Consultation on
Data Centre Connection Offer
Process & Policy

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1 Introduction

1.1 Transmission System Context

Ireland's electricity industry has undergone a number of major transformational shifts since the foundation of the state, from rural electrification all the way to the current decarbonisation of our electricity system. Ireland is also now facing a new paradigm with rapid growth in load requirements, particularly around the greater Dublin Region, in a very short space of time. Paradigm shifts push society to think differently and work smarter to meet new challenges and embrace new opportunities. This is requiring EirGrid, CRU, ESB Networks and other key industry decision makers to look at things differently to meet new challenges.

EirGrid offers connections to the transmission system to parties seeking to connect in accordance with Section 34 of the Electricity Regulation Act, 1999 ("the Act"). It does so in accordance with directions from the Commission for the Regulation of Utilities ("the CRU").

Generally the transmission system has, to date, been able to accommodate the requests for new demand growth. Where it has not been able to do so, further proportionate investment in transmission infrastructure has enabled it, and enabled it in a relatively timely and expeditious fashion. However, the number and scale of large data centres seeking to connect means that Ireland's electricity demand is currently expected to grow by c.38% between 2017 and 2025, equivalent to the growth in the 50 years between 1930 and 1980, including the entire rural electrification programme[1]. This is occurring at the same time as societal change means that the building of new High Voltage (HV) infrastructure is taking place against an ever increasingly complex backdrop and involves greater consultation and stakeholder engagement from an earlier stage.

The electricity system is a capital intensive one. Capital intensive industries require long term foresight and planning and once made, the investments are often sunk and irreversible. It is these characteristics, combined with the lead time in delivering such capital programmes, which make the accommodation of such a rapid increase in load projections challenging. Whilst society has invested in the development of the transmission system to accommodate load growth associated with expected long term trends in growth, the potential level of load increase seen as a result of data centre inquiries exceeds long term load growth and cannot easily be accommodated. The long term planning of transmission infrastructure took place in the past against the backdrop of similar long term evolution of the generation portfolio. In the context of market liberalisation there is however an increasing requirement for stakeholder co-ordination, market signals and regulatory frameworks to help ensure supply demand balance both locally and nationally.

[1] It is also broadly equivalent to the growth over the last quarter of a century, between 1994 and 2017. The last 25 years have seen very substantial investment in both transmission and generation.

1.2 Current Challenge

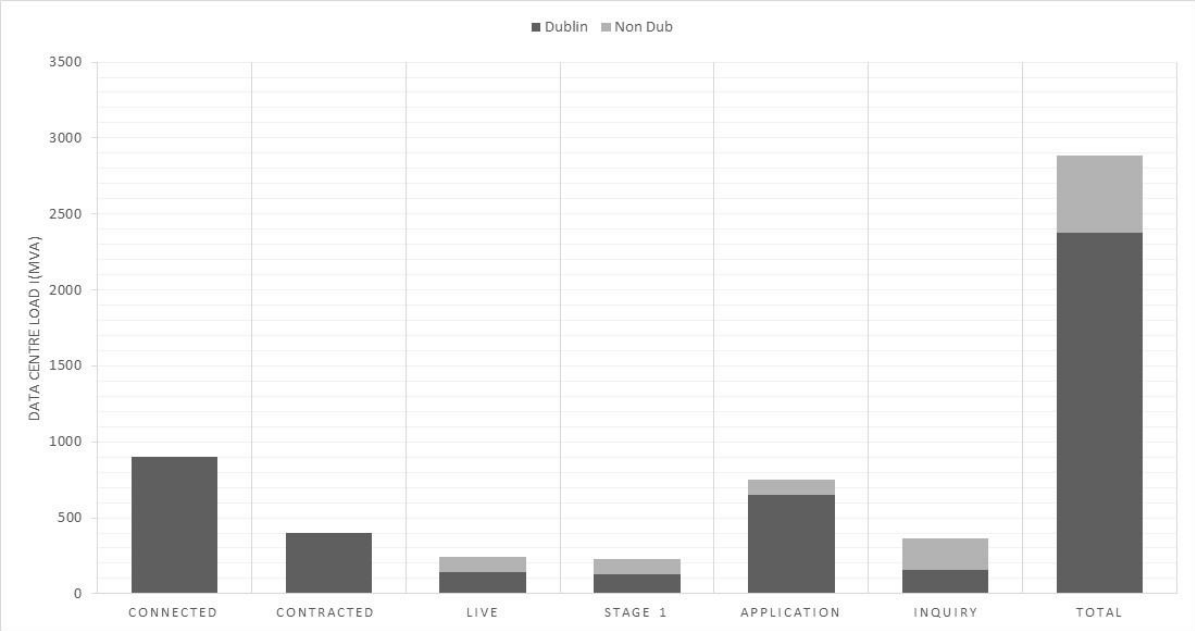
Load customers connected to Ireland's electricity system in a given region have their power needs met by generation in that region and generation from outside that region that is transported via the HV network into the given region.

The capability to connect new power users in a region is therefore governed by the available generation in a region, the available HV network to bring power into that region from other parts of the country, and availability of generation in other parts of the country. EirGrid also utilises prudent planning and operational standards to continue to meet demand in a region even if there is a failure or unavailability of some generation or HV network.

There is currently over 1,300 MVA of connected/contracted data centre capacity and a further approx. 1,600 MVA that has applied for connection or has made a material enquiry. As per EirGrid Generation Capacity Statement 2019-2028 data centre capacity could account for 29% of total demand by 2028. This Statement identifies that a generation deficit could occur by 2025. The challenges associated with a generation deficit are most acute in the Dublin region where the overwhelming majority of data centres (almost 2,300 MVA) have concentrated. Prior to the increase in major data centre connections, the historical Dublin peak demand for all customers was 1,500 MVA. This gives an indication of the transformative effect that data centres could have on the Dublin power system.

We have seen consistent ramping of data centre demand in recent years in the Dublin Region. EirGrid contracts with customers on the basis that their power needs can be reliably served. EirGrid is therefore faced with the challenge of offering contracts for connection of data centres in the Dublin Region above the power capability of the Dublin Region whilst offering the level of reliability that customers need, and expect. This raises legitimate concerns for customers about reliably servicing their future power needs without further action. At present there are over 1,000 MVA of new data centre applications and enquiries in the Dublin region. A summary of Data Centre contracts and enquiries is summarised in Figure 1 below

Figure 1 – Scale of Contracted Demand and Data Centre Enquiries



EirGrid is engaging proactively with customers and the wider industry to meet the future challenges in the Dublin Region. Based on load currently connected in Dublin there is no immediate shortfall. A number of data centres are at an early stage in their lifecycle where there is currently a significant gap between the usage and the total Maximum Import Capacity (MIC) contracted.

The challenge for meeting overall capacity requirements only occur when and if the customers reach their full MIC. In reality it is expected that this could take several years. Historically, ramp rates have been growing at on average approximately 8 MVA per year per site. If this trend continues, it allows some scope for the TSO to apply prudent judgement in assessing how likely it is that all contracted MIC will actually connect in the coming years and also the likelihood that it will ever be required simultaneously. For example, it could be reasonably assumed that it will take up to 10 years for the Data Centres in Dublin to ramp to 1000 MVA.

However, EirGrid must be mindful of the validity of assumptions being applied for new industries such as data centres. These may turn out to develop much quicker or with higher capacity usage than assumed therefore placing the Transmission System and/or other users at risk. It is also the case that, in general, electricity usage is diversified so not every customer uses the full extent of the MIC allocated simultaneously. However, the nature of data centre load profiles, and the degree of diversification available between them may differ, and be either higher than or lower than, that of power loads to date.

There are currently opportunities for new connections for large data centres outside the Dublin region as outlined in EirGrid's Ten Year Transmission Forecast Statement[2]. It is worth noting as per EirGrid's Generation Capacity Statement[3] that there will be a need to attract new generation investment in the medium term. The scale of this new required investment will be determined ultimately by the general scale of load growth in Ireland which will include new data centre growth whether it will be in Dublin or elsewhere.

1.3 Meeting the Challenge

We recognise the important role that data centres will play in the future energy system and the role that EirGrid has to play in supporting Government Policy in this regard. The Government Statement on The Role of Data centres in Ireland's Enterprise Strategy[4] confirms the strategic significance of data centres for Ireland. This is further underpinned in the Government's Climate Action Plan in 2019[5].

The CRU has also recognised that action is needed in the Dublin region in particular to meet these challenges. The CRU's direction CRU/18/228[6] sets out a range of initiatives to be taken that relate to the retention of existing capacity, provision of additional capacity, development of network solutions and data centre flexible demand.

EirGrid has been working with policy makers to advance a range of measures to unlock as many opportunities as possible. As referenced above one of these measures relates to 'flexible demand' as an option that could be provided directly for data centres in constrained areas. In order to give effect to this and other measures EirGrid produced the Data Centre Connection Offer Process and Policy (DCCOPP)[7] paper in June 2019.

The DCCOPP paper set out the connection offer process and policy for data centres and consolidated existing and new policy measures into a single document for customer clarity. It also provided details for data centre customers seeking to connect to the transmission system regarding the following:

- Flexible demand options in constrained areas.
- A new two stage offer process.
- Linkages between achieving planning permission for a project and a connection offer.
- Annual capacity reviews to identify if any firm access is available in constrained areas.
- Extending ramping rates over a longer time period than the existing 3 ramps over a maximum of 18 months.
- Firm capacity availability where new on-site dispatchable generation is installed.
- Clarity on related policy items such as mergers and capacity relocation.

[2] http://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Ten-Year-Transmission-Forecast-Statement-2019.pdf
[3] http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Group-All-Island-Generation-Capacity-Statement-2019-2028.pdf
[4] https://dbei.gov.ie/en/Publications/Publication-files/Government-Statement-Data-Centres-Enterprise-Strategy.pdf
[5] https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf
[6] https://www.cru.ie/wp-content/uploads/2018/10/CRU18228-Information-Note-on-DMILC-process-1.pdf
[7] http://www.eirgridgroup.com/site-files/library/EirGrid/Data-Centre-Connection-Offer-Process-and-Policy-paper.pdf

A number of data centre customers provided feedback to EirGrid in relation to the measures included in the DCCOPP. We have taken that feedback and used it to make the changes to the DCCOPP as outlined in Version 2 that has been published alongside this document.

1.4 Purpose of this Paper

This consultation paper sets out the purpose and background on the existing DCCOPP. It also sets out changes that we have made following initial feedback from customers and subsequent EirGrid developments. We also set out a number of areas we may implement for the next version of DCCOPP for which we seek feedback. Specific consultation questions are posed in section 2.

2 DCCOPP – Specific Areas for Consultation

In the following section, we will outline a number of potential future amendments to the DCCOPP. We are particularly interested to hear stakeholders' views on these possible amendments.

2.1 Capacity Allocation

EirGrid received a range of diverse feedback from customers about how firm access should be allocated to customers in constrained areas. At present EirGrid intends to allocate any firm access that becomes available on a 'needs' basis. In considering how to effectively allocate firm capacity EirGrid was guided by the objectives of having a clear, consistent and targeted approach that could be applied to customers who most demonstrably met the requirement for the access and that would limit the potential for hoarding of the capacity. We therefore decided to allocate it to customers with flexible demand that are actually using that demand in the first instance and in the event of a tie break then connection date is used. There may be other ways that this objective can be met and we would welcome feedback on alternative methods that could also satisfy the objectives above.

Question 1: Do you have any views on how any new firm capacity should be allocated to customers in the future? Please provide reasoning for same.

2.2 MIC Ramping

Many transmission data centre customers do not utilise their full contracted MIC upon energisation. 'MIC ramping' options are therefore provided. Originally this was set to a maximum of 3 ramps allowed over 18 months. As part of DCCOPP we agreed with the CRU additional ramping allowances in constrained areas so that a reasonable number were to be allowed. However transmission connecting customers are still restricted to 3 ramps over 18 months in non-constrained areas of Ireland. It is an option for EirGrid to recommend to CRU that ramping flexibility would be provided for all transmission connecting data centre customers in Ireland. This is to remove any perceived advantage to locating in constrained areas. There have also been queries around the number and timescale for ramps that is reasonable. We believe that allowing up to 1 ramp per quarter over 5 years is reasonable. It should be noted however that any request for MIC ramp increases which are brought forward would have to be assessed in terms of the overall context of load growth in that particular region at that time.

Question 2: Do you agree that the flexibility in ramp rates should be allowed for all transmission customers in Ireland and the allowable ramps for all transmission customers?

2.3 Planning permission timeframes

The DCCOPP included certain timelines in the connection process related to connection method confirmation and planning permission. Customers are provided with a connection method which is reserved for them for 3 months within which such time as planning permission must be submitted. Customers have a further 3 months for planning permission to be achieved for the site. This means up to 6 months of connection method being reserved. This aims to strike an appropriate balance between the time one customer can effectively book a connection method ahead of another customer who may be seeking access at the same point on the network.

EirGrid is open to reviewing these timeframes acknowledging that providing the first customer with longer timeframes to achieve planning permission could create delays and uncertainty for any subsequent customer seeking to connect in similar timeframes.

Question 3: Do you have a view on what length of time should be provided for data centre customers to lodge planning permission once a connection method is determined? Please provide a basis for this view accounting for potential impacts on other customers.

Question 4: Do you have a view on what length of time should be provided for data centre customers to complete the planning permission process before connection methods could be offered to other customers? Please provide a basis for this view accounting for potential impacts on other customers.

As stated in DCCOPP, EirGrid will provide a connection offer for up to 2 MVA of MIC for every 1000 m^2 of data centre planning permission received. Based on current power usage of data centres in Ireland, which shows usage of approx. 1.5 MVA per 1000 m^2, this allocation therefore provides a substantial amount of headroom. A number of customers have argued though that power densities are continually increasing such that smaller spaces may require addition power even though efficiencies of data centres are improving continually.

Naturally, allowing more MVA to be booked for every m^2 of data centre planning permission received will limit the capacity available for other customers and future expansion for existing data centres. EirGrid is therefore interested to hear feedback on what is an appropriate capacity to allow to be booked and if exceptions are to be allowed, how can this be fairly and effectively managed.

Question 5: What do you think is an appropriate MVA allowance for every 1000m^2 of data centre planning permission received? Please provide a basis for this view accounting for potential for limitations of capacity on other customers.

Question 6: What may be an appropriate way to assess and allow derogations to a power density limit?

2.4 Data Publication

EirGrid will be publishing aggregate data on historical energy consumption for the last five years. Aggregate Maximum Import Capacity (MIC) values by year that are contracted and that are in the Connection Offer Process are also published. While this aggregate information is not specified by region at present due to low volumes outside of the Dublin Region, regional breakdown may be included in future publications.

Due to the often sensitive and commercial nature of early stage data centre developments, we enter into individual confidentiality agreements to protect these interests for customers. We are however mindful of requests for increased information from stakeholders. We would like to know what additional information could be published regarding data centre development on the Irish electricity system.

Question 7: What additional non commercially sensitive data centre data would you like to see published by EirGrid and/or what data do you believe should not be made publically available?

2.5 Provision of System Services and Demand Response

The additional system load associated with data centres can bring with it benefits in terms of the facilitation of renewables. The increased load across the portfolio of data centres

increases system demand and thus enables EirGrid to curtail less renewable generation than would otherwise be curtailed at times of high asynchronous renewable generation availability.

However the additional load associated with data centres also bring with it challenges for EirGrid in terms of meeting demand at times of low asynchronous renewable generation availability as well as ensuring that system security metrics can be economically met continually as renewable generation penetration levels vary throughout the day. As noted in the Government Statement on The Role of Data Centres in Ireland's Enterprise Strategy, data centre load is typically characterised by a flat daily load characteristic. Unfortunately this flat profile currently provides very little flexibility to EirGrid with respect to managing a system with ever increasing renewable generation. We note however the potential flexibility which data centre load can potentially deliver and indeed this is also noted in the Government Statement on The Role of Data Centres in Ireland's Enterprise Strategy.

A number of Data Centre's, already provide some demand response capability to EirGrid though the use of third party Demand Side units (DSU). However DSU utilising Data Centre sites have typically aggregated the back-up generation on Data Centre sites. The dispatch of these units' results in the provision of a net demand response as the running of the back-up generator reduces net import at the connection point. This model is unlikely to remain sustainable going forward, particularly in cases where diesel generators are used, noting the requirements set out in the clean energy package in terms of capacity market participation.

The TSO note that the provision of flexibility through the use of interruptible load, through the minimising of site consumption following dispatch or indeed through price following energy market participation are not yet areas which Data centres have begun to actively participate.
In order to deliver on our renewables potential, we will require flexibility from a wide range of new and existing technologies and market participants and have commercial markets and services currently in place to procure this flexibility. We believe that as renewable penetration figures increase an ever increasing proportion of these services will need to be obtained from the demand side and envisage large energy users such as Data Centres potentially being a large provider of the flexibility required to operate the power system going forward.

Question 8: Are you aware of the System Service market arrangements and the potential remuneration mechanisms available for providing flexibility services to the System Operator or what information would be helpful for you in this regard?

Question 9: Are you aware of the Capacity market arrangements and the potential remuneration mechanisms available for providing capacity certainty to the System or what information would be helpful for you in this regard?

Question 10: Are you aware of the Balancing market arrangements and the potential remuneration mechanisms available for providing demand flexibility to the market or what information would be helpful for you in this regard?

3 Consultation Questions

EirGrid has posed a number of specific questions in section 2 of this document. These have been gathered below for ease of reference:

1. Do you have any views on how firm capacity should be allocated to customers with flexible demand? Please provide reasoning for same.
2. Do you agree that the flexibility in ramp rates should be allowed for all transmission customers in Ireland and the allowable ramps for all transmission customers?
3. Do you have a view on what length of time should be provided for data centre customers to lodge planning permission once a connection method is determined? Please provide a basis for this view accounting for potential impacts on other customers.
4. Do you have a view on what length of time should be provided for data centre customers to complete the planning permission process before connection methods could be offered to other customers? Please provide a basis for this view accounting for potential impacts on other customers.
5. What do you think is an appropriate MVA allowance for every 1000m^2 of data centre planning permission received? Please provide a basis for this view accounting for potential for limitations of capacity on other customers.
6. What may be an appropriate way to assess and allow derogations to a power density limit?
7. What additional non-commercially sensitive data centre data would you like to see published by EirGrid?
8. Are you aware of the System Service market arrangements and the potential remuneration mechanisms available for providing flexibility services to the System Operator or what information would be helpful for you in this regard?
9. Are you aware of the Capacity market arrangements and the potential remuneration mechanisms available for providing capacity certainty to the System or what information would be helpful for you in this regard?
10. Are you aware of the Balancing market arrangements and the potential remuneration mechanisms available for providing demand flexibility to the market or what information would be helpful for you in this regard?

EirGrid is also very interested to hear any other views that respondents may have on the future direction of processes and policy that relates to data centres. While such feedback may be outside the scope of the development of the DCCOPP we will use it to feed into other potential EirGrid initiatives. It may also be used to inform other policy decision makers.

4 Next Steps

4.1 Consultation Responses

EirGrid welcome feedback on the questions posed within this paper, which will be used to inform our next steps on data centre policy development.

Responses should be submitted to info@EirGrid.com before 28th August 2020. It would be helpful if answers to the questions include justification and explanation.

It would be helpful if responses are not confidential. If you require your response to remain confidential, you should clearly state this on the coversheet of the response. We intend to publish all non-confidential responses.