



NETWORKS

Flexible Access to the Distribution System for Renewable Generation

NATIONAL NETWORK,
LOCAL CONNECTIONS
PROGRAMME

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1. Glossary

1. Glossary

Table 1-1 Glossary of Terms used in this document

Term	Definition
ADMS	Advanced Distribution Management System
DSO	Distribution System Operator
ECP	Enduring Connection Policy – Policy under which offers to generation projects are issued in batches
Firm Capacity	The export capacity available to the Pilot project under normal and standby feeding arrangements
Flexible Capacity	Additional export capacity available to the Pilot project under normal feeding arrangements only. This capacity will not be available during transformer outages
LCTA	Least Cost Technically Acceptable
LV	Low Voltage
MEC	Maximum Export Capacity
MV	Medium Voltage
MW	Megawatt
NFA	Non-Firm Access
NN, LC	National Network, Local Connections
RESS	Renewable Energy Support Scheme

2. Background

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The purpose of this paper is to provide information on the criteria which have been, and which will be, used to identify projects for participation in a Pilot to be operated by ESB Networks' National Network, Local Connections Programme. This paper will also set out what the Pilot is aiming to achieve and will outline the process around how projects will progress into the Pilot.

The Pilots in question were identified as Pilot 4A and 4B in the January 2022 ESB Networks' Piloting Roadmap (at this [link](#)) and are focussed on flexible access to the distribution system for renewable generation projects. Under a flexible access arrangement for Pilot 4A and 4B, the connection method proposed for a new generation connection would allow full export under normal feeding arrangements but reduced (or zero) export where a transformer¹, at a station with two or more transformers, is unavailable due to fault or maintenance. This proposal will allow customers connect earlier than would otherwise be the case with the added benefit – in the event that the connection transitions from pilot to enduring – of a cheaper connection. In terms of Ireland's Climate Action Plan, which calls for a significant increase in the connection of renewable energy over the next number of years the ability to connect and operate this energy is key.

The January 2022 publication set out the key criteria under which projects would be selected for the Pilot 4A and Pilot 4B (focussed on community led projects). However, following an assessment, no projects were identified which met the criteria.

As flexible access to the distribution system remains a high priority for ESB Networks, and piloting this concept is expected to inform the operation of same, ESB Networks have reviewed the criteria for inclusion in the Pilots.

This paper will set out:

- Key questions which have been addressed when developing this paper;
- Key principles of the Pilot for flexible access – noting that these principles may also be applicable to an option for enduring flexible access;
- Revised criteria – which have been identified to select projects for the Pilots;
- What the National Network, Local Connections Programme Flexible Access Pilots propose to deliver over and above what is available to parties under current non-firm access policy [Non-Firm Access Connections for Distribution Connected Distributed Generators \(esbnetworks.ie\)](#);
- The process which will apply for parties eligible for inclusions in the Pilots (reference Section 5).

In the next section, the paper will identify some key questions which were raised during the development of the paper.

¹ The Transformer can be at the local station – to which the generation is directly connecting – or deeper in the system (e.g the local 110kV/38kV station)

3. Key Considerations

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3.1 Key questions which have been considered

The following table contains a series of questions and propositions which the DSO have applied in developing this proposal.

Question	DSO Position
Are we offering flexible access on an enduring basis or temporary only for the duration of the Pilot?	Enduring flexible access to be offered post the Pilot on the condition that: <ul style="list-style-type: none"> • The Pilot is deemed a success and operation of same has not presented any issues of concern for system security; • The customer does not wish the deep works/changed connection to be delivered which would deliver a fully firm connection.
What costs are to be incurred by the candidate projects?	<ul style="list-style-type: none"> • Customer will be responsible for the costs of their connection in the normal manner; • Customer will be liable for any costs incurred due to subsequent modification (as per the usual policy); • Customer will be responsible for the costs of technology at their installation; • Where a modified offer is required, customer will be liable for a modification fee².
Which customers are eligible?	Criteria included in Section 4
Will there be a change to how microgeneration is considered?	For the purpose of studies and calculation of flexible capacity, the 30% allocation for microgeneration will be reduced to 0% on the basis that these Pilot projects will be actively managed. This will not translate to any restriction on the microgeneration to be connected in the Pilot location.
Will Pilot projects be eligible for compensation for generation which is constrained by the DSO?	No compensation will be paid for generation by DSO during the Pilot.
What is the duration of the Pilot?	It is expected that the Pilot will run for 2 years from the time of energisation of the project.
When, and if, the project transitions to an enduring flexible access connection, what – if any – changes will be required?	This will be part of the Pilot learnings. However: <ul style="list-style-type: none"> • It is likely that a system operator modification to the connection agreement will be required; • Technology changes may be required as flexible access becomes more widespread and systems become more advanced.

² Community projects will be exempt

3.2 Key Principles

In addition to the questions set out above, further key principles relating to flexible access are set out below:

- Once flexible access is in place, the secure and safe operation of the network will depend on the ability of the participating project to reliably receive and respond to instructions sent by ESB Networks, to modify the project's active power output;
- A key aspect of the project implementation will be the development and agreement with participants of the technology, including the related processes and testing requirements that will ensure required control of the active power output of participants;
- Appropriate contractual arrangements and procedural documentation will be developed to capture these requirements;
- Candidates will accept, at their own expense, the cost of participation in the Pilot, including, but not limited to, any foregone revenues because of responding to instructions from ESB Networks over the course of their participation in the Pilot;
- For the initial Pilots, flexible access will be based on transformer capacity only;
- In the event that – at the end of the Pilot period – either ESB Networks or the Pilot customer wish to revert to a firm connection, the Pilot arrangements and principles will remain in effect until the N-1 contingency related deep reinforcement works have been completed, or – where the Pilot was based on a different connection method – the new connection is available;
- Projects which – as part of their initial offer process – requested a reduction in their MEC in order to achieve a cheaper option, will be allowed request an increase in MEC. The increase in MEC:
 - Would be limited to the MEC approved for processing in Enduring Connection Policy (ECP);
 - Would be offered on a flexible access basis only.

4. Updated criteria for flexible access pilots

4. Updated criteria for flexible access pilots

In January 2022, the ESB Networks' National Network, Local Connections Programme Piloting Roadmap was published ([find here](#)). Within this roadmap, there were 2 different Pilots – Pilot 4A and 4B - proposed to examine and test flexible access for generators.

4.1 Pilot 4A: RESS1 Early Access – Original Proposal and Results

The objective of the RESS-1 early access Pilot was to use a managed approach to offer early network access to RESS-1 generators whose connection works were of a higher risk due to the deep reinforcement works required. This was to reduce the potential risk to the customer associated with the Dec'23 RESS-1 Commercial Operation Longstop Date.

The key criteria for inclusion in the Pilot based on above were as follows:

- Project has a RESS-1 contract;
- There are 'deep distribution reinforcement works' required to facilitate their full export. In this instance deep works are defined as works which do not change how the development is directly connected to the system;
- There is an identified risk that the deep works may not be complete in 2023;
- The deep works are driven solely by the need to cater for an N-1 contingency (i.e., not driven by normal feeding arrangements);
- Customer shallow works will be complete in time to meet the Commercial Operation Longstop Date of Dec 2023.

Using the above criteria, an assessment of the database of projects identified only one project which potentially would qualify, as the majority of projects were on target to be energised prior to their RESS longstop date. Even in the event that this project did participate in a Pilot the expectation is that the deep works would be complete in late 2023 or early 2024 meaning that the duration of the Pilot would be very short.

4.2 Pilot 4b: RESS2 Community – Original Proposal and Results

The focus of Pilot 4B, RESS 2 Community, was to offer flexible access to community projects. The criteria for Pilot 4B were slightly different to those of Pilot 4A. The criteria for Pilot 4B, are shown below:

- Project has qualified for a RESS 2 contract by virtue of being 100% community-led;
- There are 'deep distribution reinforcement works' required to facilitate their full export. In this instance deep works are defined as works which do not change how the development is directly connected to the system;
- The deep works are driven solely by the need to cater for an N-1 contingency (i.e., not driven by normal feeding arrangements);
- Project is progressing towards commercial operation with an executed connection agreement in place.

As with Pilot 4A, an assessment of the pool of projects failed to identify projects which would qualify for the Pilot.

Aiming to expand the Pilots¹ to more participants, a revised criteria was developed as follows to replace the original inclusion criteria for Pilot 4A and 4B. As part of this development, Pilots 4A and 4B were merged to become Pilot 4.

4.3 Pilot 4: ECP2.1 and ECP2.2 – Revised Criteria

The ECP process for grid connection applications is the current pathway for generators, storage and other system services technology projects to connect to the electricity system. Projects who qualified for ECP2.1 were issued offers in 2021/22. Projects who qualified for ECP2.2 were issued offers in 2022/23. For both of these batches, therefore, offers had been issued prior to an opportunity being available to participate in a pilot.

Projects whose offers were issued in ECP2.1 or ECP2.2 are deemed eligible based on the proposed connection method:

- Contractual criteria. At least one of the below criteria should apply:
 - Project has a RESS contract;
 - Project is a 100% community-led project;
 - Project is a registered stakeholder on the National Network, Local Connections Programme database;
 - Project has an executed connection agreement or connection assessment³.
- Connection method. The projects connection method is such that:
 - There are deep distribution reinforcement works – specifically involving transformer updates at a station with at least two transformers - required to facilitate their full export. In this instance, deep works are defined as works which do not change how the development is directly connected to the system; **Or**
 - There are significant shallow works required to facilitate their full export. For projects such as these, a change in connection method will be required to facilitate early access for export; **Or**
 - Connection is proposed to a station which is not the closest station geographically⁴.
- The flexible access proposed connection method can accommodate the full output under normal feeding arrangements and the connection will only need to be managed to cater for an N-1 contingency (specifically a transformer outage).

³ Connection assessments were issued to community projects which had not yet obtained planning permission for their developments.

⁴ Albeit still connected to the same 110kV node. For clarity the flexible access connection cannot result in a change in 110kV node.

4.4 Pilot 4: ECP2.3 – Criteria

ECP2.3 connection offer process is currently underway and as a result projects can be assessed for eligibility for the pilot during the offer process. For ECP2.3, therefore, projects are deemed eligible based on the proposed connection method:

- Connection method. The projects connection methods is such that:
 - There are deep distribution reinforcement works – specifically involving transformer updates at a station with at least two transformers - required to facilitate their full export. In this instance deep works are defined as works which do not change how the development is directly connected to the system; **Or**
 - There are significant shallow works required to facilitate their full export. For projects such as these, a change in connection method will be required to facilitate early access for export; **Or**
 - Connection is proposed to a station which is not the closest station geographically⁵.
- The flexible access proposed connection method can accommodate the full output under normal feeding arrangements and the connection will only need to be managed to cater for an N-1 contingency (specifically a transformer outage).

⁵ Albeit still connected to the same 110kV node. For clarity the flexible access connection cannot result in a change in 110kV node.

5. What is different in Pilot 4 compared to existing non-firm access policy?

5. What is different in Pilot 4 compared to existing non-firm access policy?

[Non-Firm Access \(NFA\) Connections for Distribution Connected Distributed Generators \(esbnetworks.ie\)](#) is the document which sets out our current policy as DSO on non-firm access for generators connecting to the distribution system. This policy was first implemented for offers being issued in ECP2.1 and resulted in only a small number of non-firm offers being issued and accepted.

Under the initial NFA offering, non-firm second transformer access is available for High Voltage/Medium Voltage (HV/MV) transformer capacity from the second HV station transformer. This option utilises a hard-intertripping / special protection scheme arrangement within the HV station and is subject to limitations as set out in Section 2.2 of the Non-Firm Access policy document.

Per industry feedback, some of the shortcomings of the policy were as follows:

- Non-firm connection must be firm as related to infrastructure beyond the connecting station i.e. deep works may still be required on the 38kV network and at 110kV/38kV stations;
- If the connection was at 38kV and into a 110kV/38kV station then inter-tripping could not be implemented for loss of the 110kV transformer and therefore non-firm access was not available to these connections.

5.1 What will National Network, Local Connections Programme Pilots offer?

The intention of the NNLC Flexible Access Pilots is to offer additional flexible access to a small number of candidate projects. In the initial Pilots, flexible access will be by a centrally managed manual intervention – enabled by monitoring and alarm settings in our operational systems – rather than inter-tripping.

It is important to note that the focus at this stage remains on an N-1 scenario for transformer assets. As cables and overhead lines typically do not have any emergency overload capacity to allow time for mitigation actions (such as reducing generation output) to be taken, connections will remain on a firm basis in relation to these assets. In the enduring solution – with an automated system and therefore faster response time – the flexible access offering will be possible to expand.

As the Pilot is enabled by manual intervention, the following benefits can be achieved (compared with the existing guidelines):

- For a transformer outage, the generator is not disconnected (reducing output to zero) but rather output will be reduced to a capacity which can be accommodated on the system. This output will be termed the 'Firm Capacity'⁶;
- For constraints on transformers at upstream/remote station locations, flexible access will also be offered;

⁶ In some instances the Firm Capacity will be zero, in which case a trafo outage would result in the generation export reducing to zero

- For 38kV connections into 110kV/38kV stations, flexible access could be offered, thereby negating the need for additional 110kV/38kV capacity in some scenarios. (This is feasible as the manual intervention will allow other factors – for example load – to be assessed and ensure that the reduction of generation will not cause any adverse impacts on the system);
- Connections can be offered with both firm capacity and flexible access at the same site. E.g., total application is for 9MVA. 5MVA can be connected on a firm basis with the remaining 4MVA available on a flexible basis;
- The 30% capacity held for microgeneration can be reduced to 0%. As point 2 above, this is feasible as manual intervention will take account of load (including any impact of microgeneration) prior to taking an action. Furthermore, the enduring solution will be via an Advanced Distribution Management System (ADMS) which will forecast available capacity for export, taking a range of factors into account.

5.2 How will National Network, Local Connections Programme Pilot operate?

In the event of an outage (planned or fault) of a transformer in a station that has a flexible access Pilot connection in place, the following steps give an outline of the process:

- The generator will be contacted⁷ and instructed to reduce their output;
- Following this contact, the generator will be required to reduce the Flexible Capacity portion of the connection to 0MW within 15 minutes;
- Following system restoration to normal conditions the generator will be contacted and the Flexible Capacity restored.

In the event that

- The customer cannot be contacted, or
- The customer has not reduced their generation export by the required amount within 15 minutes, or
- At any time post instruction (and pre-contact noting a return to ability to export additional Flexible Capacity) the export exceeds the Firm Capacity.

the site may be temporarily disconnected until such time as the unavailable plant has been restored to service. This is to ensure the safe operation of the system.

This process will be in place for the duration of the Pilot or up until such a time as an ADMS is in service. As part of the more advanced system, it is probable that a signal will be sent directly to the generator based on system conditions. This signal will require a reduction in output to the Firm Capacity of the facility, or to an alternative level determined by the ADMS.

⁷ Contact may be by phone; email; text or some other means to be agreed

5.3 What does this mean for Pilot projects?

Some of the customer impacts – for projects participating in the Pilot – are detailed below:

Deep Works	Significant Shallow Works
Customer will be connected and allowed to export at an earlier stage than would otherwise be possible.	Customer will be connected and allowed to export at an earlier stage than would otherwise be possible.
Deep works will be deferred or may not be required at all leading to a reduction in cost to the customer.	Significant shallow works will be deferred or may not be required at all leading to a reduction in cost to the customer.
Participation in the Pilot will allow the customer to engage proactively with the DSO on this important matter.	Participation in the Pilot will allow the customer to engage proactively with the DSO on this important matter.
For the duration of the Pilot, (and beyond if the flexible access connection becomes enduring) the customer will be required to limit their export for certain specified contingencies.	Prior to the significant shallow works being completed, (and beyond if the flexible access connection becomes enduring) the customer will be required to limit their export for certain specified contingencies.
In the absence of the required response from the customer, ESB Networks reserves the right to de-energise the connection for System Security purposes.	In the absence of the required response from the customer, ESB Networks reserves the right to de-energise the connection for System Security purposes.
In the event that – post energisation and Pilot – the customer (or ESB Networks) determines that a firm connection is required, the customer may experience outages/may be required to limit their export to zero at times, while the required works are being undertaken.	In the event that – post energisation and Pilot – the customer (or ESB Networks) determines that a firm connection is required, the customer may experience outages/may be required to limit their export to zero at times , while the required works are being undertaken.
For customers who had already received connection offers prior to this option being available (ECP2.1 and ECP2.2), a modified offer will need to be issued. The customer will need to request this modification offer which will be liable for a level 4 modification fee.	For customers who had already received connection offers prior to this option being available (ECP2.1 and ECP2.2), a modified offer will need to be issued. The customer will need to request this modification offer which will be liable for a level 4 modification fee.
-	As the customer will need a new connection method, there is the potential that this will drive stranded assets which will have to be paid for in-full.
Proving tests will be required before being able to fully participate in the Pilot.	Proving tests will be required before being able to fully participate in the Pilot.

6. Processes to apply

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The Flexible Access Pilot was originally focussed on ECP2.1 and then ECP2.2. However, following discussions with customers and industry, ESB Networks has been considering how Pilot projects for flexible access might be identified at an earlier stage of the ECP process. This would allow the issuance of offers which incorporate flexible access for a Pilot, thereby avoiding the impact - in terms of cost and time/resource - of modifying offers.

6.1 ECP2.1 and ECP2.2

For both ECP2.1 and 2.2, offers will have issued prior to a project being assessed for inclusion in the Pilot. With this in mind the process applied is as follows:

#	Step
1.	Each project will be assessed against the criteria set out in Section 4. The initial assessment will be a high-level screening.
2.	Based on the initial, high-level screening, the project developer will be contacted and invited to a meeting to discuss the potential inclusion in the Pilot.
3.	Following this meeting, the projects will be invited to express their interest in the Pilot.
4.	A further assessment will be done of projects who have expressed an interest in the Pilot and – following this further assessment – any projects which are still deemed to be eligible will be invited to submit a modification application and fee.
5.	Once the modification application is received and deemed complete, and the fee has also been received, the full connection assessment will be undertaken. In line with updated connection offer policy this assessment will include detailed project scoping.
6.	Once the modified offer has been issued and executed, connection works will progress in the normal manner until the project is energised. During connection works the primary interaction will be with the Renewable and Major Connections Team ⁸ . The Flexible Access Team – in NNLC – will also have a customer point of contact during this period. This point in contact will continue to engage with the customer – albeit on a more active basis – once the project is energised.
7.	Once energised, the project will be required to comply with operations instructions as described in Section 5.2.

⁸ Also known as Renewable Delivery Team

6.2 ECP2.3

ECP2.3 is underway and is incorporating an assessment of projects which meet the flexible access criteria. As the assessment and application process is slightly different for ECP2.3, it is described separately below:

#	Step
1.	The connection offer study process will progress in the usual manner under the RESS Planning team and the LCTA connection will be identified.
2	The Flexible Access Pilot team will then assess the proposed connection and any other connections which were considered with a view to identifying suitable Pilot projects.
3.	During the customer meeting the customer will be offered: <ul style="list-style-type: none">• The LCTA connection method – offer to be progressed as per original application;• Where a reduction in MEC will negate the need for costly deep works or shallow connection works, the customer in MEC will be advised of this and:<ul style="list-style-type: none">○ Be offered the opportunity to reduce their MEC; or○ Be included in a Pilot which will accommodate the additional capacity on a flexible basis.
4.	The selection connection method will undergo scoping and a connection offer will be issued.
5.	Once the offer has been issued and executed, connection works will progress in the normal manner until the project is energised.
6.	Once energised, the project will be required to comply with operations instructions as described in Section 5.2.

