. This work stream is ongoing.

Demand Side Unit

Demand sites may participate in the wholesale electricity market as a standalone Demand Side Unit (DSU). DSUs can participate in the wholesale electricity markets as an aggregated Demand Side Unit (DSU) or stand-alone DSU e.g. above 10MW (cannot be part of aggregated DSU). This would entail participation in the energy markets and possibly in the capacity market Capacity Remuneration Mechanism (CRM). The DSU can trade in the ex-ante markets, offering its available capacity. Based on the positions taken in the energy market the DSU receives dispatch instructions from the TSO to reduce electricity demand.

Provision of Demand Flexibility

The CRU notes the CAP aim of 20 to 30% of electricity demand to be flexible by 2030 (15-20% flexibility by 2025). In light of the requirement for data centre connections to bring onsite or proximate dispatchable generation capacity which, at a minimum, matches the sites' MIC the CRU does not propose mandating an additional requirement that all connections applications falling under this policy must also provide a demand flexibility contribution to the system. However, in certain situations it may be appropriate for the relevant System Operator to require the provision of demand flexibility services on the local system in order to be able to facilitate a new data centre connection. The CRU sees merit in the System Operators having the ability to require demand flexibility from data centres on the local system as deemed necessary on a case-by-case basis. This need could be driven by factors such as the

[60] ESBN – December 2023 - Demand Flexibility Product Proposal – Consultation Document – link here
[61] CRU – July 2023 - ESBN Demand Flexibility Product Procurement Decision Paper – link here

operational management of local system constraints and/or to facilitate the integration of renewable energy on to the system.

In cases where the SO deems that local flexibility should be required, the SO would need to set out the expected parameters of this required local flexible demand service to the data centre applicant during the course of its engagement on a connection application. This would include the level of demand flexibility required e.g. 20% of total demand, and the expected service profile e.g. 4-6 hours each day over specified hours over minimum number of months each year. In providing this service to the local system it is proposed that the site would be remunerated through the relevant System Operator's local demand flexibility scheme which they will specify. Participation in this demand flexibility scheme would provide a revenue stream to the site which can contribute towards offsetting the initial capital outlay required to provide this service. The CRU notes that such demand flexibility schemes would be subject to CRU approval. The CRU would welcome respondent's views on this proposed approach to allow the SOs to require demand flexibility, where required to manage local operational constraints on a case by case basis, in addition to the requirement for onsite or proximate dispatchable generation to match the demand sites MIC.

In scenarios where the relevant System Operator does not require the provision of demand flexibility for local system reasons, the CRU notes that there may be significant opportunities for data centres to participate in demand flexibility measures, such as those outlined above, which may provide additional revenue streams while supporting system needs. Increased flexibility can support the integration of renewable energy, e.g. from wind and solar, and will be an important component of any transition to real time net-zero emissions. These opportunities should be considered in the design of onsite equipment and processes.

Proposed decision

The Commission has made a proposed decision that there is no additional requirement for demand flexibility provisions on all new data centre connections, however the System Operators can require demand flexibility provisions from data centres on the local system as deemed necessary on a case-by-case basis.

3.5. Renewable Energy Targets & Emissions Requirements

Consultation process so far

In Call for Evidence CRU202357 and Consultation CRU2024001 a number of different potential approaches to treating the issue of new LEU demand connections in the context of emissions requirements were considered. This included consideration of mechanisms such as the requirement to provide on-site renewable electricity generation such as solar and/or wind. If on-site dispatchable generation was to be used, it was described how the fuel for this could be sourced exclusively from renewable sources (e.g. sufficient certified renewable gas feeding on onto Ireland's national gas network to cover on-site consumption requirements). It was suggested that if on-site battery storage was being used, the fuel for this could be sourced exclusively from renewable sources, e.g. secure sufficient renewable electricity feeding onto Ireland's national electricity network to cover the associated consumption. For electricity consumption by a LEU itself, it was described how Corporate Power Purchase Agreements (CPPAs) could support additionality of indigenous renewable generation outside of Government support schemes, with renewable electricity feeding into the Irish system and certified renewable gas feeding into the Irish gas network.

In feedback to these papers, respondents favoured the use of CPPAs for additionality of renewable generation outside of Government support schemes for decarbonising electricity consumption. Challenges such as having adequate space for sufficient onsite renewables were raised, and it was suggested the use of CPPAs would be essential to delivery, with on-site generation and CPPAs seen as complementary. CPPAs were described as the most effective instrument available to facilitate new renewables and can support the core investment required to make these projects financeable. It was suggested this may also support storage and conversion projects such as pumped hydro.

Ireland's Climate Action and Low Carbon Development Act 2015 (the Climate Action Act) provides the statutory framework for Ireland to meet its international and EU climate commitments and commits Ireland to a legally binding path to net-zero carbon emissions no later than 2050, and to a 51% reduction in emissions by 2030. Under the provisions of section 15 of the Climate Action Act, the CRU and System Operators are required to act in a manner consistent with the furtherance of the national climate objective. However, it is the CRU's understanding that Climate Action Act does not provide it with sufficient legal basis to mandate explicit emissions reduction and off-setting measures.

The CRU is of the view that connection policy should take account of renewable energy policy, namely, to promote the use of renewable energy. The Climate Action Plan sets out the roadmap to deliver on Ireland's climate ambition. The Climate Action Plan includes measures to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030.

In promoting the use of renewable energy as part of connection policy one key question is in relation to how any volume requirement could be set. For instance, what level of renewable energy could be required by a new demand applicant captured under this review. The Climate Action Plan includes measures to increase the proportion of renewable electricity to 50% by 2025 and up to 80% by 2030. This target could be used to inform a target of a percentage proportion of a data centre's annual demand being matched with an indigenous renewable energy match such as through CPPAs. This could support additionality of indigenous renewable generation outside of support schemes, while contributing towards the Climate Action Plan renewable electricity target of up to 80% by 2030. In order to ensure the associated renewable electricity and /or gas contributes to Ireland's renewable energy targets and security of supply, the CRU considers that this should be indigenously produced energy - for electricity, renewable electricity feeding into Irish system and, for gas, secure sufficient renewable gas credits feeding into Irish system. The aligns with the preference set out in the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy for data centres that can demonstrate additionality of renewable energy use in Ireland.

The publication of Electricity Generation and System Services Connection Policy Decision Paper (CRU2024101) in September 2024 facilitates more timely connection of generation to the electricity system. This update to the connection policy removed the cap on the number of projects to be processed in a given year, thereby facilitating increased connections of renewable energy projects to the electricity system. This can support the delivery of projects to provide renewables additionality for data centres.

The CRU notes that repowering of renewables could count towards additional indigenous energy where developers could increase the overall capacity of their sites to support the additionality of renewables. Repowering of renewables could include wind farms at the end of their REFIT/RESS support contract.

Proposed approach

The CRU recognises the importance of transitioning to a net zero energy system in line with Ireland's climate commitments and believes that data centres can play an important role as part of that transition. This is in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy which sets out a preference for data centres developments that can demonstrate a clear pathway to decarbonise and ultimately provide net zero data services. In the context of not having sufficient legal basis to mandate explicit emissions reduction and off-setting measures, while also having regard to the need to ensure that grid connection policy takes account of renewable energy policy, the CRU sees merit in capturing and publishing data relating to renewable energy procurement and emissions associated with new demand connections captured under this policy. This will help inform future policy in the areas of renewable electricity and emissions contribution and will act as an incentive for data centres to contract with renewable energy providers.

The CRU does not propose to introduce measures to require the procurement of renewable electricity in addition to the requirement for onsite or proximate dispatchable generation capacity. However, the CRU considers it appropriate, and in alignment with our remit, to require connection applicants falling under this policy to demonstrate the level of renewable energy being procured. Therefore, the CRU proposes that new data centre connections will be required to report to the System Operators annually in relation to their use of renewable energy and emissions offset.

The CRU notes that there are a number of initiatives underway relating to reporting requirements for data centres and LEUs. The Energy Efficiency Directive[62] includes requirements to collect and publish data on data centres energy performance, water footprint, and demand side flexibility, to contribute towards increasing efficiency and promote decarbonisation of the grid.

The Energy Efficiency Directive is supplemented by Regulation 2024/1364 on the first phase of the establishment of a common Union rating scheme for data centres. This Regulation sets out the information and key performance indicators (KPIs) to be communicated to the European database by the operators of data centres with an installed information technology power demand of at least 500 kW and are necessary for the establishment of a common Union scheme for rating the sustainability of data centres in the Union, as well as a common measurement and calculation methodology. It also defines the first data centre sustainability indicators that will be calculated based on the information and key performance indicators

[62] EU – September 2023 - Regulation 2023/955 – link here

communicated to the European database on data centres. The focus on KPIs such as energy consumption, renewable energy use, waste heat reuse, and water input ensures that data centres are continuously monitored for environmental performance.

The Corporate Sustainability Reporting Directive[63] (Directive (EU) 2022/2464) requires companies to disclose how sustainability risks impact them and how their operations affect society and the environment. This directive supports the EU's Green Deal objectives by ensuring that corporate practices are aligned with resource efficiency and the transition to climate neutrality by 2050.

The CRU notes that Action EL/24/22 in the 2024 Climate Action Plan sets out that SEAI /CRU /EirGrid /ESBN are to deliver the 'Implementation of enhanced emissions reporting framework for electricity emissions for large energy users and the system operators dispatch actions'. As part of this action, SEAI recently published the 'LEU electricity emissions reporting framework – Recommendations for design and implementation'[64]. This report sets out high-level recommendations for how such a framework could be structured. The report stated that '*the decision to implement the scheme in the manner recommended (or not), whether to adopt and how to phase each of the different elements of the scheme will be made by the Department of the Environment, Climate and Communication (DECC), taking into account the recommendations and challenges highlighted in the report, along with other stakeholder engagement'*.

The reporting requirements under this proposed decision will be further developed in advance of the final decision. The CRU proposes that annual reporting by new demand connections falling under this policy will include the following as a minimum:

- Details of the renewable electricity contribution to the site's demand with reference to the following:
    - Total additional renewable electricity produced and/or contracted on the Irish electricity network, e.g. through CPPAs (not covered by State support schemes such as RESS).
    - Total renewable electricity from Guarantees of Origin.
    - Total renewable electricity from on-site renewables.
- Renewable energy procured to support dispatchable generation requirements.

[63] EU – December 2022 - Regulation 2022/2464 – link here
[64] SEAI – December 2024 - LEU electricity emissions reporting framework – link here

- Quantification of (i) emissions associated with the demand connection in the previous reporting period (expected to refer to scope 1 and scope 2 emissions) on an annualised basis and (ii) abatement of emissions by 'additional renewable electricity' produced/contracted on the Irish electricity network on an annualised basis.
- Quantification of emissions associated with the demand connection in the previous reporting period (expected to refer to scope 1 and scope 2 emissions) on an hourly basis (24/7) and (ii) abatement of emissions by 'additional renewable electricity' produced/contracted on the Irish electricity network on an annualised basis.
- Details of planned measures to close the gap to zero emissions on an hourly basis, including an associated timeline for delivery of measures.
- Details of capacity contracted in demand flexibility schemes.

It is envisaged that these reports will be independently audited in advance of submission to the relevant System Operator. The System Operators will each publish an annual report summarising information by user on renewable energy use and emissions for new demand connections falling under this policy. The CRU is of the view that transparency with regard to compliance with this self-reporting requirement is important and, as such, proposes that the information referred to above should be made publicly available either by the SOs or the parties. Feedback on this is welcome as part of responses to this proposed decision.

Proposed decision

The Commission has made a proposed decision to require data centres to self-report to the System Operator annually in relation to their use of renewable energy (directly or through Corporate Power Purchase Agreements (CPPAs)) and their sites' emissions, and that the System Operators will annually publish information summarising the information provided by the data centres.

3.6. Assessment and enforcement

In terms of assessing data centre connections, it is envisaged that the SOs will assess applications at the connection application stage to assess whether the proposed measures meet the requirements outlined. Where the SO is not satisfied by reference to the

assessment criteria that a connection offer can be made to an applicant consistent with the needs of the electricity system, the application will not be processed by the SO, accordingly, the application will terminate.

Requirements associated with this new connection policy will be appropriately reflected in contracts which the system operators may enter into with connection applicants. This will help ensure that generation is made available as required under contractual obligations. Any breach of the criteria could result in actions up to and including a termination of the connection agreement. The CRU considers this appropriate in circumstances where the criteria are not being met given the potential risk to system security.

Q2. Comments are invited from interested parties in relation to the topics described in Section 3 Proposed decision on electricity connections.

Q3. Comments are invited from respondents as to whether there should be a minimum level in terms of MIC below which this policy, or elements thereof, should not apply and, if so, what would be a reasonable minimum level of MIC?

Q4. Comments are invited from respondents on the proposed approach of providing the System Operators with the ability to require demand flexibility from data centres on the local system as deemed necessary on a case-by-case basis.

4. Gas connections

A number of applications from Data Centres have been received by Gas Networks Ireland ("GNI") for connection to the gas system. These connections could be in addition to, or as back-up to, a site's electrical connections. Some of these data centre applications may have chosen gas as their primary source of energy, for example, in cases where they were unable to secure an electrical connection. In these cases, applicants seek a gas connection to generate electricity onsite for the data centre load - arrangements known as an 'islanded data centres' since they are isolated from the electricity network. The CRU understands that a number of data centres have been contracted by GNI to connect to the gas system as their primary energy source.

The treatment of LEU gas connections (mainly in relation to data centres) was raised by respondents in response to the Call for Evidence (CRU202357) and discussed in Consultation (CRU2024001). Some respondents suggested that those islanded gas LEUs that intend to migrate to the electricity system once it is able to facilitate new connections should not be treated as islanded gas LEUs. One respondent suggested that they do not consider it appropriate nor feasible to grant or refuse a connection to the gas network based on the availability of capacity on the electricity network.

The Call for Evidence on LEU connections policy set out how a coordinated approach is required for connections to the electricity and gas networks to ensure that policies introduced for electricity do not inadvertently result in an unintended consequence of increased connections to the gas network, and vice-versa. The measures being put in place for the connection of data centres to the electricity network have been developed in the context of system constraints and security of supply. Where gas-connected projects are also connected to the electricity system, these connections can provide resilience for Ireland's energy supply. However, the CRU does acknowledge that, due to the scale of these applicants' typical energy demands, an influx of a number of these types of users could impact gas usage and trigger the need for investment in gas infrastructure. These type of gas users may not represent long term demand (unlike traditional industrial heat users) and may result in the risk of stranding of gas infrastructure assets as this demand may seek to electrify in the future.

The July 2022 Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy outlined that islanded data centres (i.e. those connected to the gas network but not the electricity network) would not be in line with national policy, suggesting these would run

counter to emissions reduction objectives and would not serve the wider efficiency and decarbonisation of the energy system. The CRU considers that the provisions under the Climate Action Act and the Gas Act do not provide sufficient legal basis to the CRU for measures in relation to islanded data centre gas connections and emissions provisions. The Government Statement raised the potential for security of supply risk being transferred from electricity to gas. In July 2022, the Minister for Environment, Climate & Communications issued a letter directing GNI not to sign any further islanded data centre development connections, with this letter citing guidance from the Government Statement. The CRU understands that the development of islanded gas data centres continues not to be in line with Government policy. Growth in 'Islanded' data centres may transfer security of supply risk from electricity to gas supply, potentially putting stress on the gas network and gas importation.

The concept of potential future interruptible gas connections was discussed in Consultation (CRU2024001). The Government's Energy Security in Ireland to 2030 - Energy Security Package (published in November 2023) outlines that DECC are leading an action "to review gas connection policy and introduce gas demand flexibility measures" in 2025. The National Energy Demand Strategy further reinforces this by assigning an action to GNI to "Undertake assessment to identify flexibility products & services on the gas network ...". GNI are working on the development of an interruptible gas capacity product for large energy users which supports the maintenance of gas supply/demand balance. CRU is actively engaging with GNI as a separate workstream to this review in order to progress this work.

The CRU is not proposing to introduce any new decisions relating to connections to the gas network as part of this review process.

It is GNI's obligation under Section 8(2) of the Gas Act 1976 to have regard to the need to ensure the safety and security of the transmission, distribution and supply of natural gas, and it is essential that GNI continues to monitor the risk associated with connection applications to the gas network to determine whether they pose any risk to security of supply or increased network investment costs.

The CRU notes that, where data centres are connected to the gas network, the use of biomethane could play a role in decarbonisation of their demand. The certainty of long-term contracts with data centres could support the development of indigenous biomethane production, which should be done within sustainable production limits and taking into account other demands for biomethane and renewable gases.

The CRU notes the role of the gas network in decarbonising Ireland's energy system, and GNIs commitment to achieving a net-zero gas network by 2045. This includes ongoing work by GNI towards the continued roll-out of biomethane and Compressed Natural Gas (CNG) technologies. Going forward hydrogen may be an option to decarbonise the energy system. The domestic production of renewable gases can reduce the need for investment in cross-border infrastructure, support security of supply and contribute to the delivery of Ireland's decarbonisation objectives.

Q5. Comments are invited from interested parties in relation to the topics described in Section 4 Gas connections.

5. Proposed direction to System Operators

5.1. Previous 2021 direction in relation to data centres

Following extensive engagement between the CRU and EirGrid on security of supply matters and the role of data centres in this context, EirGrid sent a letter to CRU dated 27 May 2021, which outlined their concerns. In response to this in June 2021 the CRU published a consultation paper (CRU/21/060). This was in the context of a wider system security review, including greater insight into the delivery of generation through the Capacity Remuneration Mechanism pipeline, short-term security of supply challenges and network constraints. It was clear that measures would need to be implemented in order to prevent new connections for data centres from exacerbating some of these risks.

The CRU identified risks that continuing to allow data centres to connect to the electricity network in accordance with previously established arrangements would have significantly impacted the CRU's ability to comply with its statutory obligation to protect the security of supply of electricity by ensuring that electricity system can meet the reasonable demands of all consumers, including the demands of existing data centres. Following a consultation process, in November 2021, the CRU issued directions to the Electricity TSO, EirGrid, and the Distribution System Operator (Electricity DSO), ESB Networks, regarding the assessment of data centre connection applications (CRU/21/124). This was in response to an evolving, significant risk to electricity security of supply in Ireland, and network constraints identified by the SOs.

Assessment Criteria (CRU/21/124) - 2021 direction

Pursuant to Section 34(1) of the Electricity Regulation Act 1999 (the Act), the CRU directs EirGrid as (TSO) & ESBN as (DSO) to assess applications for the connection of data centres by reference to the following assessment criteria to determine whether a connection offer can be made within the system stability and reliability needs of the electricity network:

- The location of the data centre applicant with respect to whether they are within a constrained or unconstrained region of the electricity system.
- The ability of the data centre applicant to bring onsite dispatchable generation (and/or

storage) equivalent to or greater than their demand, which meets appropriate availability and other technical requirements as may be specified by the relevant SO, in order to support security of supply.

- The ability of the data centre applicant to provide flexibility in their demand by reducing consumption when requested to do so by the relevant SO in times of system constraint through the use of dispatchable on-site generation (and/or storage) which meets appropriate availability and other technical requirements as may be specified by the relevant SO, in order to support security of supply.
- The ability of the data centre applicant to provide flexibility in their demand by reducing consumption when requested to do so by the relevant SO, in times of system constraint, in order to support security of supply.

5.2. New direction in relation to data centres

Following the completion of the Review of Large Energy Users connection policy the CRU proposes to issue a new direction to the System Operators regarding the assessment of data centre connection applications. It is intended that direction CRU/21/124 will be superseded by new directions to the SOs following completion of this review. Based on the proposed decisions in this paper, draft direction text to the SOs to assess applications for the connection of data centres is outlined below.

Proposed Direction to the System Operators

Pursuant to Section 34(1) of the Electricity Regulation Act 1999 (the Act), the CRU directs EirGrid as (TSO) & ESBN as (DSO) to assess applications for the connection of data centres by reference to the following assessment criteria to determine whether a connection offer can be made within the system stability and reliability needs of the electricity network:

- The location of the data centre applicant with respect to whether they are within a constrained or unconstrained region of the electricity system.
- The ability of the data centre applicant to bring onsite or proximate dispatchable generation (and/or storage) capacity equivalent to or greater than their demand, that participates in wholesale market arrangements, is separately metered, which meets appropriate availability and other technical requirements as may be specified by the relevant SO, in order to support security of supply.

- The ability of the data centre applicant to bring demand flexibility provisions if deemed necessary by the relevant SO.
- The applicant's commitment to self-report to SOs on the data centre site's emissions and use of renewable energy on an annual basis.

Where the SO is not satisfied by reference to the assessment criteria that a connection offer can be made to an applicant consistent with the needs of the electricity system, the application will not be processed by the SO, accordingly, the application will terminate.

In addition to the assessment of applications according to the assessment criteria outlined above, the CRU also requires the SOs to:

- Publish information relating to available capacity on the system (existing & outlook) on a regular basis to be agreed.
- Require interaction between electrical SOs on transmission and distribution systems in relation to developing and publishing the required network information.
- Publish annual reports based on the self-reporting from data centres on site emissions and use of renewable energy.

Q6. Comments are invited from interested parties in relation to the proposed approach described in Section 5 Proposed direction to System Operators.

6. Future potential evolution of LEU policy

A number of respondents raised concerns in relation to the potential uncertainty introduced unless there is sufficient clarity provided upfront on what the terms of an LEU connection agreement are. It was suggested that connection policy should set requirements at the time of connection only and could include a trajectory to certain well-defined performance criteria. It was described how, for project planning and investment, certainty is required at the project initiation stage, with any requirements well defined. The CRU is not proposing to introduce a glidepath where the requirements for the connecting party are expected to change over time. This is to address concerns raised by respondents relating to the ability to respond to changing requirements once a development has been built.

Future potential evolution of measures

There are a number of areas where the CRU expects to see significant development in the coming years that will support the future evolution of connection requirements. These include:

Developments in spatial planning

Ireland has significant renewable energy potential with a non-binding target of up to 37GW of offshore wind, 12GW of onshore wind[65] and up to 12GW of utility scale solar PV to be developed by 2050. If delivered in line with Government targets, this level of renewable energy generation is beyond what is currently foreseen to be required to serve National energy demand, meaning that there is opportunity to consider how best to use this surplus energy e.g. for applications in Ireland or for exporting to other countries. In March 2024 the Department of Enterprise, Trade and Employment, published Powering Prosperity – Ireland's Offshore Wind Industrial Strategy[66]. This sets out how in the longer term, routes to market for Ireland's abundant clean renewable energy will be considered, as well as assessment of regional development opportunities in areas central to the production of offshore wind energy. With the significant growth in demand arising from data centre connections, and the potential for further demand growth from other industries, a more strategic approach to spatial planning and infrastructure development could bring significant benefit to Ireland. As part of this approach consideration should be given to the associated costs and benefits, and any potential risks arising from high volumes of similar demand customer types. As part of the NEDS decision,

[65] EirGrid SONI – 2024 - Tomorrow's Energy Scenarios 2023 – link here
[66] DETE – March 2024 - Powering Prosperity Ireland's Offshore Wind Industrial Strategy – link here

the CRU outlined one of the key recommendations for Government Departments, particularly DECC and DETE, to support the implementation of the NEDS as follows:

1. *Consider a national strategic approach for the facilitation of new LEU connections*

   Consideration to be given to a national strategic approach for the planning of large demand customers and associated infrastructure requirements (e.g. energy, water, broadband, transport etc.), the associated costs and benefits, and any potential risks arising from high volumes of similar demand customer types.

Generation Adequacy

As outlined above, Ireland has significant targets for renewable generation which is expected to exceed our current projections of demand. As these projects are built out, along with the development of the electricity grid and other capacity procured through auction processes, there may no longer be a need for onsite or proximate generation. EirGrid will continue to monitor the adequacy of the electricity system, and this requirement may be reviewed in the future, and in line with any /State-led approach.

Additional flexibility products and markets

The development of further flexibility products and markets can help unlock the flexibility potential of LEU demand while at the same time providing beneficial revenue returns. There are a number of actions and recommendations outlined within the NEDS Decision that can unlock new opportunities for data centres and LEUs to contribute to flexibility and security of supply. Some of the key actions are included in Table 7 below (action numbers refer to the action within the NEDS decision paper).

Action Number	Description	Responsible Body (Supporting Body)
2.4	**Market changes to enable increased flexibility** Assess and report on status and potential solutions to enable energy market participants to offer increased flexibility through the energy market, supporting more flexible trading of demand, engaging suppliers more actively, and ensuring technology neutrality in market and dispatch systems.	**EirGrid** (CRU, ESBN, market participants)
2.6	**TSO demand flexibility product** EirGrid to keep under review further potential options for TSO demand flexibility products.	EirGrid (CRU)

2.9	**Flexibility market development** In update to flexibility multi-year plan set out plan for longer term ambition to move from focused product development to broader technology and sector agnostic arrangements to build a deep and competitive market.	ESBN
2.10	**DSO demand flexibility product** ESBN to review further potential options for DSO demand flexibility products including industrial heat.	ESBN (CRU, DETE, Enterprise Ireland)
2.17	**Changes required for dispatchable consumption** Implement code and system changes to better accommodate "dispatchable consumption" proposals and upwards demand response.	EirGrid
3.2	**Enhanced Publication of network information** Develop a mechanism for the publication of information providing information relating to areas of the network where capacity is available.	EirGrid, ESBN, CRU
3.3	**Identify barriers and publish roadmap for facilitation of co-location of energy supply and demand** Assess the different types of projects for co-locating energy supply, demand and other services (e.g. energy parks or clusters) that could support LEUs and flexibility. Identify the regulatory barriers to these initiatives and publish a roadmap for removal of barriers.	CRU (DECC, DETE, IDA, ESBN, EirGrid, GNI)
3.4	**Implement roadmap for facilitation of co-location of energy supply and demand** Following from Action 3.3, implement the roadmap to support the delivery of initiatives identified.	TBC pending roadmap

Table 7: Actions from NEDS decision

Table 8 below provides an illustrative pathway outlining, at summary level, arrangements which would be put in place as a result of implementation of this proposed decision (referred to as 'current arrangements') and potential evolution of the new policy in the future.

	Current arrangements as per this policy decision	**Future potential evolutions of policy**
Location	Developer led with information provided on locations where capacity is available/restricted67.	Introduction of strategic development/spatial strategy for LEUs, subject to Government Policy, with coordinated provision of supporting utilities and infrastructure.

[67] The proposed decision includes the requirement for enhances publication of network information. This includes capacity maps and network development plans which provide a 10-year horizon.

Generation adequacy	Requirement to provide onsite or proximate generation, and for this to participate in the wholesale electricity market.	To be reviewed pending potential spatial strategy, build-out of renewables and future system needs, and a Government/State-led approach.
Renewable Energy & Emissions	Mandatory reporting for data centres on renewable energy use and site emissions.	Transition to real-time requirements for net-zero energy use, as supporting networks and market systems facilitate this.

Table 8: Illustrative pathway from current to future requirements

This section outlines a number of developments that are expected to occur over the coming years that may provide more opportunities to further develop the connection policy for LEUs. The CRU will review the connection policy as government policy continues to evolve and markets emerge for the provision of flexibility products.

Q7. Comments are invited from interested parties in relation to Section 6 Future potential evolution of LEU policy.

7. Summary of questions

Q1. Comments are invited from interested parties in relation to the topics covered in *Section 2 Constrained regions of the electrical system and security of supply*.

Q2. Comments are invited from interested parties in relation to the topics described in *Section 3 Proposed decision on electricity connections*.

Q3. Comments are invited from respondents as to whether there should be a minimum level in terms of MIC below which this policy, or elements thereof, should not apply and, if so, what would be a reasonable minimum level of MIC?

Q4. Comments are invited from respondents on the proposed approach of providing the System Operators with the ability to require demand flexibility from data centres on the local system as deemed necessary on a case-by-case basis.

Q5. Comments are invited from interested parties in relation to the topics described in *Section 4 Gas connections*.

Q6. Comments are invited from interested parties in relation to the proposed approach described in *Section 5 Proposed direction to System Operators*.

Q7. Comments are invited from interested parties in relation to *Section 6 Future potential evolution of LEU policy*.

8. Next Steps

This paper sets out the CRU's proposed decision in relation to the new LEU connection policy.

Comments are invited from interested parties on this proposed decision until **Friday 04 April 2025**. In cases where respondents identify potential issues with aspects of the proposed decisions, respondents are encouraged to outline potential solutions which achieve the objectives of the proposed new LEU connections policy. Responses to this consultation be submitted via the online CRU consultation portal at link here.

Unless marked confidential, all responses may be fully published on the CRU's website. Respondents may request that their response is kept confidential. Responses received to this paper will be considered and a final decision will issue in due course.

CRU Disclosure Requirements

Unless marked confidential, all responses from companies or organisations may be fully published on the CRU's website. Respondents may request that their response is kept confidential.

The CRU shall respect this request, subject to any obligations to disclose information. Respondents who wish to have their responses remain confidential should clearly mark the document to that effect and include the reasons for confidentiality.

All respondents may be listed in summary of responses, even those who request that elements of their response should be treated as confidential. Responses from identifiable members of the public will be anonymised prior to publication on the CRU website unless the respondent explicitly requests their personal details to be published.

The CRU privacy notice sets out how it protects the privacy rights of individuals and can be found here.

Appendix A – Summary of consultation feedback

The CRU received 53 responses to the Consultation on Review of Large Energy Users Connection Policy (CRU2024001), with 12 of these marked as confidential. 41 of these responses are published alongside this consultation paper. The non-confidential respondents are listed below:

American Chamber of Commerce	ESB Customer Solutions
Bord Gais Energy	EP UK
Bord na Mona	ESB G&T
Cement Manufacturers Ireland	ESBN
Chambers Ireland	Energy Storage Ireland
CLEAR Consulting	Eastmont Developments Limited
Cloud Infrastructure Ireland	Equinix
Codema	Fingleton White
CSC Commodities	Finsbury Infrastructure
CyrusOne	Found Digital DS
DETE	Herbata
Digital Infrastructure Ireland	IBEC
DRAI	IDA
EDF Renewables	Irish Planning Institute
eHeat	Kildare Innovation Campus
Electricity Association of Ireland	Mayo Energy Group
Enterprise Ireland	Orsted
EngineNode	Uisce Eireann
Energia	Walton Institute
EnergyTag	Wind Energy Ireland
EirGrid	

The following section provides a high-level summary of some of the key messages received through feedback to each section of consultation CRU2024001.

8.1. Category of LEU to which this policy applies

In terms of the categories of LEU in electricity and gas to which this policy should apply a broad range of views were received. For electricity, some respondents suggested using a single criterion to determine what is captured as an LEU while others proposed using a number/mix of criteria to determine this. These criteria included capacity (MW), energy use

(MWh), metering group, whether provides demand flexibility, provides grid support, national interests (e.g. hospitals, pharma plants, data centres which support hospitals, banking etc), load profile, location, distribution/transmission connected and voltage level.

Some respondents favoured focusing on the larger end of LEUs suggesting it should apply to DG10 and transmission connected customers. Some respondents suggested a minimum level of capacity (MIC) above which they would be considered a LEU, such as 0.5MW, 5MW, 10MW or 20MW. One respondent suggested the connection should be for a minimum of 20MW, equivalent to 50MWth as defined by GNI currently. Other respondents suggested that DG7-DG10 connected users should be considered. Many respondents specified that the user should be transmission connected, often suggesting this in conjunction with other criteria. Some respondents raised the voltage level that users are connected to, with some specifying that 110kV should be the minimum captured. It was suggested by some that it may be most impactful, and mitigate grid congestion challenges, to focus on XLEUs rather than a broader, and more diverse set of connection sizes and development types. In contrast other respondents suggested the policy should be more comprehensive and cover all LEUs, suggesting there is no reason why one LEU should be treated differently from another. It was suggested that smaller LEU's cumulatively can also contribute to carbon reduction efforts.

Some respondents suggested acknowledging the energy profiles of users. Respondents emphasised the varying energy profiles of different LEUs describing the complexity of production/manufacturing and how the nature of business can dictate energy demand profiles. Some respondents described how users like data centres have very flat demand profiles which provide system predictability at scale.

Some respondents suggested that the proposed policy should eventually include smaller LEUs. It was suggested that this could be achieved by initially applying the policy to larger energy users, and then, after a robust analysis of the potential impact on those customers, the policy could be gradually extended to smaller LEUs. One respondent described how from their viewpoint on electrification of heat within industries, including smaller LEUs in the policy framework is ideal.

Other respondents suggested caution in including smaller LEUs. One respondent described how non-XLEUs are particularly vulnerable to additional costs. Suggesting increased mandatory requirements to connections policy can cause unnecessary uncertainty for these LEUs and may delay or block increased electrification at some facilities. One respondent stated they urge proportionality in amending connection policy for smaller industrial

connections. A number of respondents suggested the behaviour of smaller LEUs may be better influenced by providing appropriate price signals or market mechanisms to promote demand flexibility, storage or other decarbonisation efforts.

For gas connections, many respondents supported the definition of peak hourly demand greater than 50MW thermal input and a connection pressure of 16 barg or above. One respondent stated the proposed definition of a gas LEU is aligned with Gas Networks Ireland's Connections Policy (50MW thermal) and aligns with the EU ETS threshold of 50MW thermal, which provides for reporting requirements for these larger consumers of energy.

8.2. Transition period

In relation to the potential use of a transition period the majority of respondents supported this approach reflecting that real-time zero emissions are not achievable at this stage due to limitations in the current technology and products available. Respondents cited the interaction between achievement of real time net zero emissions with the ongoing development of the biomethane, hydrogen, solar, wind, battery storage systems and other renewable markets over the next number of years. It was suggested that there needs to be an acknowledgment of the current limitations on what the SOs and energy markets can deliver in terms of real time zero carbon energy. One respondent suggested that a potential transition period could take the form that certain provisions that apply from 2024 might be set at a more achievable level than those that should apply in later years. Many respondents acknowledged and supported the importance of meeting climate obligations referring to relevant legislation and policy targets. One respondent stated that the potential use of a transition must have regard to Government Policy as a whole, including enterprise and industrial policy, in terms of potential impacts on business, employment, investment and the reputation of Ireland as a location for Foreign Direct Investment. One respondent described how a glide path may also include existing LEU mechanisms such as Flexible Demand and 'Mandatory Demand Curtailment'. This respondent suggested that the inclusion of LEUs in the wholesale electricity markets through Demand Side Units ("DSUs") may also be a consideration.

Respondents provided different views on the timing of the different elements. One respondent stated that targets cannot be met overnight, suggesting there should be other measures along the way such as interim targets. Some respondents suggested that the

targets and associated timeframes at the time of connection should be reflective of the availability of renewable energy, and associated PPAs. One respondent described how they support the use of a pragmatic glide path or transition period for new LEUs meeting net zero emissions, reflecting the time needed for the delivery of new renewable projects, technologies, flexibility services, verification schemes and incentive mechanisms that can support delivery of the measures under consideration. One respondent suggested that transitional requirements should be reviewed periodically in order to reflect external developments/factors. One respondent described how any transitional measures should provide clear and unambiguous dates for employment or ratcheting of requirements. This respondent suggested that a clear and specific Real Time Emissions Reporting roadmap should be agreed. It was suggested that the timeline of this transition period should be reflective of the pace at which advancements happen within the renewable energy space. A significant number of respondents noted the timeframe of planning regarding LEUs (project planning) and that there might be an impact on the project timeframe if new rules are implemented. One respondent stated that Ireland's CPPA market is not as developed as in other EU countries. This respondent stated that favourable commercial offerings in RESS were competing with CPPAs. One respondent stated that the timing would need to align with the sectoral emissions ceilings and the time periods set out national carbon budgets, and this would need to consider cumulative emissions over the given period. Respondents highlighted the different development timelines between LEUs and renewable generation, suggesting renewable timelines are outside of an LEUs control. Some respondents raised timing issues such as planning/permitting and grid connection timelines.

Many respondents supported maintaining optionality in how any requirements are implemented, citing reasons such as reflecting different business types, facilitating innovation, investment and ensuring a smooth transition. Respondents highlighted the need for a clear policy with well-defined interim achievable targets, stating the need for flexibility regarding different options for the transition period. It was suggested that a glide path should provide optionality to LEUs, while reflecting practical, technological, and competitive challenges. Respondents suggested that it should not be an overly restrictive approach implemented without a reasonable glide path. It was suggested that otherwise this could seriously impact Ireland's FDI proposition. A number of respondents suggested that any mandated requirements/criteria have to be aligned with LEU's demand ramping schedule, rather than being based on the total MIC from the outset, reflecting the real-world demand profile.

A number of respondents stated that applicants need to understand at the time of connection, exactly what the terms of their connection agreement are. It was suggested that connection policy should set requirements at the time of connection only, and could include a trajectory to certain well-defined performance criteria. One respondent described how when developing any project, it is better to know with certainty what is required at the project initiation stage. One respondent described how developing a large energy facility requires significant capital investments and making investments to future proofing the project is difficult if all of the requirements are not well defined.

A number of respondents stated that compliance and enforcement based on any required provisions depends on a clear definition of the exact requirements. A number of respondents described how in terms of monitoring and auditing the progress of the transition on site, new requirements for publishing figures on carbon emissions, power use, water use etc. from the Energy Efficiency Directive and the European Corporate Sustainability Reporting Directive could be leveraged to facilitate this. One respondent suggested that the transition period should be split between reporting and targets. Where LEUs should be required to report their emissions on a monthly and hourly basis from the time of connection, and where LEUs should be required to be net zero initially on a monthly basis in the transitory phase and then on an hourly basis thereafter. A number of respondents suggested CRU have a role in compliance and enforcement. One respondent suggested that any compliance requirements created by the CRU should also be managed and enforced by the CRU. One respondent suggested for the transition period compliance should be enforced by a 3rd-party Qualified Verifier. Some respondents noted the EPA and ABP roles in relation to this.

8.3. Measuring performance

The majority of respondents supported the end goal of reaching close to real-time zero emissions. Respondents highlighted the challenges and complexity of meeting this standard in the short term. Respondents welcomed the use of the current GO system to offset emissions on a monthly or annual basis. Respondents supported the use of timestamped GOs to help match LEUs demand with carbon free generation. The need for location/proximity being accounted for was raised. Many respondents saw merit in the use of a glide path to allow the development and implementation of increased granularity GO products. Respondents highlighted concerns on the need for a clearly defined set of criteria.

Many respondents supported the use of existing self-reporting mechanisms. It was suggested by some respondents that users could transition to a more formal reporting framework once established. One respondent suggested policy should not require establishment of additional reporting requirements. A number of respondents agreed with approach of requiring indigenous sources of renewable energy citing benefits like security of supply. One respondent suggested the use of renewable generation on-site should be prioritised as much as possible. Some respondents suggested the definition of renewable energy should be broader, capturing sources located on the island of Ireland and in neighbouring countries interconnected to the island (with cap based on interconnection capacity). Some respondents suggested existing mechanisms for tracking cross-border guarantees of origin should be recognised, suggesting renewable gas does not need to be indigenous. Another respondent suggested Irish based companies invest in biofuels produced elsewhere and so help incentive its production in all markets. One respondent made distinction in treatment of gas versus electricity, suggesting gas as a physical quantity, once injected can be utilized anywhere across the network, while electricity operates under a "use it or lose it" principle, requiring immediate consumption upon generation.

In relation to how the storage of renewable energy is captured by any measurement system many respondents suggested the system-wide storage of electricity cannot account precisely for the source of generation. It was suggested that any policy should allow for market mechanisms which incentivise storage when renewable generation is high. Respondents cited challenges to measuring the storage and use of renewable energy. Respondents saw merit in an integrated system for measuring electricity and gas to enhance accuracy, avoid double-counting and provide transparency. Regarding responsibility for measuring LEU emissions, respondents emphasised that the roles of the different bodies should be clearly defined. Respondents mentioned different parties such as EPA, System Operators, Local authorities, an Bord Pleanála, SEAI and CRU.

8.4. Location of LEUs

Respondents acknowledged the benefits of LEUs locating in close proximity to renewable generation and storage, reducing losses on grid, reduced renewable curtailment and relieving constraints. Respondents highlighted challenges to locating certain types of LEUs close to renewable generation and storage citing factors like availability of land, labour, access to fibre optical network, local grid, water supply and road network. Respondents

welcomed the development of sites like energy parks co-locating LEUs with generation. A number of respondents highlighted concerns that data centres require low latency and favour close proximity with other data centres. In terms of encouraging LEUs to locate close to renewable generation and storage respondents suggested incentives such as use of system charges, shorter connection/planning cycle, grants and tax credits. Some respondents favoured the use of locational market-based incentives. Some respondents mentioned availability of locational information.

Respondents had different views on whether locational provisions should be mandated. Many respondents favoured the provisions remaining voluntary due to specific practical constraints faced by certain types of LEUs, e.g. cement manufacture. Some argued that imposing locational restrictions could be interpreted as discriminatory by certain types of users, and that flexibility for location should be maintained. On the question of whether there should be exceptions to locational requirements one respondent suggested that this would need to be fully evidenced and based on more than just cost implications, describing how a LEU connecting in Dublin imposes substantial costs on the system which they do not fully internalise. It was suggested that certain exemptions to any locational requirements may be necessary for particular types of LEUs. Some respondents stated that projects which have advanced planning and power applications in the Dublin area should be prioritised and allowed to be offered grid connections. Another respondent suggested linking it to the services the LEU site requires (e.g. water) and can provide (demand flexibility). One respondent described how they support the introduction of overarching requirements which minimise the need for exemptions for a given customer type, suggesting any provision for exemptions would require careful consideration to minimise the risk of discrimination.

In terms of the level of proximity between the LEU and renewable generation it was suggested it could be evaluated on a case–by–case basis. Some respondents suggested the closer the better in terms of proximity citing reduced losses. Others warned against setting arbitrary distance limitations. Some respondents recommended a market-based approach, suggesting this might be most simply applied at the nodal level, whereby an LEU locating on the same node as a source of generation could be offered a reduced network charge. Another respondent suggested it should not be based on distance only, suggesting the wider system efficiency improvements of matching LEU with renewable generation on a single node would need to be central to the application appraisal.

In terms of what roles the System Operators and enterprise agencies will have in supporting/facilitating any potential locational requirements respondents provided different views. One respondent stated that irrespective of locational requirements on LEUs, there

needs to be more integrated spatial and strategic planning of the energy networks. It was suggested that planners and developers should review the energy demand against the energy available in these areas with SOs. It was suggested that the Enterprise Agencies under the aegis of DETE (Enterprise Ireland, IDA Ireland, Local Enterprise Offices) can have a useful influence on investment decisions made by their clients. It was suggested they would benefit from enhanced information from the SOs on energy infrastructure capacity, and opportunities for lower carbon connections. One respondent described how the system operator's role involves ensuring the reliable operation of the grid, facilitating connections for new renewable generation projects, and optimising grid capacity to accommodate increased demand from electrification of heat initiatives. One respondent described how the SOs should categorise types of users as appropriate to best optimise the operation and development of their particular system, whilst meeting their obligations to meet customer needs. It was suggested that the SOs and policy makers need to concentrate on delivering energy generation infrastructure including upgrading lines and substations and deliver on its stated ambitions rather than looking to restrict demand users.

On the question of whether locational requirements should be implemented using a glide path if introduced on a mandatory basis, many reaffirmed their opposition to the introduction of mandatory locational provisions. Some respondents favoured the use of a glide path suggesting this flexibility is required for large LEU's.

8.5. Non-firm demand connections

Many respondents did not support the introduction of mandatory non–firm connections. Respondents highlighted challenges to the use of non-firm connections such as uncertainty it creates for businesses and how it would not be viable for many types of LEUs. It was highlighted how certain types of LEUs have limited ability to move away from 24x7 operations such as manufacturing and data centres. It was described how data centres require certainty of power availability in order to meet the service level agreements they must sign in order to operate. One respondent stated that the imposition of these contracts on even a small sector of industry would send a signal to the market that the Irish system is incapable of providing firm power and gas for new investment and business growth. Respondents suggested that assessments should be done on a case–to–case basis. Many respondents suggested there is no one-size-fits-all approach, and that this was related to the location of the LEU and available network capacity.

Most respondents supported the voluntary introduction of non-firm connections. Respondents highlighted regarding non–firm connections the need for clarity at the time of connection and certainty of a future pathway to firm power. Respondents stated that non-firm connections have potential, but consideration should be given to practical decision-making. It was suggested that there needs to be demand for these types of connections from customers. Respondents favoured the use of both firm and non–firm connections to allow LEUs to efficiently use the grid. If in the scenario where non–firm connections are introduced on a temporary basis, respondents stated that clear guidelines would need to be established to set out the terms and conditions of any such arrangements. In terms of what might trigger a non-firm connection becoming firm it was suggested that infrastructure upgrades could be required, and the LEUs commitment to contributing to the production of renewable energy could also be a factor.

Regarding the proportion of the LEU demand that could be connected on a non-firm basis, respondents stated the importance of voluntary participation and that there should be more consideration on this, suggesting it is too early to determine at this stage. One respondent suggested that a percentage of MW capacity would be arbitrary. Another respondent suggested it should be proportional and based on the level of constraint in the energy cluster. Some suggested a sliding scale as an acceptable approach. One respondent suggested connecting all of an LEUs demand on non-firm basis is practical, highlighting enhanced grid flexibility and potentially reduced costs for LEUs.

In terms of what incentives could facilitate non-firm connections, a number of respondents suggested that the use of incentives like expedited connections, grants and price signals. Respondents stated that these measures would encourage LEUs to seek non-firm connections, lower connection costs and expedite connection timelines. One respondent emphasised the importance of all connections aligning with the Irish Transmission Security and Planning Standards.

Respondents suggested that the SOs should use the flexibility provided by non–firm connections only for a limited time and that LEUs should receive adequate advance warning of any potential disruption of supplies. One respondent suggested that if LEU’s are built with flexibility from the outset, it takes a large burden from the SOs and that some LEU’s are unlikely to ever look for a firm connection. One respondent suggested that LEUs that opt to take part in the LDES procurement could flag as part of the procurement that they are happy to be non-firm (permanently, partly or for a limited period), i.e. that EirGrid could dispatch them down at times if required. Some of the respondents expressed the ambition that SOs

could work with LEUs to better understand their demand profiles, which could inform use of demand flexibility.

Many respondents supported providing non-firm/flexible connections to islanded LEUs, citing benefits such as facilitating flexibility between the electricity and gas systems, security of supply, and decarbonisation. Respondents suggested that coordination is required between both the DSO and the TSO, especially where network constraints are present. Some respondents noted that this type of connection might provide diversification and additional security of supply to some LEUs. One respondent described how those LEUs that intend to migrate to the electrical grid once the grid is ready to accept new connections should not be treated as islanded.

8.6. On-site generation and storage

In terms of whether renewable generation be used to match LEU demand on-site or to provide flexible service to the system, respondents put forward a range of views. One respondent suggested that this connection policy should define what assets an LEU is required to develop or contract to be granted a connection offer, suggesting the definition of specific operational requirements for those assets are beyond the scope of this connection policy. A number of respondents described the challenges for LEUs to develop onsite renewable generation and storage. Respondents highlighted the many different types of business come under the heading of LEU, with different operations, budgets, and physical space onsite. Challenges were raised such as location and permitting constraints/planning permission. Respondents raised concerns in relation to the significant cost associated with the production and storage of onsite renewable energy. Another respondent raised concerns in relation to the use of renewable energy as it is so variable, suggesting that other sources and/or storage will be needed. One respondent suggested that battery storage could be installed alongside onsite dispatchable generation resulting in the need for a smaller dispatchable generator.

One respondent stated it may be challenging for a demand site to operate at a substantially lower carbon intensity than the overall grid in real time. This respondent suggested that greater value could be provided to the electricity system by using the onsite generation and storage to support the overall system. One respondent described how solutions such as storage, demand flexibility and behind the meter generation can in many instances be interchangeable in terms of their system impact, however some will be more or less suitable

to given customers depending on their cost, practical constraints (for example site availability) and interaction with their business operations. Another respondent suggested there is an opportunity for behind-the-meter storage to aid the decarbonisation journey of LEU's, citing benefits like energy cost savings, grid resilience, export trading revenue, demand side flexibility, increased environmental performance and compliment renewable generation.

A number of respondents suggested that on-site storage or renewable energy generation is unlikely to match the entire demand needed by an LEU due to size and space limitations, suggesting it was better suited to provide support/flexibility to the system (reduce system constraints) and/or provide demand flexibility. One respondent described how excess energy produced by the LEU could be stored on site or supplied to the grid, suggesting these connections should be metered to measure what level of energy is produced/consumed by the LEU. One respondent linked onsite generation/storage to the offering non-firm/flexible connections, suggesting if these were introduced it is likely that LEUs would leverage onsite storage or generation to balance a non-firm connection and ensure a stable supply of continuous power.

Some respondents suggested that LEU on-site renewable generation and storage could provide both on-site energy needs and provide flexibility to the system. One respondent suggested these resources could provide flexibility services including capacity market services to the system, noting potential increase in services possible when provided to the market via DSU versus non-firm connection. Some suggested that new LEU demand should be matched and offset by new renewable generation, but that this can be achieved via CPPA commitments and should not be required to be onsite with the LEU. One respondent stated that the benefits of "decentralising" power generation and moving to a more distributed power architecture in Ireland are significant, citing efficiency benefits of onsite generation through appropriately sized CHP installations reaching up to 90%, which is 20% to 25% higher than the combined efficiency of heat-only boilers and conventional power stations.

Respondents highlighted reasons for why on-site dispatchable generation using only renewable fuels would have limited run hours citing factors such as a limited renewable fuel supply and need to comply with air emission limits set by the EPA and the Industrial Emissions Directive. Some respondents highlighted challenges being able to operate their business if they have to adhere to periods of power interruption (off-grid) for hours, and also be limited by the number of hours can run any onsite assets. One respondent described the

high investment cost for such generation suggesting LEUs would struggle to financially justify the construction of such facilities without certainty that they will be allowed to operate. The use of HVO was suggested as a significant opportunity to provide flexible demand while also committing to a net zero emission goal. Some concerns were raised with regards to HVO's in relation to the source of raw materials.

Respondents described how LEUs require backup generation to provide essential services for operational reasons. It was described how typical running hours would normally be limited as part of planning application, with exact running varying from project to project (depend on business type e.g. data centre with SLA). Respondents described how on-site back-up generators are regularly tested to verify usability. One respondent suggested that behind-the-meter storage could fulfil the function of backup generation for operational reasons. It was suggested that HVO could be used instead of diesel as a cleaner alternative.

8.7. Demand flexibility

In relation to the provision of demand flexibility services by LEUs and whether these should be used for system support, decarbonisation or both, a large number of respondents suggested both. Respondents stated that usage for system support could reduce the cost of energy. It was described how if used for decarbonisation it would align with CAP targets. Many respondents suggested that any demand flexibility provisions should not be mandatory. On the question of whether connections in certain parts of the network should be required to provide demand flexibility services, some respondents saw merit in this approach. Many respondents did not agree with the premise of this approach suggesting it should not be mandated based on location, and instead should be introduced on a voluntary basis, with incentivises used to drive participation by LEUs.

If introduced on a voluntary basis many respondents suggested that financial incentives (in the form of grants, tax credits and feed-in tariffs) could be used to encourage voluntary adoption of the demand flexibility in the new LEUs. Some respondents suggested investigating international best practices, as this segment is not fully developed domestically. Some other suggestions regarding incentives for the new LEUs from respondents could be an accelerated connection process, increased capacity for existing facilities, and access to demand flexibility products.

A large number of respondents indicated that demand flexibility for new LEUs should not be mandated. Some respondents emphasised that certain types of LEUs cannot turn down their demand on request because of the nature of their operations. Respondents proposed comprehensive case–by–case assessments, with the possibility for exemptions to be granted. Respondents put forward reasons for exemptions such as grid stability, available resources, the size of the LEU and the technical feasibility of implementing demand flexibility measures.

In terms of the introduction of timed/profiled connections some respondents did not agree with this approach, describing these connections as impractical for many LEUs. Other respondents agreed with the introduction of timed/profiled connections. One respondent qualified their support only if there is a market for these types of connections. Respondents highlighted the need for sufficient information and signals to effectively implement these. Challenges in projecting renewable energy to inform timings were cited. Need for regulatory structure on flexible connections was cited by a respondent.

8.8. Energy efficiency & district heating

In relation to the use of waste heat from LEU sites, the majority of respondents saw merit with the utilisation of waste heat from LEU sites. Respondents highlighted the importance of factors like the location of the LEU and the LEUs type of business. The different types of high grade and low grade heat were highlighted, it was described how waste heat from different processes such as a power plant, pharmaceutical manufacturing and a data centre output completely different types of waste heat. Respondents described the need for an interface to transfer this medium, suggesting that heat pumps can be utilised to reuse waste heat to increase the efficiency of waste heat generators onsite. One respondent described that the highest potential is heat in the temperature range of 70 °C to 90 °C, which could be utilised up to 5 km from the centre of origin of the heat. It was described that for heat networks population should be clustered in close proximity of LEUs due to heat transportation over long distances being inefficient.

Many respondents were supportive of utilising waste heat from LEUs to feed into district heating or other processes. Respondents highlighted how district heating is not very developed or facilitated in Ireland. Some respondents cited the need for additional supports, defined roles of independent operators (e.g. Local Authorities) and a regulatory framework. Respondents highlighted examples of models from other countries with far more advanced

district heating sectors, suggesting there is the need to develop standards and procedures regarding district heating. It was suggested the concept should be supported as it is aligned with the Climate Action Plan.
Respondents suggested that it should not be a mandatory requirement in the current environment. Many respondents suggested that the provision of waste heat from new LEUs should be voluntary. Respondents suggested it should be encouraged by means of grants and tax credits. One respondent suggested that Heat Bill 2024 might create district heating areas, which would facilitate this endeavour.

8.9. Gas

Respondents supported the use of biomethane towards decarbonisation of LEU. Respondents highlighted that biomethane production in Ireland is in its infancy, which impacts on its feasibility to impact on decarbonisation in the short to medium term. Respondents cited the CAP, SEAI (heat study) and GNI (industry survey) estimates giving a range from 5.7 TWh to 14.8 TWh of gas production per annum. Respondents noted the potential natural ceiling in biomethane supply available. One respondent cited the Draft National Biomethane Strategy “Sustainable Biomethane production volumes will always be limited by the availability of sustainable feedstocks".

In terms of what running profile should be adopted by onsite gas generation which is being run on a limited supply fuel like biomethane a range of views were provided. Some respondents suggested that these assets should never be restricted to limited running. It was described how the technology is expensive to install and to run, and is only justified on the basis of grid not being available. It was suggested that it should not be limited to being used for back up and/or flexibility purposes. Other respondents suggested that consideration needs to be given to the supply needs of other sectors e.g. such as hard to abate use cases. These respondents noted the limited availability of renewable gas production, and that there are better use cases for high-energy biomethane in Ireland’s energy system than meeting baseload energy demand. Some of these respondents suggested that biomethane could be used sustainably by LEUs for the purposes of flexibility services for short periods when the electricity grid requires support/balancing.

Respondents supported the use of green hydrogen as a potential path to decarbonisation. Respondents described the current limitations in the development and production of green hydrogen but cited its large potential to contribute to decarbonisation. Some respondents

suggested that hydrogen should be reserved for hard to abate use cases. One respondent included a diagram of the hydrogen ladder which indicates how hydrogen should be used in any energy system. Respondents raised the need for clear direction to fully harness the benefits of green hydrogen. Respondents welcomed the publication of the National hydrogen strategy. One respondent suggested that green hydrogen should be converted into derivatives like ammonia and sustainable aviation fuel, stating the versatility and potential of green hydrogen as a renewable energy source.

In relation to the renewable gas certification scheme respondents favoured its use in supporting the development of an indigenous renewable gas industry, helping to offset fossil fuels. Respondents cited GNIs current certification scheme. One respondent described how the renewable gas certification scheme serves as a valuable tool in promoting renewable energy deployment, especially with regards to identifying the source and origin of indigenous renewable fuels.

In relation to the introduction of any non-firm/interruptible gas connections for LEUs (at exit point) respondents provided different views. Many respondents raised concerns in relation to an approach like this due to potential onsite generation arrangements, stating there would need to be co-ordination between Eirgrid and Gas Networks Ireland. It was suggested it would be untenable for there to be a gas interruption if at the same time Eirgrid was also calling for LEUs to reduce their loads and go to their own on-site generation, which is likely to use gas. It was described how facilities cannot be expected to operate with a non-firm gas connection as secondary power to a non-firm grid connection. One respondent stated that an interruptible contract cannot be the only type of contract offered to an LEU, otherwise it is a signal that the Irish system is not capable of providing firm power to consumers and will damage Ireland's competitiveness. Another respondent suggested it was unclear what problem interruptible gas supplies are intended to solve. A number of respondents supported this approach. One respondent stated would support in theory, the provision of a voluntary, non-firm connection process for access to the gas network, suggesting it could be an incentivised option with lower connection and network tariffs, existing alongside the traditional firm connection application process. Another respondent suggested the introduction of non-firm/interruptible gas connections for LEUs has the potential to accelerate connection timelines and reduce costs by enabling the accelerated rollout of renewable gasses to the market ahead of a time where the supply of renewable gas can sustain firm connections.

In relation to whether demand flexibility services on the gas system can provide a benefit for both system support and decarbonisation respondents highlighted the resilience provided in having the option to switch between energy sources be it gas or electricity. Respondents described how as a means to provide generation during times of low renewables, the gas system can be a key enabler of more renewables on the grid, contributing directly to decarbonisation, as well as the benefit of supporting the grid.

8.10. Connection considerations

In relation to maintaining optionality many respondents supported this approach, describing it was sensible. Respondents suggested that room for innovation should be offered. It was suggested that what an LEU can offer to the system could vary widely and the policy should facilitate innovation in this space offering flexibility with regards to detailed implementation. It was suggested that guidance is required at a high level for development to progress. One respondent described a concern that any mechanism for 'maintaining optionality' may correspond to a lack of certainty for potential applicants and deter investment. This respondent suggested that connection policy should set requirements that are binding at the time of connection.

In relation to how a new LEUs location may inform what criteria it may need to meet a range of views were provided. Some respondents suggested that whether they are within a constrained or unconstrained region of the electricity system could inform what services they are required to provide like dispatchable generation to support supply and ability to provide demand flexibility. One respondent described a variant of this whereby the new LEUs would need to accept a non-firm connection in areas where there are demand constraints unless they can provide sufficient on-site renewable generation to cover their demand. It was suggested this will create an incentive for LEUs to locate in less constrained areas where they can connect faster and on a firm basis. One respondent suggested that projects which can provide flexibility to the grid by way of generation should not be restricted by location. One respondent described preference for locational criteria to drive the need for LEU's to be closely located near renewable sources, citing significant environmental as well as grid security benefits. One respondent suggested differing requirements for a connection offer is one way to provide a location signal to LEUs to locate in less constrained areas of the network. One respondent recommended that the CRU create market-based policies that send price signals to encourage the location of demand to certain areas of Ireland. Some

respondents suggested location should not be a generalised assessment criteria. These respondents warned against defining preferred locations citing the risk of a rush in given locations. It was suggested that the impact of location should be limited solely to the local system level grid capacity / constraint.

In relation to how a transition period may inform an evolving net zero target and provision of demand flexibility services some respondents were supportive of this approach as providing a pathway to meeting targets. One respondent suggested that progress towards our national renewable energy targets will depend on investment certainty for renewable energy developers. This respondent suggested that LEU's are best placed to provide certainty of future demand, and to contribute to the flexibility required to integrate these renewable resources into the energy system. It was described how Shaping Our Electricity Future outlines a roadmap supporting up to 50% demand growth in the period to 2030 (including 300 MW of additional LEU demand), delivering a balance between demand in the form of economic growth, electrification and digitalisation and the delivery of a low carbon electricity system based on renewable technologies and low carbon system services. One respondent described a transitional period as meaning that the provisions (criteria or requirements) that apply from 2024 might be set at a more achievable level than those that should apply in later years.

One respondent suggested that connection policy criteria must address characteristics or requirements that are empirically definable at the time of connection, stating there cannot be unclear performance or load-shifting requirements mandated, that are not set out in granular, implementable detail in the connection offer. A number of respondents suggested that projects that had their applications terminated following the CRU Decision in November 2021 (CRU/21/124) should be prioritised. It was suggested that for data centres, location should not be a key criteria. One respondent described how the twin objectives of this new policy are to reduce GHG emissions and boost the resilience of the electricity system. This respondent suggested there is a risk that these objectives could conflict where increased electricity use is needed on site. This respondent stated that policies and conditions imposed on LEUs that inadvertently prolong fossil fuel use over potential electrification and carbon capture must be avoided.

In terms of additional approaches for LEUs to help meet net zero requirements one respondent suggested facilitating flexibility through thermal storage technologies in manufacturing, revision of network charges to incentivise flexibility, and measures to address the 'spark gap'. A number of respondents suggested use of private wires. One respondent

suggested that assurance is needed that the legal and permitting framework is in place to facilitate installations of large-scale battery solutions to store energy. One respondent suggested that LEUs should have to demonstrate a net zero carbon overall impact on the system right from the start. One respondent stated that the transition to net zero is seeing an evolution of the retail market from purely selling electricity to more integrated offerings of solar, batteries energy efficiency and other services. It was suggested that this highlights the need for the regulatory framework to evolve to the changing circumstances and needs of customers.

8.11. Roles of other organisations

The CRU received a range of views in relation to the roles of other organisations. A number of respondents suggested there needs to be a coordinated approach across industry, system operators, IDA and other Government departments and agencies. One respondent described how engagement with the relevant utilities and organisations to ensure that suitable sites surrounding planned renewable energy generation are serviced in advance could facilitate a plan-led development approach, rather than the existing, somewhat ad hoc development-led planning of LEU locations. It was suggested this site servicing could include engagement with Uisce Eireann, Local Authorities, Eirgrid, ESB, fibre optic cable operators, district heating operators etc. Another respondent stated that the roles of other organisations such as An Bord Pleanala, EPA and MARA will be fundamental to the process of achieving net-zero emissions.

One respondent suggested that regulators, planning authorities, revenue, government can work with LEUs to help generate incentives for either investing in or building renewable generation or locating close to renewable generation sites. One respondent stated that the Planning Authorities and An Bord Pleanála should have no role in deciding on issues which are within the control, responsibility and accountability of the CRU, SOs such as EirGrid, Gas Networks and the EPA. Another respondent stated that the IDA / Department of Enterprise, Department of Finance and Industry need to be considered as part of the bigger picture before implementing changes to the grid network that will have a profound and ongoing affect to stakeholders and the economy for decades to come.

One respondent stated that the System Operators should be required to implement a revised connection policy in the short-term. This respondent stated that SEAI will play an important role in developing and trialling a methodology for near to real-time emissions intensity. It was suggested that DETE, DECC and CRU will need to continue coordinating policy roles under

the NEDS, and work with SEAI, the System Operators and the Enterprise agencies to progress the key objective of facilitating electricity demand growth, and economic development, while transitioning our energy system to renewable sources. Another respondent stated that EirGrid/SEMO market should be the favoured approach in all practical cases.

8.12. Acknowledgement

CRU would like to thank respondents for their feedback to the Consultation, and to the development of the Large Energy User Connections Policy to Date.

Taking on board this extensive feedback received, the CRU has developed this proposed decision paper.