

RESPONSE TO THE COMMISSION FOR REGULATION OF UTILITIES (CRU)

CALL FOR EVIDENCE PAPER – REVIEW OF LARGE ENERGY USERS CONNECTION POLICY CRU/2024001

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Herbata Limited, having its registered office in 4C Sycamore House, Millennium Park, Naas, Co. Kildare, is set to create a state-of-the-art data centre campus that prioritises energy efficiency. Throughout the design process, careful thought has been given to implementing measures aimed at minimising energy consumption and promoting decarbonisation.

The Herbata Data Centre Campus is, at its core, an 180MW Data Centre represented by six independent data centre buildings each providing up to 30MW of IT capacity.

Once developed this Data Centre Campus will be a large energy user (LEU) so therefore we welcome the opportunity to comment on the CRU consultation paper (CRU/2024001)

The following are the detailed responses to the Questions in the Call for Evidence:

1. Introduction

The CRU published three papers on the 21st June 2023 relating to discussion on an Energy Demand Strategy for Ireland’s gas and electricity networks. The papers, as calls for evidence, cite three areas of focus, namely Smart Services, Demand Flexibility and Response and New Demand Connections. Herbata, a developer of data centre sites in Ireland are keen to respond and have focused their attentions on the last of the three papers, that of the review of Large Energy Users (LEUs) Connections.

The valuable input provided by the Irish Government in its paper “The Role of Data Centres in Ireland’s Enterprise Strategy” published in July 2022 clearly identifies both the need for data centres in the Irish economy to provide digital services whilst at the same time requiring data centres to increase their use of energy from decarbonised sources. The Government’s Climate Action Plan is also well recognised and understood in direct response to reducing the impact on the climate emergency. Herbata clearly understand these needs and has been working hard to ensure that these objectives are met.

This paper aims to provide real life project feedback as a potential consumer of both gas and electricity in all of its available forms, it is intended that this feedback be used to inform the CRU, Eirgrid and Gas Networks Ireland on the reality of obtaining connection agreements today.

In addition, responses to questions included in the CRU’s Consultation Paper issued 15th January 2024 are now included.

2. Background

Herbata are proposing to develop a site to the west of Naas in Co. Kildare for the provision of multiple data centre buildings on a campus; the site has already been zoned for data centre use. The campus will contain six data centre buildings each having a total electrical power demand of 40MW, using a mix of electricity generated on-site using gas turbines/engines, solar PV arrays on roofs and renewable energy from sites within Ireland via Commercial Power Purchase Agreements (CPPAs) and potentially in the near future with private wire connections to local renewable providers. In order to enable this mix of power sources, a new 110kV grid substation is included to allow import and export of power at the appropriate times.

The proposed format for these connections to both the electricity grid and gas network in Ireland has been based on looking forward to the future and opportunities to aid the electricity grid and to decarbonise, in summary these are:

- To benefit from the gas networks being decarbonised over the next 25 years or so with the injection of bio-methane and hydrogen for example.
- Being able to accommodate the direct injection on site of bio-methane and possibly hydrogen in the future within the site.
- To provide frequency stability support by use of the battery energy storage systems (BESSs) that are directly connected at medium voltage within all of the data centre buildings.
- Being able to provide spare on-site generation capacity back to the grid.
- Being able to come off the grid when requested by Eirgrid as per an Autoproducer agreement.
- Being able to access off-site renewable energy capacity via CPPAs

It is Herbata's view that all of the measures above will aid the stability and operation of the electricity grid whilst also accessing lower carbon based energy.

3. Assessment Criteria

The CRU have requested that views be given on the possible assessment criteria that System Operators (SOs) should use to assess LEU applications. Herbata have looked at this question and can provide its views, but first it is important to present the wider context of how projects are developed in particular taking into account the planning process to a local authority, in our case to Kildare County Council.

Wider Context

These are some of the points that have to be taken into account when formulating a planning application particularly given updates that many local authorities have made to their policies driven by the Government's Climate Action Plan:-

- All planning authorities in Ireland have a duty to develop their policies on energy by considering the strategic objectives set by Central Government as part of the overall Climate Action Plan for Ireland.
- Demonstrating that the technologies to be used for heating, cooling and ventilation are selected from low carbon types are a cornerstone of Building Regulations and must be adhered to.

- Energy policies now include a minimum content for operational energy that has to be sourced from renewable energy sources, whether on-site or off-site via CPPAs.
- Planning authorities look for evidence that CPPAs have or could be entered into for a project; however, to enter into a CPPA, an agreement to have a connection to the Irish grid is needed which cannot be completed without planning being achieved; there is therefore often an impasse.

How should SOs assess LEU applications?

There are a number of factors to consider, including in the first instance, what is an LEU? It is suggested the following criteria are used, either singly or in combination: -

- The connection should be for a minimum of 20MW, equivalent to 50MWth as defined by GNI currently.
- The connection should be at 110kV as a minimum. This would relate to the minimum set by An Bord Pleanála planning authority as a definition for Strategic Infrastructure Development (<https://www.pleanala.ie/en-ie/strategic-infrastructure-development-guide/sid-types-of-strategic-infrastructure-development>).
- A minimum level of expected annual electrical energy usage, example would be 150GWh per annum.
- The available generation on the site that could be used to support the grid when in need (as requested by Eirgrid, as per an Autoproducer)
- A discussion on the amount of fuel storage required to support generation on site. Most data centres require a minimum of 48 hours.

These criteria are easily definable and provide a good base for the SO to provide a first pass of the application for a connection. However, in order for the SO to assess the likely Greenhouse Gas (GHG) emissions, there needs to be a second assessment that responds to the needs of the Climate Action Plan and should include the following:

- Identification of the sources of electricity to be used by the site in question. For example, how much is to be imported from the electrical utility, how much is to be generated on site.
- Assess the profile of the energy used by virtue of the source type including the following:
 - The carbon profile of the electricity used over the years to be assessed e.g. first 15 years. This will be a national profile and dependent on the deployment of renewable energy within Ireland and imported from the UK and France. This will exclude any energy from renewable sources under CPPAs.
 - The quantum of annual energy available from signed up renewable sources either on site or via CPPAs
 - The carbon profile of the generated electricity onsite including assessing the fuel used, e.g. natural gas, hydrogen, bio-methane.
 - The overall expected GHG emissions from the assessment of the above items compared to the target level expected now and in the coming years to, certainly 2030 and beyond.

Once the analysis of the emissions has been completed, an assessor should review and advise the utilities as to whether the connection requests can be acceded to. As the assessment will very likely involve multiple sources of energy, no one utility e.g. Eirgrid or GNI, should decide as it is about the overall emissions for the site and to compare to the targets set in the Climate Action Plan. There therefore needs to be a more independent body that can assess applications for Connection Agreements in a much more co-ordinated approach. Currently, Eirgrid or GNI operating on their own are not able to view the whole impact on GHG emissions.

4. Conclusion and Recommendations

Currently applications for connections to the electricity grid or gas network is handled by individual bodies, Eirgrid and GNI, rightly to look at their networks, flows, connection formats etc. However, they are not able to look at the wider context in terms of compliance with the Government's Climate Action Plan or in respect of a planning applications (new or existing).

It is recommended that a two-part process is considered: -

- First part is for the Eirgrid and GNI to consider where in their networks a connection would be made and for technical compliance. Once identified and that it could be achieved, then it passes on to the second part.
- The second part is for a new organisation to look at the overall balance of the energy mix for a project, taking into account GHG emissions, planning and national government policy.

If a co-ordinated approach between utility, projected energy usage and compliance with the Climate Action Plan is not put in place, then the current delays seen in gaining power and gas connections will continue and will also continue to impact investment in the digital economy as well as construction and employment.

REVIEW OF LARGE ENERGY USERS CONNECTION POLICY - CRU/2024001

Responses to questions included in the CRU's Consultation Paper

Issued 15th January 2024

Category of LEU to which this policy applies

1. Comments are invited from interested parties on the categories of LEU in electricity and gas to which this policy should apply (e.g. for electricity is DG10, DTS-T is appropriate, should DG6-DG9 be included, should the definition focus on capacity or usage, should a combination of criteria be applied?).

We would prefer that the LEUs are specified as simply as possible, either using a threshold of MW demand or MWh used annually or a combination of both. Connection format i.e. distribution or transmission is not really relevant in our view.

2. Please provide views on whether this proposed policy should apply to capture smaller LEUs in due course, and if so which categories of LEU and on what timeline should this occur. Please provide rationale for any views shared.

We consider that the thresholds noted above will capture most relevant LEUs particularly as data centres are becoming larger & larger in power terms.

Transition period

3. Comments are invited from interested parties on the proposed use of a transition period/glide path in relation to (i) the changing requirements at time of connection on the transition to zero real time emissions, and (ii) once connected, the changing requirements as the project transitions closer to real time zero e.g. from non-firm connection to firm connection linked to milestones.

We welcome the use of a transition period/glide path as it reflects the reality of the situation. However, it must be reviewed periodically as for example, the availability of renewable sources for CPPAs or direct connection is subject to market forces and planning/permitting, so is not controllable in terms of timing.

4. Please provide views on the proposed timing of different options.

In principle the timings are workable but needs a lot more detail and integration with other government and local government policies.

5. Should optionality be maintained in allowing a menu of different options to perspective LEUs, with the end net zero emissions target becoming more binding as the glide path advances?

Yes, absolutely.

6. Comments are invited on how compliance and enforcement with required provisions can be effectively implemented in the operation of a transition period/glide path approach.

As noted above, more detail is needed and a set of criteria set so that Eirgrid and GNI can assess to allow connections to proceed. It should be simple and workable.

Measuring performance

7. Comments are invited on the approaches used to account for net zero emissions. This could include timestamped GOs or renewable certificates. Please provide reasons and rationale for any views provided.

We agree with the approach of using CPPAs but also agree that these should be with new renewable energy sources not existing ones that are transferred. The exception to this is where CPPAs are no longer used or the full capacity is not being used.

8. Should the end target/goal be real time zero emissions? Do respondents have other suggestions as to how this can be demonstrated? Please provide reasons and rationale for any views provided.

We would welcome the use of storage to offset demand timing to the grid, this we believe will be important to fully assessing the carbon impact of a demand customer. However, this needs to be carefully considered with a framework of measurement in place to accommodate. In respect of location, as the Isle of Ireland is effectively an islanded grid and not strictly part of the overall EU grid, then all CPPAs and GOs should be Irish based.

9. Comments are invited on the use of a glide path to implement the basis on which net zero emissions are determined. This could entail starting with measuring net zero performance on an annual basis and moving closer to more real time arrangements in incremental steps.

A glide path is a good instrument but needs to be considered at the front end of the application for electricity and gas. For example, an application for a data centre campus today, could take 3 months to process, say 3-6 months to be considered, then two years for the first phase to be completed, and another 5 to 10 years for all buildings to be completed. Within a 10-year period, a lot will change, there will be more renewable electricity sources, more bio-methane available, hydrogen being introduced to the gas network, all of which will change the carbon emissions. We agree that real time measurements and reporting will also be needed, but this will take time to implement, in the meantime, assessments and carbon modelling will be needed on say a monthly basis.

10. Comments are invited on the use of self-reporting based on best available data/methodology and transitioning to a more robust formal framework over time when it becomes available.

Yes, self-reporting will be essential initially to getting the framework moving as there is a lot of change to accommodate.

11. Comments are invited on the requirement for indigenous sources of renewable energy e.g. renewable electricity feeding into the Irish system and for gas secure sufficient renewable gas credits feeding into Irish system.

As noted in 8 above, CPPAs for electricity need to really only consider renewable energy in the Isle of Ireland. However, gas credits could be given for bio-methane or similar produced in Ireland, they could also be used for shipped in renewable gas but only if the carbon in shipping the gas is taken into account.

12. Comments are invited on how the storage of renewable energy is captured by any measurement system when this stored renewable energy is used.

Where storage is provided at the demand site, then its use does not need to be measured as the overall profile of demand will be seen at the metering point of supply. However, if storage is provided at the source of renewable energy, then this should be measured and controlled to a degree to meet the requirements of the grid.

13. Comments are invited on whether the electricity and gas measuring and tracking systems should be integrated to help avoid double counting? If so, how might this be achieved?

In principle yes but am not aware of systems and metering that can deal with double counting.

14. Comments are invited on who should have responsibility for measuring LEUs emissions and emissions abatement performance?

We would assume the EPA or SEAI, but this will require significant amounts of re-sourcing in these organisations.

Location of LEUs

15. Should new LEUs be located close to areas of renewable generation and/or storage or within energy parks? Please provide reasons and rationale for any views provided.

Locating LEUs close to renewable energy sources is not always practicable due to the other constraints of operating. For data centres, latency can be a big issue, reliability and the ability to transfer compute to other facilities is essential, these two aspects will always be considered first before energy sourcing. However, where they can be, then all to the good.

16. In respect of storage, we believe that storage should be located at the demand point or at the source of renewable energy or ideally both. Locating it at the demand point provides resilience and stability, providing at the source of renewable energy provides smoothing of the variable output of these sources. We would welcome encouragement of this principle.

17. What type of measures to facilitate this approach could be introduced to encourage new LEUs to locate close to renewable generation.

Please see response to 15 above, unlikely to be achievable.

18. Should there be any exemptions to locational requirements for certain LEUs? How could this be assessed? If so what type of connection conditions/requirements might these require?

Please see response to 15 above, unlikely to be achievable. The exception may be where compute is for research or AI or similar, where location is less critical.

19. Comments are invited from interested parties on the level of proximity between LEUs and renewable generation? How should this be measured? Should this value apply across the board or be determined on a case-by-case basis?

Please see responses to 15-17 above

20. If locational requirements are introduced, there is a need for better integrated planning of the network, generation and demand. What are the roles of the System Operators and enterprise agencies in supporting/facilitating this?

Please see responses to 15-17 above

21. If introduced on a mandatory basis should locational requirements be implemented using a glide path?

No, please see responses to 15-17 above

Non-firm demand connections

22. Should non-firm LEU connections be introduced? If so, should these non-firm connections be made on an enduring basis? Please provide reasons and rationale for any views provided.

Yes, this should be introduced, effectively Eirgrid already have this available to them as they require power generation as dispatchable power. In principle though, it can be long term but for data centres, it must be accepted that providing backup power may

be from fossil fuels such as gas or HVO. The rationale for this is that they would not need to run very often, perhaps less than 5% of the year, so the impact on the overall emissions would be small.

23. If non-firm LEU connections are implemented on a temporary/non-enduring basis what should trigger these connections being made firm? e.g. date(s) specified upfront, linked to certain requirements. Please provide reasons and rationale for any views provided.

Question is not well understood, however would suggest that unavailability of alternative sources of power would trigger and need to make the LEU connection firm.

24. If non-firm LEU connections are mandatory in certain parts of the system, should there be any exemptions for certain LEUs? If so what type of connection conditions/requirements might these require?

Yes, where there is potential for impact to life, where it is not possible to go to an alternative power/energy source or transfer the operations to another facility within a short space of time.

25. Comments are invited regarding the proportion of the LEU demand that would be connected on a non-firm basis. For example, would a non-firm connection apply to 100% of the connection, or would it apply to smaller portion than this?

Potentially up to 100% of the connection, subject to the points in Q21 above

26. Comments are invited regarding what incentives could be applied to facilitate non-firm LEU connections. Should these incentives recognise the potential locational value of these?

Incentives should be based on time-of-day interruption capability.

27. How should the SOs deploy this flexibility provided by non-firm demand?

This will need developing, but essentially, each regional control centre will need the capability to communicate with each LEU to advise on when they are to be disconnected.

28. Should non-firm/flexible electrical connections be provided to islanded LEUs in order to facilitate flexibility between the electrical and gas systems?

Don't understand the question, if the LEU is islanded then by definition there is no connection to the electrical grid?

On-site generation and storage

29. Comments are invited on the use of renewable generation and storage on-site. Should this be used to match LEUs demand on-site or to provide flexibility services to the system? Please provide reasons and rationale for any views provided.

If this relates to true renewable generation on site, then the likelihood of this being possible is very low and not therefore a priority. If renewable generation is off site, then the likelihood that it will match the capacity of the LEU is also unlikely. Renewable energy is so variable, that other sources and/or storage will be needed. So overall no.

30. Should the use of on-site dispatchable generation using only renewable fuels have limited run hours, to reflect limited availability of an indigenous renewable fuel? Please provide reasons for any views provided.

There is reasoning for this view in the next few years, but as renewable fuels are developed and become more available, then this should not be the constraining factor.

31. Do LEUs require back-up generation for operational reasons? If so, what is the typical annual running hours of this back-up generation?

Yes, typically 5% or less

Demand flexibility

32. What should demand flexibility services provided by new LEUs be used for, system support, decarbonisation or both? Please provide reasons and rationale for any views provided.

Principally for system support as renewable energy sources are so variable.

33. Should demand flexibility services be mandatory or voluntary for new LEUs? Please provide reasons and rationale for any views provided?

Voluntary. They should be incentivised by reasonable commercial terms; each LEU will have operational and regulatory constraints that may not make it possible to use demand flexibility.

34. Should LEU connections in certain parts of the network be required to provide demand flexibility services? Is this measure justified?

No, as 32 above.

35. If demand flexibility is voluntary for new LEUs, what type of incentives could be introduced to encourage the adoption of these services?

Commercial terms should take into account energy support cost of provision and possibly carbon reduction aid.

36. If demand flexibility is mandatory for new LEUs, should there be any exemptions for certain LEUs to having to provide these services? How could this be assessed? On what basis could these exemptions be applied?

Yes, as 32 above.

37. Should timed/profiled connections be introduced? Please provide reasons and rationale for any views provided.

Our understanding is that specific times / profiles can not necessarily be fixed. Whilst the overall demand profile could be predicted, the output and energy availability from renewable energy sources can't be predicted well enough.

Energy efficiency

38. Comments are invited from interested parties on the use of waste heat from LEU sites.

We support this but with provisos; 1) there is a clear need for heat locally for facilities that have a real demand and 2) that the temperature of the waste heat is high enough not to need further elevation to enable distribution to a district heating system or similar.

39. Comments are invited on the use of waste heat from LEUs to feed district heating networks or other processes.

As Q37 above

40. Should provisions to use waste heat from new LEUs in suitable locations to feed district heating or other processes be mandatory or voluntary? Please provide reasons and rationale for any views provided.

Can be mandatory subject to the provisions of Q37 above.

Gas

41. Comments are invited from interested parties on the use of biomethane towards decarbonisation of LEU demand. Do respondents have a view on the volume of indigenous biomethane that can be produced annually? Do respondents have a view on the scalability of using biomethane towards the decarbonisation of LEU demand?

Yes, we are aware of assessments made in the following publications: *Ireland's Draft National Biomethane Strategy* (DECC, Jan 2024) and *Biomethane Energy Report* (Gas Networks Ireland, Sept 2023)

42. Comments are invited on what running profile should be adopted by onsite gas generation which is being run on a limited supply fuel like biomethane e.g. should it be limited running for back-up and/or flexibility purposes, or baseload (islanded LEU). If for flexibility services what would be a typical capacity factor.

We would suggest that a proportioned running mix of bio-methane with natural gas is adopted, with increasing proportions as more bio-methane becomes available.

43. Comments are invited from interested parties on the use of green hydrogen towards decarbonisation of LEU demand and the timelines in which this might be viable. Please provide reasons and rationale for any views provided.

Due to the difficulties of storing hydrogen of any sort on site, we suggest that green hydrogen should be used for injection into the overall gas network. Recent studies have shown that up to 20% hydrogen mix is possible, although lower levels of around 15% initially is more likely.

44. Comments are invited from interested parties on the renewable gas certification scheme.

We suggest that a renewable gas certification scheme should be at the same level of legal status and commercial operation as CPPAs.

45. Are there other options for decarbonisation of gas demand that should be considered?

Not currently

46. Comments are invited on the introduction of non-firm/interruptible gas connections for LEUs (at exit point). Do respondents have a view on whether these non-firm/interruptible connections can help alleviate emissions? Please provide reasons and rationale for any views provided.

We would rather see this applied to the plant that operates on gas rather than by interrupting the gas itself. This is for operational reasons.

47. How can demand flexibility services on the gas system provide a benefit for both system support and decarbonisation?

On the assumption that an LEU has access to both an electricity connection and gas connection, then demand flexibility can be used to prioritise the sourcing/use of low carbon based energy whilst also satisfying the security of supply of the grid. If the availability of wind and solar power is very low at any one time for example, then clearly it makes sense to use gas with some bio-methane input to provide power, but as this situation is reversed then the gas reliance is reduced.

Assessment criteria

48. Comments are invited from interested parties on maintaining optionality in what provisions an LEU must meet as part of its net zero emissions requirements.

It is recognised that over say the next 20 years or so, an LEU should have sufficient flexibility in how it operates from an energy sourcing view point. This will reflect the transitional nature of moving from a part fossil fuelled / renewable situation to a very high proportion of renewable energy with storage.

49. Comments are invited on how a new LEUs location may inform what criteria it may need to meet.

For data centres, location should not be a key criteria.

50. Comments are invited on how a transition period may inform an evolving net zero target and demand flexibility services that could be provided.

We would support providing a model for targeting net zero for each LEU and then monitoring it on a monthly/annual basis with some tolerances.

51. Respondents are welcome to suggest alternative approaches in how criteria is selected.

As 49.

52. Respondents are welcome to suggest any additional approaches for LEUs to help meet net zero requirements not considered in sections above.

Not currently

Roles of other organisations

53. Comments are invited from interested parties on the roles of other organisations in the different approaches considered in this paper.

The consultation lists a number of organisations which are important in the process, however some of these are more important than others, e.g. Local Authority and SOs. However, what is even more important with the changes needed to decarbonise the country, is a true co-ordination and framework between all of these organisations in the direction of how this should be achieved. Currently there is misalignment in a number of areas of policy and requirement.

54. Comments are invited on what functions should be carried out by who, in the context of potentially real time net zero emissions for LEUs going forward.

We cannot see real time net zero measurements being capable of being implemented in the next 5 years.

55. Feedback is requested from stakeholders on other mechanisms that may need to be considered for the implementation of SECs and who should be responsible for delivering them.

No input at this time.