Data Centre Technical Assessment

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The Oval, 160 Shelbourne Road, Ballsbridge, Dublin D04 FW28
Telephone: +353 1 677 1700 | www.eirgrid.ie

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R1	20/05/2026	Original – published in response to CRU Decision Paper “Large Energy Users Connection Policy” (CRU/2025236)

Executive Summary

The Commission for Regulation of Utilities (CRU) published the *Large Energy Users Connection Policy* on 12 December 2025 (CRU/2025236), establishing a new structured framework for assessing and processing data centre connection applications.

The *Data Centre Technical Assessment* document outlines the Transmission System Operator's approach to assessing a new data centre application and how the Transmission System Security and Planning Standards[1] (TSSPS) are utilised in determining if an area is considered constrained. This document is a separate, standalone document alongside the Data Centre Connection Process Policy ("DCCOPP") Version 3 document which is also published as a response to CRU/2025236. The approach detailed in this document will be refreshed as needed and aligned with the Ten-Year Transmission Forecast Statement (TYTFS) and/or future locational constraint information.

This document outlines the technical criteria that an applicant must satisfy in order to progress to a connection offer. The technical assessment of data centre applicants will focus on four specific elements:

1. Provision of dispatchable onsite or proximate generation and/or storage capacity that matches or exceeds the data centre Maximum Import Capacity (MIC), subject to derating requirements.
2. Requirement for the data centre to meet at least 80% of its annual demand with additional renewable electricity.
3. The location of the requested data centre connection in respect of whether it is in a constrained or unconstrained location.
4. The impact of the requested data centre connection on the stability of the power system.

Technical assessments of data centre applications will be carried out in accordance with the TSSPS. This document outlines how the TSSPS is applied in determining whether a requested data centre connection is in a constrained or unconstrained area of the electricity network, how the proposed dispatchable and renewable energy accompanying the data centre connection is considered and how system stability issues are considered. This document also describes the specific connection considerations which impact on the ability to connect the data centre to the transmission system.

[1] EirGrid-Transmission-System-Security-and-Planning-Standards-TSSPS-Final-May-2016-APPROVED.pdf

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1 Introduction

Ireland's electricity system is experiencing a period of strong and sustained demand growth, reflecting the rapid expansion of data centres as a critical enabler of a technology-rich, innovative economy. Data centres have played a central role in Ireland's success in attracting high-value investment and supporting a broad range of sectors, contributing significantly to national economic growth over the past decade.

This success has been accompanied by a marked increase in electricity demand, with data centres now representing one of the most significant drivers of overall system growth. At the same time, this demand expansion is occurring in a context where the delivery of new grid infrastructure and generation capacity is increasingly complex, giving rise to challenges for network capability and security of supply. Addressing these challenges requires a clear, credible pathway that supports continued economic development while ensuring the resilience and sustainability of the electricity system.

In response to these pressures, the Commission for Regulation of Utilities (CRU) published a decision paper, the *Large Energy Users Connection Policy*[2] (CRU/2025236) on 12th December 2025. CRU/2025236 sets out a pathway for new data centre applications to the electricity system which addresses risks in relation to security of supply, system constraints and renewable energy targets, while minimising, where possible, the impact on national carbon emissions. This direction supersedes Direction CRU/21/124 and will apply to all new connection applications for new or additional capacity captured under the scope of the decision. Applications received prior to the publication of this decision, and which are currently being processed will continue to be processed under CRU/21/124.

The new direction sets out that the System Operators (SO) shall publish an engagement and connection process for data centre connection applicants. Once published, new applicants will then have the transparency and clarity required to advance potential new data centre connection applications.

In response to CRU/2025236, EirGrid has developed four documents relating to the new engagement and connection process for data centre connection applicants, which are described as follows;

1. **Data Centre Connection Offer Process and Policy Version 3 (DCCOPP v3):** supersedes previous versions of the DCCOPP (version 2 published July 2020) and clearly outlines mandatory requirements that must be satisfied before a data centre application can formally enter the connection offer process to receive a connection offer. This policy establishes a clear, structured pathway for processing new large-demand connection applications, applying exclusively to data centres, with the aim of safeguarding security of supply, supporting renewable energy targets, and minimising impacts on national carbon emissions.
2. **Data Centre Technical Assessment**: outlines the EirGrid approach to assessing new data centre applications.
3. **Data Centre Constrained Area Overview**: provides an overview of the system limitations to accommodating further sustained data centre growth, details of areas where some level of growth may be possible and considerations of how the system can be planned to facilitate further growth.
4. **Heat maps for LEUs:** outlines EirGrid's proposed approach to deliver up-to-date locational information/heat maps to showcase demand capacity on the Irish transmission system.

The suite of documents will outline the mandatory requirements that must be satisfied before a data centre application can receive a Connection offer, and describe how EirGrid will assess new data centre connection applications in a transparent and clear manner. The suite of documents will also set out an overview of the Irish transmission system limitations so all stakeholders have a common understanding of the demand capacity that the Irish transmission system can facilitate.

This document, 'Data Centre Technical Assessment' outlines EirGrid's approach to assessing data centre applications taking account of the CRU/2025236 direction.

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[2] CRU2025236_Large_Energy_User_connection_policy_decision_paper.pdf

2 Application Assessment Overview

Based on CRU/2025236, the assessments for new data centre applications will focus on four specific aspects:

1. **Dispatchable Generation Requirement**

   Provision of dispatchable onsite or proximate generation and/or storage capacity that matches or exceeds the data centre Maximum Import Capacity (MIC), subject to derating requirements.

2. **Renewable Generation Requirement**

   Requirement for the data centre to meet at least 80% of its annual demand with additional renewable electricity.

3. **Constrained Area Assessment**

   The location of the requested data centre connection in respect of whether it is in a constrained or unconstrained area.

4. **System Stability Assessment**

   The impact of the requested data centre connection on the stability of the power system.

The following sections will describe how each of these aspects is considered in the assessments.

2.1 Dispatchable Generation Requirement

CRU/2025236 requires data centres to provide dispatchable onsite or proximate generation and/or storage capacity which matches their MIC (subject to derating requirements). The Data Centre Connection Offer Process and Policy (DCCOPP) v3 outlines how this requirement will be implemented for data centre applications. Both the technical criteria outlined below and the requirements outlined in the DCCOPP in relation to dispatchable generation must be satisfied by the data centre applicant.

2.1.1 Dispatchable Generation Criteria

The data centre applicant shall provide sufficient detail on their proposed onsite or proximate generation and/or storage capacity such that EirGrid can assess the impact of the generation.

In particular, the applicant will provide:

1. The location and proposed connection method for the generation and/or storage.
2. Demonstration of how the generation and/or storage will meet 100% of the facility's MIC following the application of a technology-specific derating factor.
3. Demonstration of how renewable generation is considered in terms of a reduction in the derated dispatchable generation/storage requirement, as per the CRU direction. See Section 2.2 for other renewable-specific requirements.
4. Details on the approach to generator fuelling arrangements where applicable (for example, type of gas connection, evidence of gas connection contracts, logistic arrangements for other fuel types etc.), run hour limitations and EPA licence status.

2.1.2 Examples of Technical Issues that will be Assessed

Once sufficient detail on the applicant's proposed onsite or proximate generation and/or storage capacity has been provided, EirGrid will need to consider if the proposal can adequately meet the demands of the data centre facility, meet the required system needs, and ensure that no breaches of the TSSPS are created as a result of the connection.

To provide transparency and clarity of the type of technical issues that may arise, examples of technical issues which could occur include:

- Where generators in specific areas increase the short circuit level such that equipment ratings are exceeded, this means that the generation cannot be connected.
- Where the generation and/or storage is not connected at the same transmission system node as the data centre, this may result in equipment overloads during specific power flow conditions as the electricity flows from the generation to the demand. In such a scenario, the generation and demand would be considered as being in a constrained area (See Section 2.3).
- Where a data centre is using energy storage to meet their dispatchable capacity requirements, this may create issues during times when the storage asset needs to recharge the depleted energy. For example, if a 100 MW data centre is using a 300 MW storage facility, the total electricity demand for the area could reach 400 MW for a significant period of time while the storage is recharging and supply is also maintained to the data centre facility. If equipment overloads were to occur during such a scenario, the storage and demand would be considered as being in a constrained area (See Section 2.3).

2.2 Renewable Generation Requirement

CRU/2025236 requires data centres to meet at least 80% of their annual demand with additional renewable electricity generated in the Republic of Ireland (subject to a 6-year glide path). The assessment criteria outlined below describes how the details submitted by the applicant, in particular the locations of the renewables that the applicant intends to provide, will be considered in order to ensure the renewable generation criteria will be met.

2.2.1 Capacity Factor

It is assumed that a data centre will consume energy on a 24/7 basis (e.g. a data centre consuming 100 MW across the entire 8760 hours of the year would use 100 MW × 8760 hrs = 876 GWh). Given that renewables are typically an intermittent source of energy compared to the constant 24/7 energy requirements of a data centre, the renewable energy capacity factor must be considered.

Capacity Factor Example:

- Wind (Capacity factor 40%) => 2 × MIC (i.e. 100 MW DC needs 200 MW Wind to be 80% renewable)
- Solar (Capacity factor 20%) => 4 × MIC (i.e. 100 MW DC needs 400 MW Solar to be 80% renewable)

These metrics, included for illustrative purposes, consider a very optimistic view of the typical annual energy availability from wind and solar sources. A 100 MW solar farm cannot produce energy during nighttime hours and produces limited energy during winter periods and other times when solar conditions are not favourable. With a 20% capacity factor, a 100 MW solar farm could produce 175 GWh of energy across an entire year (20% × 100 MW × 8760 hrs). Based on these figures, four separate 100 MW solar developments would be required to produce an energy volume equivalent to 80% of a 100 MW data centre’s annual energy consumption.

2.2.2 Dispatch Down

The above basic energy calculations assume that all of the renewable energy produced from wind/solar sources can be utilised. In practice, the electricity output from renewables on the Irish power system often has to be reduced. This reduction is referred to as Dispatch Down and can occur for three reasons:

1. **Surplus:** This occurs where there is excess energy supply available versus the instantaneous system demand available to consume this energy. For example, if there is 6 GW of electricity available from wind and solar sources, and 5 GW of electricity demand available to consume the renewable energy, then it will be required to dispatch down 1 GW of the available renewable energy. This supply/demand balancing requirement is expected to become a more prevalent

feature of the Irish power system as the level of renewables required to meet 2030 targets is achieved.

2. **Curtailment:** This is driven by an operational need to keep a minimum number of synchronous units online to provide essential stability services. As a result, there are times when the volume of renewable electricity from non-synchronous sources needs to be dispatched down in order to ensure system-wide stability.
3. **Constraint:** This occurs due to local or regional network congestion where circuits do not have sufficient capacity to accommodate the full volume of electricity flowing from a specific area.

Dispatch Down Example

Consider a 100 MW solar development.

Assuming 7% of total available solar energy is restricted due to Dispatch Down and assuming the site has a capacity factor of 20%, the site only delivers (93% × 100 MW × 8760 hrs x 20%) 163 GWh of annual renewable energy.

As a result, four similar 100 MW solar developments would only be providing 74% of the 876 GWh total annual energy consumption of a 100 MW data centre. As such, an additional 30 MW solar development would be required in order to ensure that the 100 MW data centre is providing 80% of its annual electricity energy consumption from renewable sources. Alternatively, the data centre MIC could be retained below 92 MW which would ensure the facility is meeting the 80% renewable requirement.

2.2.3 80% Renewable Energy Demonstration

Data centre applicants will be required to provide sufficient detail to demonstrate how their development will meet the 80% renewable energy requirement. In particular they will need to provide:

1. The location(s) of the renewable generation being used to meet the 80% requirement.
2. Site-specific capacity factors for the renewable generation.
3. Demonstration that locational specific Dispatch Down from the latest EirGrid Constraint Forecast Analysis Reports has been taken account of in determining that the renewables can provide 80% of the data centre’s annual energy requirement.

2.2.4 Dispatch Down Analysis

As part of the application process EirGrid will complete a Dispatch Down analysis on the renewable generation nominated by the data centre applicant. If the level of Dispatch Down predicted for this renewable generation is such that the data centre will not meet the CRU requirement of at least 80% of its annual demand being provided by renewable electricity, then the application process will be terminated.

2.3 Constrained Area Assessment

The assessment will consider the applicant’s facility in order to determine if it is in a constrained area. A region of the electricity system is deemed **constrained** if it cannot accommodate a data centre application without the development of new electricity infrastructure to reinforce the area and bring it into compliance with standards. The TSSPS sets out the standards that the transmission system is planned against. The transmission system is assessed for a range of load and generation patterns and compliance or otherwise with the standards and limits defined in the TSSPS is determined.

2.3.1 Technical Assessment of Constrained Area

The following assessments are used in determining whether an area of the network is constrained or unconstrained.

1. If an item of equipment is overloaded beyond its capability by more than 1 MW (or if an existing overload is increased by more than 1 MW), then the area will be considered constrained as a reinforcement would be required to bring the area back into compliance with standards.
2. If voltage or frequency (including RoCoF) standards are breached or if the analysis indicated that contingencies could result in system instability then the area will be considered constrained as a reinforcement would be required to bring the area back into compliance with standards.
3. If short circuit levels are exceeded as a result of a proposed data centre development (including also the generation/storage and renewable components) then the area will be considered constrained.

Section 3 describes in more detail the technical assessment to determine if any of these three issues could occur. If an application is determined to be in a constrained area then the application process will be terminated.

2.4 System Stability Assessment

The assessment will consider the applicant's facility in order to determine the impact on power system stability. A data centre connection could compromise the integrity of the bulk transmission system due to its behaviour during normal operating conditions and in response to system disturbances. For example, Fault Ride Through is a significant challenge to the TSO's ability to operate the power system securely. During transient faults on the transmission system, most data centres, even those remote from the fault, automatically reduce their consumption from the grid and switch to their own, temporary, back-up sources of supply. This behaviour has been observed through multiple recorded events on the power system. Industry is currently expediting a technological response to this fault ride-through challenge. The oscillating demand characteristics of Artificial Intelligence data centres observed in other countries have also been reported to contribute to system stability concerns.

2.4.1 System Stability Application Requirements

The data centre applicants will be required to provide sufficient detail on the demand behaviour of their facility. In particular they will need to provide:

1. Dynamic models of their facility representing how the demand will respond to transmission system voltage and frequency changes including the impact of transmission system disturbances and faults (See Section 2.4.2).
2. Typical profile for how the demand is expected to operate in normal operation including any fluctuations that are expected to occur, presented to a relevant time scale that captures the specific fluctuation (or time scales if there are multiple types of fluctuations).
3. Details of any solutions which are proposed in order to prevent system stability issues (for example E-Statcoms or Synchronous Compensators). These solutions would be in addition to ensuring compliance with the proposed MPID345 Grid Code requirements.

Section 3 describes in more detail the technical assessment to determine the impact of a data centre on system stability. If an application is identified as contributing to system instability then the application process will be terminated.

2.4.2 Dynamic Modelling Requirements

- Clause PC.A8 of the Grid Code[3] applies to all Users. This clause details the requirements for provision of suitable and accurate dynamic models capable of representing the behaviour of the

[3] Grid Code Version 16 | www.eirgrid.ie

Plant in balanced root mean-square (RMS) positive phase-sequence, time-domain studies and electromagnetic transient (EMT) and harmonic studies.

- The balanced, root mean-square (RMS) positive phase-sequence time-domain model must include all material elements that affect the Active Power and Reactive Power of the Plant with respect to changes or excursions in Voltage and Frequency at the Connection Point. This model must include all relevant electrical and mechanical components as well as protection and control systems that can impact the dynamic behaviour of the plant and must:
  - be compatible with TSAT v19 software (DSA Tools),
  - capture the characteristics of the demand facility's operating ranges for active and reactive power,
  - represent the dynamic behaviour of the demand facility during and after system faults, voltage disturbances and frequency disturbances,
  - reproduce control interactions in the range of 0.1 Hz to 10 Hz,
  - function correctly for a range of power system frequencies (47 to 52 Hz) and voltages (0 to 1.4 pu),
  - represent the voltage dependency (overvoltage and undervoltage) of the demand facility seen at the point of connection,
  - represent the frequency dependency (over and under frequency) of the demand facility seen at the point of connection,
  - activate any relevant internal protection or control functionality in the event of external network faults or frequency deviations,
  - include relevant control functionality (such as tap changers or blocking functionality) expected to operate within the timeframe of the simulation, typically up to 20 seconds following a voltage or frequency disturbance in the power system,
  - represent any internal reclosing or swapping functionality (for example local demand to UPS) as well as re-connection of demand,
  - initialise to a stable operating point and provide a numerically stable simulation for a minimum of 60 seconds following any system incidents/faults,
  - operate with any integration time-step in the range of 1 to 10 ms (in steps of 1 ms) without negative impact on accuracy,
  - integrate in the larger network model and run in online mode (24 x 7) without detrimental impact on performance of the overall system model,
  - aggregation is accepted (If an aggregated model, instead of individual units, is used then the aggregated model must be able to represent the characteristics of the whole facility at the point of connection. Descriptive information on the aggregation approach and assumptions should be provided),
  - not contain any encrypted or compiled parts,
  - all protection and control parameters shall be accessible to the user,
  - be accurately parameterized to represent site-specific controls, settings, and protections with supporting documentation,
  - be validated. For validation purposes the User shall ensure that appropriate tests are performed and measurements taken to assess the validity of the dynamic Model. Where the validity of the Model has not been confirmed prior to the commissioning of the User's Plant, appropriate tests shall be carried out and measurements taken at the User's site to

assess the validity of the dynamic Model. The tests and measurements required shall be agreed between the User and the TSO,

- be provided in “equipment name” format for bus identification (as opposed to “bus number”). An associated PSAT (load flow) model shall also be provided.

The three-phase electromagnetic transient (EMT) model must include all material aspects of the Plant that affect the symmetrical and asymmetrical voltage and current at the point of connection. The model shall represent phenomena that materially affect the Voltage and Frequency at the Connection Point over timeframes of sub-cycles up to 500 cycles including but not limited to response to system faults, switching of power electronic devices, transformer saturation or equipment energisation. A detailed specification for this type of model is currently under development and will be published on EirGrid’s website.

3 Technical Assessment Approach

This section of the report provides an overview of the approach taken in carrying out the technical assessment of a proposed data centre connection in order to determine if the application is in a constrained area. The technical assessment will take specific consideration of the demand, generation, renewable and dynamic modelling details provided by the applicants. Studies will be carried out in alignment with the standards set out in the TSSPS.

3.1 Input Conditions

3.1.1 Demand

1. The analysis will be based on a credible range of demand patterns which take account of expected future growth.
2. ESB Networks as the Distribution System Operator (DSO) will be requested to provide an update on the specific demand requirements in an area of study.
3. Projected DSO organic demand growth needs will be added to the study models to cater for domestic, commercial and industrial requirements from homes, farms, business and transport.
4. Where the distribution system has planned reinforcement capacity this will be included in the study models.
5. At a minimum it is expected that each transmission node supplying DSO demand would need to include an additional 10 MW of demand in addition to any annual demand growth.
6. Where the applicant elects to use storage capacity instead of dispatchable generation to meet the CRU requirements, the assessment will consider a demand scenario where the storage asset is recharging while supply is also maintained to the data centre facility.

3.1.2 Generation and Interconnection

1. The analysis will be completed based on deterministic generation patterns which consider specific conventional, solar, wind and interconnector dispatches.
2. Probabilistic 8760 hourly analysis using unit commitment and dispatch algorithms will be used to identify specific challenging dispatch scenarios that could occur in a study area.
3. The analysis will also consider the implications of declining reliability from a maturing generation fleet. This increases the risk that multiple generation forced outages need to be considered as credible dispatch scenarios.
4. It must be possible to supply the new demand during zero renewable generation conditions, including during transmission maintenance. Equally, it must also be possible to supply the new demand during high renewable generation conditions, including during transmission maintenance.
5. The new demand should not impact on the ability of the network to trade (export and import) on interconnectors, including during times of transmission maintenance.

3.2 TSSPS Performance Tests & Requirements

This section of the report gives an overview of how the standards set out in the TSSPS will be applied to assess the performance of the power system following the connection of the data centre. The scenarios and conditions outlined below are not an exhaustive list and all standards outlined in the TSSPS apply.

3.2.1 Power System Performance

1. This assessment will consider the performance of the power system in order to identify if the new demand creates any new system issues or exacerbates any existing problems.
2. The power system performance will be tested for:
    a. Overloads of transmission system equipment (lines, cables, busbars & transformers).
    b. Breaches of short circuit levels, voltage and frequency (including RoCoF) standards, and indications of system instability.

Section 2.3.1 describes the system performance criteria which would result in a determination that an area of the network is constrained.

3.2.2 Contingency Analysis

1. The power system will be tested for breaches of standards during intact network conditions and contingency conditions where items of transmission equipment are unavailable due to an unexpected tripping, a planned outage or a combination of contingencies (N-1, N-G-1, N-1-1, etc.).
2. In addition to the standard contingency (N-1) and maintenance/contingency combinations (N-G/1-1) the analysis will consider the system following a major failure and resultant prolonged outage of a transformer or EHV (Extra High Voltage) cable (400 kV). The system must remain within standards for N-1 and N-G-1 contingencies following this event. In addition, it should also be possible to continue to maintain and upgrade the system following this event.
3. The instantaneous loss of a double circuit will not be considered as an N-1 issue. Double circuit outages will be considered as critical maintenance scenarios following which the system must remain within standards for N-1 and N-G-1 contingencies. This is to ensure that double circuits can be safely taken out of service and worked on for maintenance/upgrades.
4. In certain substations, when working on an individual piece of equipment, adjacent equipment may also need to be taken out of service in order to ensure the work can be completed safely. Depending on the location and congestion in the substation, this may require an outage of half of the busbar (and all equipment connected to that busbar). In worst case scenarios, the entire busbar may need to be taken out of service to facilitate maintenance or refurbishment works. Following these outages the system must remain within standards for N-1 and N-G-1 contingencies.
5. There is an exceptional volume of development works required on the power system over the coming years. These works are required in order to connect renewables, connect generation for security of supply, support the upgrade of the distribution system, connect low carbon technologies, upgrade transmission equipment, and maintain ageing assets. If the outages required for these works are completed one-at-a-time, on a sequential basis (where the system is N-1-1 compliant), this would make it impossible to meet the various renewable targets that are in place, and would also severely impact the reliability of the power system due to inadequate maintenance. Given the volume of work required, it is clear from multi-year outage plans that multiple levels of simultaneous outages will need to be facilitated on the power system. In specific study areas, multi-year outage plans will be consulted in order to identify items of equipment which need to be considered as overlapping outage scenarios.
6. In addition to overlapping outages, the volume of work to be completed also means that the outage season is often extended well beyond the traditional summer scenarios and into winter peak conditions. As such, higher winter demands will need to be considered as credible demand patterns that can occur during maintenance outages.

3.3 TSSPS Remedial Actions

3.3.1 Use of Dispatchable Generation to Alleviate Constraints

This section outlines how a data centre's dispatchable generation will be considered as a remedial action in the technical assessment.

1. A data centre's dispatchable generation will not be considered as appropriate for mitigating issues during intact or N-1 conditions as this would effectively result in the generator being a "must-run" unit and compromising the Electricity Market.
2. A data centre's dispatchable generation can be used to mitigate issues during N-1-1 maintenance conditions if they occur during zero-renewable scenarios. As described in Section 2.1, if the generation is not connected at the same transmission system node as the data centre, it may not be possible for the generation to mitigate specific maintenance issues. If there are any run hour limitations on the generation then it will not be possible to consider this generation as a mitigation for specific maintenance issues.
3. A data centre's dispatchable generation will not be considered as appropriate for mitigating issues during N-1-1 maintenance conditions if they occur during renewable dispatch scenarios, as this would result in the generator having to run at the expense of renewables, thereby impacting on renewable electricity targets and raising questions about compatibility with the CRU's decision.
4. Where a data centre is using energy storage, renewable generation or other forms of intermittent non-dispatchable generation to meet their dispatchable capacity requirements, this generation will not be a suitable mitigation for N-1-1 issues. It is considered that storage would not have sufficient volume/duration of capacity to be able to run continuously to address the issues. Furthermore, storage also has the challenge of re-charging the depleted energy. This would place even greater stress on the system to support even higher electricity demands. Similarly, intermittent renewables are not considered as reliable enough to be taken account of when planning system maintenance.

3.3.2 Reinforcements to Alleviate Constraints

1. Where there is already a planned reinforcement which would alleviate a constraint, this will be considered in the assessment provided the risk of delivery delays is low. This would be considered as a reinforcement whose estimated delivery date is currently scheduled within three years of the data centre application assessment date.
2. Planned system reinforcements with estimated delivery schedules beyond three years will not be considered as suitable mitigation for any constraints observed. This is to avoid scenarios where areas are only unconstrained if major new infrastructure is delivered.

3.3.3 Customer Mitigations

1. In relation to the impact of a data centre load on power system stability, the analysis will take account of any customer proposed mitigation solutions such as E-Statcoms or Synchronous Compensators. This will be subject to the provision of adequate models and manufacturer documentation to allow the effectiveness of these mitigations to be fully understood. As set out in Section 2.4.1, these customer proposed solutions would be in addition to ensuring compliance with the proposed MPID345 Grid Code requirements.

4 Connection Considerations

In addition to the specific criteria set out under CRU/2025236, the following section presents a number of additional considerations that a potential data centre developer needs to be cognisant of when selecting a site for a data centre facility.

1. Most data centre facilities will request two connections to the transmission system. In existing transmission substations this will mean that two “bays” will be required to facilitate the physical electrical connections to the data centre. Challenges can occur when connecting into existing substations, if there are a limited number of bays available or if it is not feasible to expand the substation. Challenges can also occur due to “pinch-points” when accessing the substations. This is particularly relevant to underground cable connections. Cables generate heat as current flows through them. Cable temperatures rise with increasing power transfer, and safe operation depends on effective dissipation of this heat into the surrounding environment. Mutual heating may occur between cables (and other underground infrastructure), reducing the cooling capacity available to both assets. This can be particularly problematic where cables are in parallel over extended distances leading to thermal and electromagnetic interactions. These cable interaction issues can lead to thermal limitations which restrict the overall power capacity that can be accommodated on existing and new cable assets.
2. Given the volume of development works required on the power system over the coming years, new connections which require the disconnection of existing transmission equipment are extremely challenging to accommodate. In particular, loop-in connections are considered especially invasive to the secure operation of the power system. These connections require an existing transmission circuit to be removed from service, a portion of the infrastructure decommissioned and new infrastructure developed to reroute the existing circuit into a new substation. These works require the existing circuit to be unavailable for an extended duration. In some recent examples, new customer developed substations have experienced equipment energisation problems which further prolonged the duration that the power system had to be operated without a critical corridor for power flows, and impacted the ability to complete other connections and system maintenance. Future customer connections requiring dedicated loop-in connections are anticipated to be extremely challenging to integrate into development plans. Loop-in connections will only be considered where there is a broader system benefit, for example, where a loop-in connection will facilitate the integration of further system reinforcements.
3. The increasing size of modern data centres (in excess of 50 MW of continuous demand) is considered significant in the context of the 110 kV network capacity in Ireland. It is illustrative to consider how the Irish power system has developed for large cities like Galway and Limerick. These areas have peak demands in the range of 100-150 MW and the load varies on a cyclical basis throughout the 24-hour daily cycle and seasonally across the entire year. Both of these areas are interconnected with three 220 kV circuits and more than four 110 kV circuits. This provides an illustrative example of the scale of infrastructure that is required to integrate this volume of demand in a secure and resilient manner. It is considered that data centre development of this size of import capacity will need to focus on connection voltages above 110 kV.
4. As described in Section 2.2, the volume of energy that can successfully be extracted from renewable generation sources is impacted by the capacity of the network that the generation is connected to. If a data centre development is progressed at one end of the country and the equivalent renewable generation is developed at the other end of the country, and if there are significant network constraints between the two developments then clearly the data centre will not meet the 80% renewable energy requirement. The extent to which the data centre demand and the renewable generation can be electrically proximate optimises the volume of renewable generation that can be supplied and reduces the risk that an application will be considered constrained.

5. As described in Section 2.4, equipment installed at the customer's facility can mitigate the risk of system instability. Incorporating devices such as E-Statcoms or Synchronous Compensators as part of the master-planning, design and consenting for new developments is considered a prudent approach in order to minimise the risk of instability problems.