



CLUSTER METHODOLOGY REVIEW

Conclusions Paper
29 February 2024



About the Utility Regulator

The Utility Regulator is the economic regulator for electricity, gas and water in Northern Ireland. We are the only multi-sectoral economic regulator in the UK covering both energy and water.

We are an independent non-ministerial government department and our main duty is to promote and protect the short- and long-term interests of consumers.

Our role is to make sure that the energy and water utility industries in Northern Ireland are regulated, and developed within ministerial policy, as set out in our statutory duties.

We are governed by a Board of Directors and are accountable to the Northern Ireland Assembly.

We are based at Queens House in Belfast. The Chief Executive and two Executive Directors lead teams in each of the main functional areas in the organisation: CEO Office; Price Controls, Networks and Energy Futures; and Markets and Consumer Protection.



Our mission

To protect the short- and long-term interests of consumers of electricity, gas and water.



Our vision

To ensure value and sustainability in energy and water.



Our values

- Be a best practice regulator: transparent, consistent, proportionate, accountable and targeted.
- Be professional – listening, explaining and acting with integrity.
- Be a collaborative, co-operative and learning team.
- Be motivated and empowered to make a difference.



Abstract

In this conclusions paper we, the Utility Regulator (**the UR**), make our final views on the UR Cluster Methodology Review¹ and consideration of the changes to the Cluster Methodology in NIE Networks' Statement of Charges (**SoCC**)². These changes were proposed in NIE Network's Cluster Methodology Review Recommendation Paper³, and formally submitted for consideration.

Audience

This paper will be of interest to: NIE Networks; System Operator for Northern Ireland (**SONI**); new large scale demand customers; generators connected to an existing cluster; new data centres; new battery sites; developers and new synchronous compensators in close proximity to an existing cluster site or potential new cluster site, There may also be interest from consumer representative bodies such as: RenewableNI (**RNI**); Consumer Council Northern Ireland(**CCNI**); Major Energy Users Council (**MEUC**); and Manufacturing NI.

Consumer impact

This paper considers the potential impact of NIE Networks' proposed changes to its Cluster Methodology on customers who are currently connected to, or in the future will be connected to, a cluster.

We have considered whether the proposed changes would provide NIE Networks with the opportunity to pursue the most practical and cost-effective solutions in its connections and network planning now and in the future and ultimately whether, or not, they are in the best interest of all NI consumers.

¹ [UR Cluster methodology consultation paper \(uregni.gov.uk\)](http://uregni.gov.uk)

² [NIE Networks' Statement of Charges | Northern Ireland Electricity Networks](#)

³ [Cluster Methodology Review \(nienetworks.co.uk\)](http://nienetworks.co.uk)



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Executive Summary

In 2011 UR published a decision paper⁴ in which approval was given to NIE Networks to modify its Statement of Connection Charges (SoCC)⁵ to reflect connection of groups of generators to the NI distribution system by means of “clusters”. The paper outlined that NIE Networks, should - under Condition 32 of its Distribution Licence⁶ - submit a revised SoCC which would set out the basis of charges for connection. This resulted in the development of Appendix 2 - Methodology for Connecting Groups of Generators to the Northern Ireland Distribution System using Cluster Substations - in the current SoCC.

The Climate Change Act 2022⁷ inter alia sets targets for 2030, 2040 and 2050 with the overall aim to reduce greenhouse gas emissions. It provides for a system of carbon budgeting and for reporting and statements against those targets and budgets. It also confers power to impose climate change reporting duties on public bodies and provides for reports and advice from the Committee on Climate Change.

Over 10 years have passed since the Methodology for Connecting Groups of Generators was established (Appendix 2). The network is changing and needs to change further to achieve the ambition of Net Zero. Now is an optimal time for the cluster methodology to be reviewed.

Part of this review involves consideration as to whether or not clusters should be limited to just connecting groups of generators, or whether the methodology should be expanded to incorporate demand connections. On 22 September 2023 NIE Networks published the Cluster Methodology Review Recommendation Paper⁸ (the Recommendation Paper). This follows on from its Call for Evidence (CfE)⁹ and Consultation Paper¹⁰ published in 2020 and 2022 respectively.

In its Recommendations Paper NIE Networks proposes several changes in relation to matters affecting “clusters”. NIE Networks states that the proposed changes reflect its statutory duty (under Article 12 of the Electricity (NI) Order 1992¹¹) to “develop and maintain an efficient, coordinated and economical system of electricity distribution”. Revised updates to the SoCC are submitted for the UR’s approval.

We issued a consultation in November 2023 on proposed changes to NIE Networks’ Cluster Methodology in order to widen the potential range of stakeholders who may wish to respond and to ascertain whether the changes could lead to additional costs

⁴ [Decision Paper on Charges for Connecting Groups of Generators.pdf \(uregni.gov.uk\)](#)

⁵ [NIE Networks' Statement of Charges | Northern Ireland Electricity Networks](#)

⁶ [NIE Networks Distribution Licence \(nienetworks.co.uk\)](#)

⁷ [Climate Change Act \(Northern Ireland\) 2022 \(legislation.gov.uk\)](#)

⁸ [Cluster Methodology Recommendation Paper \(nienetworks.co.uk\)](#)

⁹ [Cluster Methodology Call for Evidence \(nienetworks.co.uk\)](#)

¹⁰ [Cluster Methodology Consultation \(nienetworks.co.uk\)](#)

¹¹ [The Electricity \(Northern Ireland\) Order 1992 \(legislation.gov.uk\)](#)



becoming attributable to NI consumers.

Our consultation closed on 7 December 2023 and five responses (including one confidential) were received within the time limit which we have considered in making our conclusions. One response was received after the closure of the consultation period and has not been included in our considerations.

Responses were received from:

- Confidential
- Mutual Energy Limited (MEL)
- NIE Networks
- Renewable Energy Systems (RES)
- Renewable NI (RNI)

In summary, we agree with the key proposals that NIE Networks has outlined in its Recommendations Paper on both current and future cluster matters. Our view is that incorporating large demand connections into clusters is in line with NIE Networks duty to develop and maintain an efficient, coordinated and economical system of electricity distribution. We envisage that the changes proposed to the matters, listed above, will provide NIE Networks with the opportunity to pursue the most practical and cost-effective solutions in its connections and network planning both now and in the future.

In this conclusions paper we have provided our views under each of the proposals made by NIE Networks in its Recommendations Paper.

1. Introduction

- 1.1 The Cluster Methodology was consulted on in detail between 2010¹² and 2013, after which the detailed cluster methodology and charging arrangements were introduced into the SoCC.
- 1.2 The Cluster Methodology was originally proposed to "improve access to the network for remote renewable generation, by extending the 110 kV transmission system, in the form of a 110/33 kV substation¹³ (referred to as a cluster substation), to a point more central to these groups of renewable generation projects. This enabled a more efficient connection arrangement with a reduced environmental impact by decreasing the aggregated length of overhead network required"¹⁴.
- 1.3 In 2011, UR published a Decision Paper on the charges for Connecting Groups of Generators (Clustering) to the Northern Ireland Distribution System. This was an approval of the development of a new connection charging methodology. The UR instructed NIE Networks to submit for approval its revised SoCC, which was then submitted and approved. Since its implementation, the Cluster Methodology has been very successful in NI, in connecting groups of generators. Between 2012 and 2021, six clusters were commissioned enabling approximately 590 MVA of renewables to be connected, meaning that cluster connections represent approximately a third of all renewables connected in NI¹⁵.
- 1.4 The methodology has been a key enabler in meeting government targets such as the 2020 target of 40% renewable energy consumption. It is likely to continue to contribute to achieving new targets set out in the NI Energy Strategy¹⁶ and Climate Change Act 2022.
- 1.5 NIE Networks published the Cluster Methodology Review Call for Evidence (CfE) in 2020 and the Cluster Methodology Consultation in 2022.
- 1.6 NIE Networks has recently published a Cluster Methodology Recommendation Paper presenting its proposed modifications to its SoCC for both present and future cluster matters.
- 1.7 The UR then posted a consultation paper of our own regarding NIE Networks' proposed modifications to the SoCC for both present and future cluster matters.

¹² [Consultation Opens on Electricity Connection Policy for the NI Distribution System \(uregni.gov.uk\)](https://www.uregulation.gov.uk/consultation/consultation-opens-on-electricity-connection-policy-for-the-ni-distribution-system)

¹³ [Technical specification of 33/11 kV 2x31.5 MVA power substations](#)

¹⁴ [Cluster Methodology Consultation Paper \(detailed on Page 7\) \(nienetworks.co.uk\)](#)

¹⁵ [Cluster Methodology Review Consultation Paper \(Page 6\) \(nienetworks.co.uk\)](#)

¹⁶ [Energy Strategy - Path to Net Zero Energy | Department for the Economy \(economy-ni.gov.uk\)](#)

2. The Purpose of the Paper

- 2.1 The UR consulted on NIE Networks' proposed modifications to the Cluster Methodology in order to provide stakeholders who may have missed NIE Networks' consultation with the opportunity to respond and to ascertain whether the changes could lead to additional costs becoming attributable to NI consumers.
- 2.2 Clusters can be described as hubs that connect groups of generators (mostly wind farms) which are connected by short individual 33kV lines to a local hub substation. The hub is then connected to the NI transmission system.
- 2.3 NIE Networks proposes in its Recommendations Paper to change from connecting generation only to clusters to enable demand customers to also connect to clusters.
- 2.4 These proposed changes will impact new connectees, existing cluster share allowances, existing connectees and the remaining NI customer proportion of the existing cluster.
- 2.5 Our consultation outlined NIE Networks' proposed modifications to its SoCC and sought views on the potential impact of connecting demand into clusters on NIE Networks' reinforcement requirements. It also sought clarity on any potential unforeseen additional costs which could be attributable to NI consumers as a result of the proposed changes.
- 2.6 Under Condition 32 (Basis of Charges for Use of and Connection to the Distribution System) of its Electricity Distribution Licence¹⁷ NIE Networks is required to seek approval from the UR regarding these changes.
- 2.7 We have considered each of NIE Networks' proposals and have provided our view in the next section.

¹⁷ [nie-distribution-licence-effective-24-may-2023 \(nienetworks.co.uk\)](https://www.nienetworks.co.uk/nie-distribution-licence-effective-24-may-2023)

3. NIE Networks' Consultation for Matters Regarding Existing Clusters

3.1 This section has been taken from the NIE Networks' Cluster Methodology Review Recommendations Paper¹⁸. It outlines, the proposed changes to the SoCC and the reasons NIE Networks has provided.

3.2 This chapter also outlines the stakeholder responses received to our consultation on the changes proposed by NIE Networks as well as the UR final views on these proposals. The key considerations for Present Cluster Matters are:

- Standardisation of Capacity Allocation
- Cluster Designation
- Timing
- Technical Assessment - Geographic Extent of a Cluster
- Definitions

Standardisation of Capacity Allocation

3.3 Reason for Consultation

“The current NIE Networks’ charging arrangements for Authorised Generators connecting to the network as part of a cluster makes some explicit assumptions about the use of MW and MVA and in other places uses the terms interchangeably.”

“The NIE Networks’ Distribution Code¹⁹ requires all Type C Power Generating Facility(s)²⁰ to be capable of operating at its Registered Capacity in a stable manner as a minimum within the power factor range 0.95 absorbing to 0.95 producing. This would mean a generator with a 10 MW Registered Capacity must (as a minimum) be capable of providing ± 3.3 MVA_r equating to an MVA capacity installed or to be installed of 10.5 MVA.”

NIE Networks proposes updating the Statement of Connection Charges to reflect that MVA will be calculated based on a 0.95 power factor and update the charging examples to align with this.”

¹⁸ [Cluster Methodology Review \(nienetworks.co.uk\)](https://www.nienetworks.co.uk) from page 8

¹⁹ <https://www.nienetworks.co.uk/distribution-code>

²⁰ Type C Power Generating Facility(s) means Power Generating Facility(s) with a Registered Capacity of 5 MW and above.

3.4 Consultation Proposal

NIE Networks has proposed the following modifications:

- " To update the SoCC text, and examples within the SoCC, to reflect the reactive power element of the generator MVA rating.
- To update wording in the SoCC to include reference to the Distribution Code requirements for reactive power when determining the MVA capacity of a generator as opposed to a power factor reference.
- That NIE Networks will continue to determine the transformer generation capacity based on the manufacturer nameplate rating.
- That if the generator wants to provide reactive power in a range in excess of what is required within the Distribution Code, they can inform NIE Networks of this through the application process. NIE Networks will then base all network design studies and costing on the capacity requested."

3.5 Consultation Responses

Two respondents disagreed with NIE Networks' recommendation to standardise capacity allocation through the rigid application of a 0.95 power factor. They both state that this approach would lead to a 90MVA transformer being regarded as having a generation capacity of 85.5MW, based on operating power factor of 0.95 at generation sites. They raise the concern that this approach could lead to underutilisation of the cluster transformer.

Both respondents suggest determining the transformer capacity based on a rudimentary load flow study stating that this would more accurately predict the impact of generator sites operating at a 0.95 power factor.

3.6 UR Views

UR view is to accept NIE Networks proposal to submit an update of the SoCC to UR for consideration to reflect that MVA will be calculated based on a 0.95 power factor and update the charging examples to align with this.

The NIE Networks' Distribution Code²¹ requires that all Type C Power Generating Facility(s), with a registered capacity between 5MW and 10MW, be capable of operating at its Registered Capacity in a stable manner as a minimum within the power factor range 0.95 absorbing to 0.95 producing.

This change brings NIE Networks' Cluster Methodology in line with the Distribution Code and reference to such should be added into the SoCC text.

²¹ <https://www.nienetworks.co.uk/distribution-code>

Cluster Designation

3.7 Reason for Consultation

“At present a threshold of 56 MVA is used as the minimum combined weighted MEC needed to justify a cluster. This is based on the typical capacity of two 33 kV overhead lines (28 MVA) and the need to reduce aggregated overhead line lengths. Weighting factors are applied to the generator MEC based on which stage of the planning process it is in.”

“Currently the MVA value is calculated based on an assumed unity power factor i.e., 1 MW = 1 MVA.”

Based on the technical reasons discussed in NIE Networks Recommendations Paper²² in section 2.1, NIE Networks state the MVA value should be calculated based on a 0.95 power factor.

3.8 Consultation Proposal

NIE Networks' Consultation paper proposed the following recommendations to Cluster Designation:

- "Currently the 56 MVA Value is calculated based on an assumed unity power factor i.e., 1 MW = 1 MVA. Based on the technical reasons discussed in section 2.1²³, the MVA value should be calculated based on a 0.95 power factor.
- The 0.8 weighting factor for generators who have made a submission for planning or submitted an appeal to the Planning Appeals Commission (PAC) should be maintained.
- While acknowledging that developers undertaking environmental impact assessments (EIA) would be a good early indicator, no proposal was made to change the weighting factor (0) applied to this group of generators.
- The category currently titled "Applied for Grid Connection" that had a weighting factor of 0.8 should be removed. This is because a generator that has applied for a grid connection will either be consented and have a weighting factor of 1 applied or have submitted to planning or appealed to the PAC and will have a weighting factor of 0.8 applied.
- No proposal was made to expand the scope of designation beyond the renewable generation it currently applies to."

²² [Cluster Methodology Review \(nienetworks.co.uk\)](https://www.nienetworks.co.uk) Page 8 PRESENT CLUSTER MATTERS

²³ [Cluster Methodology Review \(nienetworks.co.uk\)](https://www.nienetworks.co.uk) Page 8 PRESENT CLUSTER MATTERS

3.9 Consultation Responses

Two respondents stated that the cluster process development needs to start earlier in order to reduce delays to generator connection. One agreed that planning permission should be linked as a requirement in the connection process but added that as clusters can take 8 years to develop designating a project only after planning has been achieved can result in generators having multiple years of development time. Both responders mooted that renewables projects that are in the Environmental Impact Assessment (EIA) process should count for the purposes of calculating the needs case qualifying MW. This would be to facilitate, where possible, earlier designation of a cluster of generator projects that have commenced EIA projects, with a lower weighing factor.

3.10 UR Views

UR shares NIE Networks' view that there is a need to find the correct balance between preventing speculative applications for connection and ensuring that the process of obtaining a connection into a cluster is not unduly onerous, either financially or administratively.

In that context we accept NIE Networks' position to maintain designation of clusters based on the 0.8 weighting factor for generators who have made a submission for planning or submitted an appeal to the PAC. We note NIE Networks has not proposed to change the weighting factor applied to generators undertaking EIAs. NIE Networks maintain that EIA should not at this time be included in the cluster weighting on the basis of concerns that cluster thresholds could be held prematurely.

Timing

3.11 Reason for Consultation

"The NIE Networks' SoCC acknowledges that a connection offered to a generator via a designated cluster may take longer to deliver than an individual 33 kV connection to an existing constructed main substation."

"NIE Networks' experience is that the timing provision in its current form does not reflect the length of time required to develop and construct a cluster and is unclear as to the point in time at which each of the three conditions must be assessed."

3.12 Consultation Proposal

NIE Networks proposed the following recommendations in its Clusters Consultation paper:

- "That the first in the queue is required to indicate to NIE Networks that they wish to pursue a direct connection to trigger the timing provision (assuming other criteria are also met). The intention behind this is to

provide certainty to the other generators in the cluster queue and to NIE Networks when applying the timing provision."

- "That the proposed timing provision now determines a delay based on the difference between the estimated scheduled completion date stated in the offer of terms for connection issued to the applicant by NIE Networks and the latest scheduled completion date. In addition to this, the consultation proposed that some consideration will be given to the source of the "Delay". Where the latest scheduled completion date has been delayed due to a connecting party change or delay e.g., change of route or connection methodology for the unique connection, this will not be considered when determining the "Delay". However, if the delay in the latest scheduled completion date is attributable to NIE Networks, this delay will be considered when determining the "Delay"."

To incorporate these proposals, in the consultation document NIE Networks proposed to amend the SoCC so that the timing provision could only be applied if all of the following conditions were met:

- "The applicant is the "first in the queue" for connection to a designated or approved cluster and has suffered or will suffer a 'Delay' in being connected to that cluster. In this context 'Delay' shall mean a delay in excess of 24 months, commencing on the estimated scheduled completion date stated in the offer of terms for connection issued to the applicant by NIE Networks, which is wholly attributable to NIE Networks."
- "The first in the queue has applied for and paid NIE Networks for a connection design and analysis study to be undertaken within 3 months of the connection design and analysis study application date, to determine if a direct connection to an existing node is technically acceptable; and
- Where a direct connection to an existing node is technically acceptable, offering a direct connection to an existing node to the first in the queue would not result in the cluster falling below the 56 MVA threshold for designation should the offer for the direct connection to an existing node be accepted."

3.13 Consultation Responses

All respondents agreed with that the timing provision should be clear. One noted the current timing provision is complex and unclear.

One respondent raised that the right to exit a cluster on the grounds of delay is currently restricted to the generator that is the first in the queue. They request that this restriction should be removed stating instances where the first in queue generator finds cluster timescales acceptable, whilst the next in queue finds such timescales unworkable.

3.14 UR Views

UR considers that, based on NIE Networks' reasoning, the timing provision regarding developing and constructing a designated cluster should be updated, as requested, to ensure that it is reflective and clear. In terms of NIE Networks applying the timing provision to the first in the queue this is because the first is likely to face the longest potential delays. This is a consistent approach as when the first in the connection queue comes out, the second becomes the first and the process is repeated.

Technical Assessment – Geographic Extent of a Cluster

3.15 Reason for Consultation

“When determining the amount of generation capacity that is likely to connect to a potential cluster substation, NIE Networks carried out an assessment of all generation anticipated in an area. The current cluster methodology limits this area to approximately 310 km² based on a 10 km radius from the potential cluster substation location. The current cluster methodology also allows for this radius to be extended when it is technically acceptable to do so. The radius is based upon average conditions so engineering principles and judgement are to be applied to refine any case. The inclusion of a radius is to act as a guide for NIE Networks when carrying out technical assessments to designate a cluster and for generators to understand the likely geographical extent of the cluster area.”

“Developments in NIE Networks' connection policy including development of long cable connections and design means this 10 km limit can be extended in many scenarios, whilst maintaining the 33 kV voltage at the generator within statutory limits, based on factors such as generator size, technical specification, and connection method i.e., overhead line or underground cable.”

“Based on the feedback to the CfE, NIE Networks carried out an assessment of the length of the 33 kV connections into existing cluster substations. This assessment agreed with the wider view of industry, in that almost all connections were made using a combination of overhead line and underground cable or were exclusively underground cable.”

3.16 Consultation Proposal

NIE Networks proposed the following recommendations in its consultation document:

- To increase the cluster designation radius within the SoCC to 15 km.
- To maintain the allowance for engineering judgement to be applied.

3.17 Consultation Responses

Respondents generally supported the proposal to extend the guideline geographic range of a cluster to from 10km to 15km with the potential to deviate on a cluster specific basis.

3.18 UR Views

It is the UR's view that the proposal to extend the guideline geographical range of a cluster from 10km to 15km by NIE Networks while also maintaining the allowance for engineering judgement to be applied is appropriate.

Definitions

3.19 Reason for Consultation

“NIE Networks through the consultation process recognised that there may be a requirement for new definitions and/or updates to existing definitions within the SoCC as part of the proposed cluster methodology update. The subsequent definition changes can be found in the updated SoCC document.”

3.20 Consultation Proposal

NIE Networks proposed that any required new definitions should be added to the SoCC document, and any previous definitions should be updated accordingly if needed.

3.21 Consultation Responses

All respondents agreed with the proposal regarding the updating of definitions and no issues were raised.

3.22 UR Views

UR agrees with the proposal to update the definitions relating to Cluster Methodology in the SoCC document accordingly. NIE Networks will submit an update of the SoCC to reflect updates to cluster methodology and definitions for UR approval pursuant to NIE Networks' Distribution Licence Condition 32(12) ²⁴.

²⁴ [nie-distribution-licence-effective-24-may-2023 \(nienetworks.co.uk\)](https://www.nienetworks.co.uk/nie-distribution-licence-effective-24-may-2023)

4. NIE Networks' Consultation for Future Cluster Matters

This section is taken from NIE Networks' Cluster Methodology consultation paper. It presents how NIE Networks intend to move forward with connecting demand into cluster substations.

This chapter also gives an overview of stakeholder responses on the changes proposed by NIE Networks as well as the UR final views on these proposals.

Future Cluster Matters:

- Facilitating Network and Large Customer Demand into Clusters
- Demand Security of Supply Requirements
- Network and Large Customer Demand Connection Charges
- Demand at Clusters - Technical considerations
- Transmission/Distribution Interactions
- Cluster Innovations

Facilitating Network and Large Customer Demand into Clusters

4.1 Reason for Consultation

“Many of the justifications for connecting generation into a cluster are also applicable for the connection of demand. This approach can reduce overhead line lengths and hence minimise environmental impact, and a cluster connection may be the most cost-effective solution to resolving network constraints in terms of the contribution required from the Northern Ireland customer. It could be considered environmentally and commercially unsustainable to maintain a policy that requires the planning of 33 kV reinforcement infrastructure to by-pass a local cluster substation and connect to a more remote traditional 110 kV substation.”

“Northern Ireland is expected to see considerable growth in demand due to the electrification of heat and transport. It is expected that this increase in load will utilise existing demand capacity at all voltage levels, leading to network congestion as the volume of these new Low Carbon Technologies (LCTs) increases. In order to reduce the amount of conventional reinforcement (new lines, cables and transformers) required and ultimately minimise customer bills, NIE Networks is seeking to

implement smart and market-based solutions²⁵ to unlock further capacity on the network. With this context in mind, it is important that NIE Networks continues to consider how all network assets can be used as efficiently as possible to deliver customer and network benefits. This therefore drives a need for NIE Networks to investigate the potential for using constructed cluster infrastructure for the connection of demand.”

The Electricity (NI) Order 1992, Article 12(1) states that “It shall be the duty of an electricity distributor to develop and maintain an efficient, coordinated and economical system of electricity distribution”. Therefore, it is an obligation on NIE Networks that existing assets are used in the most efficient and economical way.

4.2 Consultation Proposal

“Facilitating the connection of large customer and network demand to existing cluster infrastructure is in keeping with NIE Networks duty to “develop and maintain an efficient, coordinated and economical system of electricity distribution” and delivers benefits to large demand, generation and general NI customers.”

4.3 Consultation Responses

Respondents generally agreed that the connection of large demand customers to existing cluster infrastructure is in line with NIE Networks duty to “develop and maintain an efficient, coordinated and economical system of electricity distribution” One respondent stated that they see this as increasing the ability of Northern Ireland meeting the legislated 80% RES-E target by 2030. Another respondent stated that they supported ongoing review and improvement of the Cluster Charging section of the SoCC. A third respondent said that this change to the cluster methodology would not create an additional burden to NI consumer in terms of cost.

4.4 UR Views

We aimed to provide additional clarity on the potential cost impact on NI consumers as a result of facilitating Large Customer and Network Demand into cluster infrastructure, should this result in additional need for network reinforcement.

Determining the cost impact is not straightforward and in every case the cluster infrastructure and the connection fundamentals will be different. However, after careful consideration of NIE Networks’ proposals, we are of the view that incorporating large demand connections into clusters will enable NIE Networks to seek the most practical and cost-effective solutions for all NI consumers.

NIE Networks proposes that, under the new Cluster Methodology, a Network Demand customer connecting into a cluster will continue to be required to pay for

²⁵ <https://www.nienetworks.co.uk/future-networks/level2/our-innovation-projects>

their connection assets, including any 33kV and/or 110kV infrastructure required to provide security of supply in line with connection charges for demand customers across the network presently. This is outlined in the current NIE Networks' Statement of Connection Charges²⁶.

The level of security of supply required is subject to Distribution System Security and Planning Standards (ERP2/6). It is subject to the "range of group demand" at the connection as per the table below²⁷ and not whether, or not, the connection is into a cluster rather than into the distribution network. Accordingly, we do not foresee additional reinforcement charges, becoming attributable to NI consumers as a result of the recommended changes to the Cluster Methodology at this time.

TABLE 1 OF ER P2/6 (NI) – FOR APPLICATION IN NORTHERN IRELAND

Class of Supply	Range of Group Demand	Minimum Demand to be met after		Notes
		First Circuit Outage	Second Circuit Outage	
A	UP TO 1 MW	In repair time: GROUP DEMAND	NIL	Where demand is supplied by a single 1000KVA transformer the "Range of Group Demand" may be extended to cover the overload capacity of that transformer.
B	OVER 1 to 8MW	(a) Within 3 hours GROUP DEMAND MINUS 1 MW (b) In repair time GROUP DEMAND	NIL	
C1	OVER 8 TO 24 MW	(a) Within 15 minutes GROUP DEMAND MINUS 8 MW (b) Within 3 hours GROUP DEMAND	NIL	Group Demand will be normally supplied by at least two normally closed circuits or by one circuit with supervisory or automatic switching of alternative circuits
C2	OVER 24 TO 60 MW	(a) Within 15 minutes 2/3 GROUP DEMAND (b) Within 3 hours GROUP DEMAND	(a) Within time to restore arranged outage GROUP DEMAND	Group Demand will be normally supplied by at least two normally closed circuits or by one circuit with supervisory or automatic switching of alternative circuits. It is normal to aim for restoration of supply to 1/3 Group Demand within 3 hours after second circuit outage to prevent widespread and prolonged supply interruption.
D	OVER 60 TO 300 MW	(a) Immediately GROUP DEMAND MINUS UP TO 20 MW (AUTOMATICALLY DISCONNECTED) (b) Within 3 hours GROUP DEMAND	(a) Within 3 hours For GROUP DEMAND greater than 100MW, smaller of GROUP DEMAND minus 100MW and 1/3 GROUP DEMAND. (b) Within time to restore arranged outage GROUP DEMAND	A loss of supply not exceeding 60 secs is considered as an immediate restoration. The Recommendation is based on the assumption that the time for restoration of Full group demand after a second circuit outage will be minimised by the scheduling and control of planned outages, and that consideration will be given to the use of rota load shedding to reduce the effect of prolonged outages on consumers. It is normal to aim for restoration of supply to 1/3 Group Demand within 3 hours after a second circuit outage to prevent widespread and prolonged supply interruption.
E	OVER 300 TO 1500 MW	System Security requirements for Group Demand in Class E and above are covered in the NI Transmission System Security and Planning Standards.		

Figure1: Table from page 9 Distribution System Security and Planning Standards (ERP2/6)²⁸

The Connection Policy Framework in NI²⁹ is under review with a joint UR and Department for the Economy (DfE) Call for Evidence (CfE) published in July 2023. As stated above, currently in NI the connecting party pays for the connection of the asset and any reinforcement to the distribution system at the connection voltage level and one voltage level above. Some stakeholders have called to move away from this policy so that parties connecting to the system would pay less where reinforcement is required by their connection and the additional reinforcement costs would be socialised amongst all NI electricity consumers. If made, this change would

²⁶ [NIE Networks' Statement of Charges | Northern Ireland Electricity Networks](#)

²⁸ Note NIE Networks is proposing to adopt the latest revisions to Engineering Recommendations P2 and G5 (EREC P2/8 and EREC G5/5). The consultation runs until Friday 16 February 2024, and can be accessed via this link: <https://www.nienetworks.co.uk/consultation-on-proposed-changes-to-engineering-recommendations-p2-g5>

²⁹ [20230707 Connection Call for Evidence Final.pdf \(uregni.gov.uk\)](#)

impact all electricity consumers (including business and domestic consumers) as they would pay for a higher proportion of reinforcement costs via their electricity bills than they do currently.

Overall, it is our view that the potential to connect a large demand customer to a constructed cluster substation will increase the optionality for possible connection planning assessments by NIE Networks who have a duty to develop and maintain an efficient, coordinated and economical system of electricity supply.

Demand Security of Supply Requirements

4.5 Reason for Consultation

“Cluster substations solely facilitate the connection of renewable generation and consequently are not required to have any level of security of supply³⁰. NIE Networks is governed by statute and by license in respect of the manner in which it plans, operates and maintains its electrical network. NIE Networks’ minimum security of supply planning obligations are defined by Engineering Recommendation (EREC) P2 (NI) of the Distribution System Security and Planning Standards. Applying EREC P2 to demand connecting at existing clusters necessitates that the demand is appropriately secured.”

4.6 Consultation Proposal

NIE Networks propose applying EREC P2 to demand connecting at existing clusters to necessitate that the demand is appropriately secured.

4.7 Consultation Responses

Respondents agreed with the NIE Networks’ recommendation that demand customers connecting at existing clusters be subject to Engineering Recommendation (EREC) P2 (NI) security requirements.

4.8 UR Views

Our conclusion is that NIE Networks should apply Engineering Recommendation (EREC) P2 (NI) security requirements to demand connecting at existing clusters as proposed.

³⁰ Though security of supply requirements do exist for generation, the maximum potential generation capacity connected to cluster infrastructure is not sufficient to trigger them.

Network and Large Customer Demand Connection Charges

4.9 Reason for Consultation

“Unlike for generation, there is currently no demand-specific charging methodology for clusters. Therefore, under current arrangements the charging which would apply to any demand which would connect to a cluster would be according to NIE Networks SoCC and would mirror the principles for how demand is charged across the network.”

“The CfE sought to present the implications of connecting demand into a cluster. It is worth noting that charging principles for all connections will be considered in a full connection charging review which will involve a full consultation process; however, it falls outside the scope of this consultation. It was considered appropriate to present how this would currently be achieved according to the existing SoCC. This approach was used in order to clearly outline the implications of connecting network and large customer demand into clusters.”³¹

4.10 Consultation Proposal

NIE Networks raised the following key points when the SoCC is applied to demand connections to a cluster:

- “A large demand customer connection at a cluster, will be required to pay for their connection assets, including any 33kV and/or 110kV infrastructure required to provide security of supply to comply with the Distribution System Security and Planning Standards (DSSPS) and Transmission System Security and Planning Standards (TSSPS).
- For network reinforcement projects which will utilize existing cluster infrastructure, the required network reinforcement is funded (including security of supply infrastructure if not already present) through the use of system charges borne by the NI customer.
- Generators seeking to connect are still charged according to the cluster charging methodology.”

4.11 Consultation Responses

All respondents supported the NIE Networks' proposals to charge large demand customers connecting at clusters for their connection assets.

³¹ Charging principles for all connections are being considered as part of the ongoing joint connections framework policy review between UR and DfE.

4.12 UR Views

Our view is that a large demand customer connecting into cluster infrastructure should continue to pay for its connection assets including any 33kV and/or 110kV infrastructure required to provide security of supply to comply with the DSSPS and TSSPS.

Demand at Clusters – Technical Considerations

4.13 Reason for Consultation

“Due to the uniqueness of Cluster substations a number of technical considerations when connecting large customer or network demand into existing clusters were presented in the consultation, which are summarised below.”

1. Allowable Connection Voltage

“It is important to mitigate against the risk that cluster infrastructure is only minimally utilized. For this reason, a threshold for connected generation was introduced to ensure that the infrastructure is not used inefficiently. It is important to ensure that any connection of demand also respects this principle and does not represent inefficient use of the assets.”

2. 33 kV Busbar Voltage Considerations

“Cluster substations differ from traditional 110/33 kV arrangements (BSPs) in that the voltage at the 33 kV busbar is designed to be 1.0pu, as opposed to BSPs where it is designed to be 1.03pu. Limiting the source voltage to 1.0pu is to provide extra headroom for voltage rise on the 33 kV circuits connecting the generators to the cluster substation, ensuring that upper voltage limits are not exceeded and thereby maximizing the amount of renewable generation that can be connected to a cluster substation.”

3. Cluster Designation

“Under the SoCC, a large demand customer seeking to connect to the network must be offered the Least Cost Technically Acceptable (LCTA) connection. In order for this offer to be considered technically acceptable, it has to provide a connection to network infrastructure which currently exists. Similarly, for network reinforcement projects, an expenditure allowance is provided for reinforcement works for the subsequent regulatory period. The reinforcement work to alleviate any identified network deficiencies cannot be based on speculative assets, and therefore speculative costings, due to the mitigation proposal taking account of assets which do not currently exist.”

4.14 Consultation Proposal

In the consultation paper, NIE Networks proposed the following recommendations:

- "The connection of distribution transformers to a 33 kV circuit of a cluster substation should not be permitted. Consequently, it follows that only 33 kV (EHV) customers and 33 kV circuits used for network reinforcement, including the connection of new or existing Primary (33/11 kV) substations, are permitted to directly connect to the cluster infrastructure."
- "As the primary function of a cluster substation is to maximise the capacity for renewable generation connections, it is therefore required that any connection of demand into a cluster substation should be designed in such a way that it does not compromise this arrangement meaning the 33kV busbar voltage remains at 1.0pu for cluster substations."
- "The connection of network or large customer demand (including electricity storage connections) should not be considered in the designation of a cluster."
- Generators seeking to connect are still charged according to the cluster charging methodology."

4.15 Consultation Responses

All respondents agreed that, as the primary purpose of cluster substations is to facilitate renewable generation, the 33kV busbar voltage at clusters should not be changed to facilitate demand connections.

4.16 UR Views

It is the UR view that it is within NIE Networks' remit to decide whether the 33kV busbar voltage at clusters should or should not be changed to facilitate demand connections.

Transmission/Distribution Interactions

4.17 Reason for Consultation

"At present, when a cluster is designated and approved by the Utility Regulator, NIE Networks applies to the SONI for a 90 MVA MEC on the transmission network. SONI carries out a technical assessment of the transmission system and provides NIE Networks with an offer. Based on the proposals for cluster substations to facilitate the connection of demand, NIE Networks would have to apply to SONI for an associated Maximum Import Capacity (MIC). As per EREC P2, a transformer capacity of 180 MVA provides a demand capacity of 90 MVA, allowing for full security of supply."

The NIE Networks' SoCC states in section 7.11 that in circumstances where an Authorised Generator makes an application for connection which has the effect of increasing the electrical capacity required from the Designated Generation Cluster Infrastructure or Approved Generation Cluster Infrastructure or Constructed Generation Cluster Infrastructure above the capacity of the First Transformer and therefore necessitates the installation of a second transformer or a third transformer (where the capacity of a second transformer is exceeded by the connection application) or triggers the need for further transmission reinforcement then that Authorised Generator shall be required to pay for the full cost of the second transformer or the third transformer or further transmission reinforcement (as the case may be) and associated works notwithstanding that the transformer and / or further reinforcement may subsequently become a shared asset. The SoCC also makes provisions for interactive offers."

4.18 Consultation Proposal

NIE Networks proposed the following recommendations regarding transmission/distribution interactions:

- "Upon receipt of an effective connection application, NIE Networks will form a view as to whether the distribution connection might require a transmission construction project. This situation would arise in scenarios where the need for additional transmission infrastructure at a cluster is identified."
- "If in NIE Networks' view a transmission construction project might be required, NIE Networks will apply to SONI to provide any necessary transmission works. NIE Networks will apply incrementally to SONI based on the information provided to them by the distribution applicant."
- "Providing the required capacity at clusters will be delivered through the installation of additional 90 MVA transformers and 110kV lines that comply with NIE Networks minimum design standards. However, the requested MEC/MIC will be applied for through SONI incrementally and will be based on the information supplied to NIE Networks in the effective connection application."
- "Should the need for additional transmission infrastructure arise from a network/system need rather than a connecting customer application, the cost of delivery of that additional transmission infrastructure will be considered in the economic evaluation of all options for system/network reinforcement. The installation of the additional transmission infrastructure may create capacity at a cluster, but it is not guaranteed to deliver the necessary network capacity for additional customer generation or load connections."

4.19 Consultation Responses

No responses were received on this proposal.

4.20 UR Views

UR considers the proposed methodology regarding transmission/distribution interactions appropriate at this time.

Cluster Innovations

4.21 Reason for Consultation

“The creation of cluster substations has been very successful in facilitating greater connections of renewable generation and has been a major contributor to the whole system drive towards a low carbon future. It marked an innovative approach to anticipatory investment, whilst overcoming capacity, environmental and technical problems and the cluster methodology will continue to be utilised to deliver these benefits and meet future renewable generation targets.”

“Clusters will continue to play an important role in meeting targets, specifically the DfE target that at least 80% of electricity consumption is from renewable sources by 2030. It is NIE Networks view that moving forward opportunities for flexible and innovative approaches for clusters, which currently are not covered in the SoCC cluster methodology, may become available.”

4.22 Consultation Proposal

NIE Networks proposed the following in their consultation:

“When opportunities for cluster innovation emerge, these would be carefully considered and engagement with stakeholders will be undertaken.”

4.23 Consultation Responses

One respondent noted clusters of the future will need to be designed to cater for larger size generators and maintaining 90MVA transformer size will likely be inefficient. The respondent recommended dropping the standardisation of cluster capacity to 90MVA and urged the consideration of incorporating dynamic line ratings and managed overloading of transformers in their approach to design of clusters.

4.24 UR Views

We agree with NIE Networks’ approach that opportunities for cluster innovation should be carefully considered and engagement with stakeholders undertaken. In order to ensure this approach is taken NIE Networks should work closely with UR and other stakeholders to develop a framework for cluster innovation.

Next Steps

- 4.25 This conclusions paper has outlined UR views on NIE Networks' proposals, set out in its recommendation paper, to change the Cluster Methodology within the SoCC.
- 4.26 NIE Networks has recently submitted an updated SoCC incorporating these changes to UR for approval Under Condition 32 (Basis of Charges for Use of and Connection to the Distribution System) of NIE Networks' Electricity Distribution Licence.
- 4.27 Subject to UR approval, NIE Networks will publish the updated SoCC on its website.
- 4.28 The updated SoCC is effective one month after it has been published on NIE Networks' website.