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Overcoming grid connection issues for community energy projects

for Co-operatives UK and The Co-operative Group

Prepared by: Vicky Simonds and Ben Hall
Cornwall Energy

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About Cornwall Energy

Cornwall Energy's team of independent specialists have experience of liberalised energy markets and their regulation since their inception in Great Britain and elsewhere in the late 1980s. We provide consultancy, intelligence and training, and are a trusted and reliable partner whether you are a new entrant or a large, established player.

Specific areas of our expertise include:

- wholesale and retail energy market competition and change;
- regulation and public policy within both electricity and gas markets;
- electricity and gas market design, governance and business processes; and
- market entry.

2 Millennium Plain
Bethel Street
Norwich
NR2 1TF

T +44 (0) 1603 604400
F +44 (0) 1603 568829
E info@cornwallenergy.com
W www.cornwallenergy.com

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1 Executive summary

1.1 Purpose

Community energy is a rapidly growing sector, with a potentially pivotal role to play in helping the UK meet its renewable energy and carbon abatement targets and ensuring security of supply. With the upcoming launch of the government's *Community Energy Strategy* this autumn, it is important that community energy projects are not inhibited or delayed by any current policy, regulatory or industry processes.

Cornwall Energy has been commissioned by Co-operatives UK and The Co-operative Group to undertake an assessment from published sources and third party contacts to identify issues that community energy projects face with network ("grid") connections. In particular we have been asked to assess the issues of cost and complexity facing community energy groups and identify potential solutions.

It is widely acknowledged that obtaining a grid connection can be a difficult and expensive process that can be the determining factor between the success and failure of a project. The research has identified a number of particular issues that cause problems for community energy projects and hinder their development.

1.2 Findings

The main findings of this research are the identification of several barriers in the connection and associated pricing process. These are:

- Distribution Network Operators (DNOs) vary significantly in terms of timeliness and consistency and this can have a significant impact on the timescales and costs of projects connecting to the distribution network (DN);
- a number of process issues that could and should be standardised, with the adoption of best-practice by DNOs;
- connection processes are strongly focused on the formal application process and could be significantly improved and a broader dialogue facilitated on possible connection alternatives in advance of triggering formal processes and fixed timescales; high and variable connection cost quotations, dependent upon location, can cause surprises and derail projects; and
- grid reinforcement can also present a very large problem to community energy developers as it has the capability of significantly increasing costs.

The DNOs have made some positive progress in improving communication with distribution generation (DG) customers generally, especially through annual DG Forum meetings led by the regulator, largely as a result of a new licence condition imposed on them in 2010. But more work is needed to improve the transparency and predictability of grid connection processes and charges, to improve consistency and the communication channels between the DNOs and generators.

The industry (with its regulator) is also trying to develop ways of overcoming these problems, primarily through the Low Carbon Network Fund (LCNF), including methods of reducing the need for grid reinforcement measures by assessing less expensive network management alternatives to reinforcing the grid. It is also researching ways of improving the communication of capacity data by DNOs. These changes cannot, however be relied upon, and the existing regulatory requirements should be updated and reinforced.

Other jurisdictions, notably both Germany and Denmark, have more focused policies than the UK that aim to specifically facilitate community energy, and consequently they have a high proportion of community energy projects. In Denmark the reinforcement costs are socialised and renewables are given priority access to the grid. Germany also offers priority grid access and its connection procedure is transparent and predictable.

These approaches have merit and empirically have delivered high levels of build-out in local energy schemes. While they embed subsidy and in some instances actively discriminate in favour of DG-especially community energy-schemes, without commensurate action in the UK the considerable potential of community energy schemes will not be realised.

1.3 Recommendations

A package of measures is recommended to facilitate the connection of community energy projects to the DN. These are:

1. good practice among DNOs should be identified and codified;
2. there should be a pre-application dialogue with the DNO, for all connections, not solely projects that fall under G59/2, to give an appreciation of the relative importance and interaction of cost, risk and programme management;
3. the connection process should be underpinned by a consultative, iterative process with defined standards of customer service and pro-active information provision by the DNO;
4. DNOs should provide a clear break-down of the costs for community energy grid connection based on standardised costings;
5. there should be facilitated communication between DNOs and community energy projects. This could be provided alongside the DNOs' long term development plans (LTDP), which they are obligated to provide annually. This would act to strengthen the incentive to deliver good customer service through the Broad Measure of Customer Service (BMCS), which is being maintained under the RIIO-ED1; and
6. the communication strategy should be underpinned by a much more comprehensive information portal supported by a help-desk facility that can sign-post key information for community energy developers. Such information should be in plain-English and take on board the fact that many community energy proponents are not energy industry specialists.

While these six informational/ communication remedies will ease the connection process for community energy projects, we believe the following additional deeper measures are necessary to significantly increase the uptake of community energy projects. These include:

7. providing priority grid access to community energy projects;
8. allowing generators to pay back the site-specific costs of connecting a community energy project to the DN over time. One option for this would be for community groups to pay these back through their FiT payments over 20 years;
9. connection offers should be based on standard cost assessments with any differences in actual costs being recovered through general cost recovery by DNOs; and
10. similarly, there should be socialisation of the wider costs of reinforcement works to reduce the financial burden of reinforcement works on one generator.

The combined effect of recommendations 9 and 10 is that the overall cost of achieving connection to the grid should be "shallow", not "deep".

Taken together, these changes would provide a standardised and predictable connection process, giving all community energy projects an equal opportunity independent of location, reducing the effect of the current "postcode lottery". Ideally they would be combined within a single industry standard underpinned by clear unambiguous policy.

2 How community generators connect to the grid

In this section the current rules, processes and costs of how community generators connect their projects to the DN are described.

2.1 The rules

Connection to the DN is currently granted on a first-come-first-served basis, with guaranteed network access only after a connection agreement has been signed.

The Standard Licence Condition (SLC) 14 (Appendix A) applies to all distribution licence holders and ensures that a charging statement that sets out the basis on which charges will be made for use of system and a charging statement that sets out the basis on which charges will be made for the provision of connections to the DNO's distribution system are always available. The licence condition states these should be presented in a format to allow any person to estimate the charges for which they would be liable for using the system.

In an attempt to align all DNOs and standardise the connection process, the connection charging statement must include a schedule listing the costs of items needed for the purposes of connection to the distribution system together with an explanation on how these costs are calculated. The statement must also set out the costs surrounding reinforcement or extension works, the disconnection and removal of power lines, the provision of any equipment needed to enable those party to the *Balancing and Settlement Code* (BSC) to be compliant and any charges for maintenance and repair.

The specific processes by which community energy generators connect to the grid are dependent upon the size of the installation and its configuration (i.e. is the whole installation on one site, or is it spread across several sites).

There are two key tasks an installer must undertake to connect to the DN.

Firstly, the generator, provided it is above 4kW[2], must inform the DNO about the installation (most importantly its location and total installed capacity) before any work is undertaken. Initially this is often via an early stage meeting, usually in the "information phase", but once the project has been planned and this information has been exchanged with the DNO a formal connection application should be submitted. The Electricity Network Association (ENA) has developed a common connection application form on behalf of DNOs and is available on its website[3].

Secondly, the DNO must submit an installation commissioning confirmation which should be completed within 28 days of commissioning the installation, of which a standard version outlining the content and format of the installation commissioning confirmation is available on the ENA website[4]. One form is needed per installation and requires details of the site location, the generator's contact information, details of the installation; the installer's contact information and a list of documents needed alongside the installation commissioning confirmation.

[2] Currently the smallest microgenerators do not need permission from a DNO to connect to the distribution network–they can simply connect and inform the DNO that they have done so. The approach applies up to a total capacity of 4kW. The ENA's Engineering Recommendation G83/1 allows this approach for generators up to 16A/phase.

[3] ENA website http://www.energynetworks.org/electricity/engineering/distributed-generation/distributed-generation.html

[4] Commissioning confirmation http://www.energynetworks.org/electricity/engineering/distributed-generation/distributed-generation.html

2.2 The procedures

The tasks involved in connecting an embedded community generation asset to the DN vary depending upon the size of the installation. In general, larger capacity plants have a more complex connection process due to the increased impact it can have on both the DN and in some cases the transmission network (TN).

To assist with the connection process the ENA has three sets of guidelines[5] to help DGs through the process. To ensure the correct set of guidelines are followed, the ENA's decision tree[6] directs the DG to the most relevant guide for its installation.

The connection process for a small single premises plant under Engineering Recommendation G83/2 consists of five stages:

1. the installer submits an application to the DNO;
2. the DNO assesses the impact of the generating plant on the DN and prepares a connection design if needed;
3. the DNO confirms if network reinforcement is needed prior to the generating unit being installed;
4. the DNO approves the application and installation and commissioning can take place; and
5. the installer notifies the DNO of the commissioning and submits supporting information within the prescribed 28 day period.

The connection process for multiple premises is also under Engineering Recommendation G83/2. However, there is one key difference—multiple sites must get approval from the DNO before they can connect.

The connection process for a larger development utilises guide G59/2[7], also with the five key stages, although this connection process requires greater communication with the DNO as the generation will likely have a greater impact on the DN. Again the DNO's explicit agreement on the connection procedure must be sought prior to the commencement of work, there is a strong emphasis on the formal application process.

The guidelines are currently believed to be under review.

The ENA also provides contact details for parties considering connection for all DNOs.

2.3 Costs of connection

Network connection costs are an important part of the total project costs for any DG scheme.

Primarily there are two costs/ charges.

The first is a one-off connection charge, which covers the cost of work and equipment used to make the connection (Licence Condition 14). DNOs have an obligation to publish a *Statement of Methodology and Charges for Connection*, these are published annually and describe the basis of DNO's connection charges and charging methodology. The principles underlying the statements must be approved by Ofgem.

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[5] ENA guidelines http://www.energynetworks.org/electricity/engineering/distributed-generation/distributed-generation.html. These guidelines were introduced in 2009-10 following a major service of a technical guide originally introduced in 2004, which in turn reflected a new condition in the distribution licence.

[6] ENA decision tree http://www.energynetworks.org/modx/assets/files/electricity/engineering/distributed%20generation/Jan%202013/Way%20in%20-%20decision%20tree%20-%20Jan2013.pdf

[7] ENA guidelines G59/2 http://www.energynetworks.org/modx/assets/files/electricity/engineering/distributed%20generation/Jan%202013/DGCG%20G59%20Jan2013.pdf

These documents follow a similar format across the DNOs and are available on each of the DNO's website. This document contains the DNO's connection charging methodology, including how it calculates its charges, it charging statement, an indication of the costs involved with providing a connection quotation, and any other relevant costs for connecting customers.

The second is use of system charges, and these are on-going charges which cover the cost of reinforcement and operations and maintenance costs (Licence Condition 13A and 13B). These costs are not uniform; they are location specific and can vary dramatically depending upon capacity available on the network. These "GDUoS" charges have been levied by DNOs since 2005 – prior to that point all costs other than connection charges were recovered through upfront capital contributions.

In addition to charges for reinforcing the network, the DNO's connection charge also incorporates the connection application, system feasibility and fault level studies, the provision of wayleaves, additional meetings with DNOs or site visits and administration costs during the process.

3 Issues with connection

In this section we identify the issues that DG connections face when connecting to the DN.

3.1 Context

Despite the DG connection process seeming relatively simple and easy to follow, there are many variables, including location and capacity. Difficulties are encountered when the network is not capable of carrying the additional generation. If "spare" capacity is not available the connection process can become more arduous and complex. The ease of which these can be overcome is heavily dependent upon the efficiency of the DNO in dealing with applications and the amount of "stress" on the network. The number of applications it is dealing with at any particular point in time can also be a factor.

The following issues have been identified:

- complexity of connection including process issues and provision of information;
- cost of connection; and
- opacity of connection costs.

3.2 Connection processes

The complexity of a connection is largely dependent upon the capacity of the installation. In the case of community energy projects this is usually relatively small; however, with the proposed plans to increase the FiT threshold to 10MW, we anticipate this will rise in the future.

The process is also dependent upon the location of the project. In areas where the DN has "spare" capacity the connection procedure becomes a lot simpler and less costly. However, usually community energy projects do not have an option of location due to their nature; it is a "postcode lottery" as to whether there is available capacity on the network, relating directly to the cost of connection.

Larger DG projects in Scotland that may impact on the transmission network have to obtain a bilateral embedded licence exempt large agreements (BELLA) with National Grid[8]. These projects will also require the DNO to provide a statement of works to National Grid. This can increase the complexity of the connection process considerably. Work is underway by some DNOs to simplify the process for DG applications that may impact on the transmission system (statement of works).

[8] A bilateral embedded generation agreement (BEGA) only applies to projects over 100MW connected to the distribution system that will impact upon the transmission system. It is a contract between National Grid and the DNO.

There are process issues that persist, including a lack of transparency, inconsistent communication, and poor customer service. Different DNOs still take different actions in improving the provision of information from the application stage onwards. These include:

- different information on fault levels and thermal capacity and primary and secondary 11kV network data;
- indicative connections costs and timescales; and
- contact points and follow-ups.

To assist with this assessment, we have reviewed the online information offered by DNOs. In general this has improved considerably over recent years, especially in the light of work by the DG Forum under Ofgem's direction. Points we would highlight are:

- all DNO websites now allow for full open access to broadly similar types of connections information, though one DNO (ENW) requires registration to access certain parts of the site;
- some sites are much more user friendly and clearly sign-posted (Northern Power Grid and UK Power Networks seemed to be "best in class"; ENW was felt to be worst);
- connection processes are comparable but still differently described. Some are more user friendly than others;
- likely timescales are provided by only two DNOs; and
- information on indicative pricing is also variable, with two DNOs providing none.

We would also highlight a number of issues.

The formal application process does not allow for discussions around options and cost drivers (connection "optioneering"). In particular, prospective connecting parties often want to know what capacity is available without triggering reinforcement. However, the current framework does not allow for initial discussions on the options, and an iterative application process is needed.

Other informational improvements are needed, including:

- comprehensive listing of DNO information that developers can expect;
- common supporting documentation for both hard (written) and soft (online) applications; and
- route maps to regulatory requirements and documentation.

In its recent *Call for Guidance* DECC sought views on development of an information hub or portal. We support this idea. At the very least, the ENA should as a minimum significantly upgrade its own information provision and also enforce minimum standards and levels of consistency between DNOs.

3.3 Cost of connection

The significant cost of connecting an installation to the DN is an issue for community energy projects as funds are often limited. The cost is site-specific and highly variable. In the main, the cost of connection is dependent upon the amount of capacity already connected to the network and/ or if any reinforcement is needed to facilitate the additional capacity. Location also plays an important part in determining the cost- the larger the distance between the site and the host's network, the greater the cost is likely to be.

The DNOs set out which connection costs are contestable and non-contestable. Despite these costs being site-specific, they can vary significantly for the same location depending upon the amount of "spare" capacity. Costs are also dependent upon whether the network needs to be reinforced prior to the connection of the installation. It is this variation in cost that presents problems to community energy projects, as it is not possible to budget for factors they are unaware of.

Cornwall Energy has accessed project details, including connection costs, for 21 community energy schemes[9]. These demonstrate how the cost of connection can vary substantially between projects, ranging from a total of £150,000/MW to almost £7.4mn/MW. In the time available it has not been possible to analyse these costs in any detail. However, it is clear that there are significant differences in how the DNOs apply the rules. The process would be greatly enhanced if DNOs applied common approaches to estimating indicative costs.

Of the community energy projects with grid connection issues, 19 reported very expensive connection costs being the primary cause of delays or causing projects to be abandoned, despite the majority having a capacity less than 1MW. Further details of these example projects can be seen at Appendix B.

To overcome the large connection costs, many of the projects that went ahead ascertained the level of capacity that could connect to the grid without reinforcement and scaled their projects down accordingly to ensure they were financially viable.

3.4 Opacity of connection costs

The process of connection is clearly set out step-by-step by the ENA and DNOs. However, information on the costs for each specific process of the connection procedure and a breakdown of how connection costs are achieved is notably absent from any of the guides or DNO's websites.

At the DG Forum event held in London on 22 October 2012 DNOs were criticised by industry body Renewable UK for the opacity of information available for connection charges along with the onerous and inflexible application process. Information was considered to be often inadequate for LV connections. Many technical requirements on which information was often sought by the DNO were considered to be unexplained.

The DNOs have since developed maps showing areas of available capacity on their networks, but these still need to be improved to provide quantitative information rather than qualitative. Information on a site-specific basis would also be of greater value to community energy projects as it would provide the information needed to establish "spare" capacity in the vicinity of its project.

As identified in DECC's *Community Energy Call for Evidence,* the inconsistencies between the different DNO's methods of approaching grid connection requests poses a problem. Greater transparency of costs was also a request of community energy groups in addition to regular DNO engagement. This is important as it allows community groups to plan in advance and realise the possible financial restrictions.

3.5 Technical challenges

The most influential technical challenges to the DG connection process include network reinforcement, DNO delays, and DNO communication; these all impact on the cost and complexity of the connection process.

3.5.1 Network reinforcement

At present, generation connecting to the grid is granted approval on a first-come-first-served basis, resulting in a scenario where an early application for a small/ minor connection can constrain the development of other potentially larger opportunities in the same area, effectively "sterilising" parts of the network. Alternatively, if the network is operating at full capacity it will need to be reinforced. Grid reinforcements, required to support the additional capacity entering the grid at a specific location, are identified by the DNOs for areas that are already operating at or near peak capacity. The increasing use of the DN and the connection of DG can affect the power flow, voltage profile and fault level of a specific network. The need for reinforcement is assessed during the early stages of developments but often entails

[9] Community energy projects with experience of grid connection issues were specifically targeted.

high unavoidable costs if the connection is to go ahead. These costs are not split equally among generators using the system, but initially are placed solely on the next generator seeking connection, creating a problem if it is a community project.

This problem of grid reinforcement usually, but not solely, resides in rural areas which are often rich in sites for renewables projects but encounter problems with weak grid networks. These are often the prime areas for community energy projects. In most circumstances the definition of a community group distinguishes a group of people by their geographical location. These differ from developers who have the capability to relocate a project to where the best resource is or easiest grid connection, for community groups' choice of location is not usually an option.

Should community energy groups be subjected to network reinforcement, the socialisation of this aspect of connection costs would reduce its impact. By spreading the cost of reinforcement across all generators, projects are not faced with high upfront connection costs, the decision to reduce the capacity of projects to enable a connection without the need for reinforcement (Appendix B), or to cancel a project because of the high connection costs.

3.5.2 DNO delays

The mis-alignment of planning and connection timescales is also an issue experienced by many generators wishing to connect to the DN. Prior to a developer accepting a grid connection offer, it will require planning permission–otherwise it may find itself out of pocket. Planning approvals can take indeterminable amounts of time, whereas grid connection offers are usually only valid for a set amount of time, ranging between one and six months. Should a generator miss its connection offer because of waiting on planning approval, it is possible when they do come to accepting the connection offer the grid constraints will be greater, requiring them to undertake reinforcement.

4 Industry developments

In this section the current industry developments in helping overcome DG connection issues are summarised.

4.1 Low Carbon Network Fund

One objective of the LCNF is to investigate means by which to connect DG to the DN without the need for expensive reinforcement. Many of the DNOs have identified alternative methods, the details of which are set out below.

The issue of weak networks in rural areas, where there is often good potential for DG build, has been identified by Western Power Distribution. It has investigated how new network technologies can increase the capacity of wind generation that can be connected to a rural network by looking to improve the network in advance of requirement. This is aimed at providing generators with a connection at a reduced cost in comparison to conventional reinforcement.

The Flexible Urban LV Networks Trial is a project specifically initiated to reduce the need for network reinforcement and consequently the connection time and cost involved. The key objective of the trial was to release capacity onto the high voltage network enabling greater connection of renewables onto the low voltage networks without the need for any reinforcement.

The UK Power Networks Flexible Plug and Play project aims to demonstrate how, through the integration of technological techniques and commercial solutions, a cost effective connection of DG to constrained parts of the DN can be achieved. It has successfully built, tested and commissioned a technical platform and plans to develop an investment model for connecting renewable generation to the DN.

Scottish Power Networks is researching methods to reduce the time taken and the cost of connecting DG. This Tier Two LCNF project aims to provide those seeking a connection to the DN with a richer source of information which will inform on the available capacity on the network at a particular point. Through the use of a portal, it will provide "real time" demand and network generation capacity to those seeking a connection to the DN. The ARC project explored how network innovation can support DG gain access to the network by providing managed or coordinated generation output directly linked to local demand, reducing the need for network reinforcement where a network constraint is identified.

Another key area explored by the LCNF projects is the availability and transparency of data. The New Thames Valley Vision Tier Two project from SSE is focused on the low voltage network and aims to demonstrate how the DN can better serve its customers by understanding, anticipating and supporting their energy use as they move towards low carbon technologies. It aims to forecast where capacity might connect to the network.

These are all worthwhile projects with the potential for guiding future development policies and the implication of new and best practice among DNOs. However, innovation incentives should not be limited to specific funded schemes.

4.2 DNO business plans

The SLC 25 took effect from 1 April 2010 and ensures licensees make information publicly available to those wishing to connect to the DN (Appendix C). In the DNOs' business plans for RIIO ED1[10] many reiterated the importance of improving communication by means of extending contactable hours. UK Power Network (among others) claimed it is seeking to maintain community engagement[11].

In general, the DNOs have committed to reduce the time taken to connect, improve communication channels with customers, and improve availability and transparency of connection costs. Some DNOs are planning to introduce compensation for quotation, delivery and connections.

Northern Power Grid identified during the DG Forum in London on 22 October 2012[12] the need to improve its communication with generators, this it proposed to do via its website.

4.3 DG Standards Direction

The DG Standards Direction took effect from 1 October 2010 and applies to all distribution licence holders in their dealings with DG customers. The DG Standards fall within SLC15 (Appendix D) and has three main conditions for DNO interactions with customers: the provision of budget estimates for generation connections; the provision of quotations for generation connections and post connection scheduling and completion of works; and energisation of generation connections. These conditions set out the timescales and circumstances in which DNOs must provide customers with a budget estimate, a quotation for the connection and a schedule for completing the connection.

Budget estimates must be provided within 10 working days for a connection of less than 1 MVA and 20 working days for connections over 1 MVA upon receiving a customer request and the appropriate information to do so. Connection quotations must be provided where a customer requests the offer of terms for making a connection. The quotation must be given with 45 working days for a LV connection and 65 working days for a HV and EHV connection. When a DNO receives written acceptance of a quote and payment it must provide a schedule of works within 7 working days for LV connections; 10 working days

[10] Ofgem RIIO ED1 Business plans https://www.ofgem.gov.uk/network-regulation-%e2%80%93-riio-model/riio-ed1-price-control

[11] UK Power Networks Business Plans http://library.ukpowernetworks.co.uk/library/en/RIIO/RIIO_ED1_Business_Plan/UKPN_Overall_Executive_Summary.pdf

[12] DG Forum https://www.ofgem.gov.uk/electricity/distribution-networks/connections-and-competition/distributed-generation

for a HV connection and 15 working days for an EHV. The DNO must comply with the timescales set-out within the schedule.

The DG Standards Direction provides an important back-stop requirement for a minimum level of customer service timescales. The separation of connection types by size benefits smaller generators and community projects. However, the timescales specified are generous and the Direction sets no obligations in relation to the other aspects of customer service.

4.4 DG Forum

To address issues faced by DGs in navigating the connection process, Ofgem organised a series of regional stakeholder events. At the forum held on 22 October 2012 industry body Renewable UK criticised the DNOs over the opaque nature of the information available for connection charging, an onerous and inflexible application process and inadequate levels of information for low voltage connected projects.

The National Farmers' Union raised the issue of grid connection being a "postcode lottery" for DG, noting that up to £250,000 had been charged to connect a single wind turbine. Similarly to farm developments, community energy installations have a very limited choice of location.

A general consensus from DG stakeholders at the forum was for DNOs to improve their websites to make them more accessible, easily navigable and jargon-free.

On behalf of the DNOs and the ENA a representative assured DGs the DNOs were committed to developing a work plan to remedy these issues.

4.5 Customer service

To encourage DNOs to deliver good customer service the Broad Measure of Customer Service (BMCS) is being maintained under the RIIO-ED1[13]. This measure consists of three elements: a customer satisfaction survey; complaints metric; and a stakeholder engagement incentive. Also included in RIIO-ED1 is a package of incentives aimed at encouraging better DNO service for customers connecting to the network. These measures include: a time to connect incentive and an incentive on connections engagement (ICE).

The survey is designed to improve all aspects of a DNO's customer service. It will include a common target and maximum reward/ penalty scores for all DNOs and all categories of customer. The incentive rate is set by the maximum reward/ penalty exposure divided by the difference between the target and the maximum reward/penalty score. Also included is a penalty of 0.02% of base revenue for each 1% of total calls that are unsuccessful.

The complaints matrix is designed to mimic the effects of competition and encourage DNOs to resolve complaints quickly. The penalty incentive rate for this will be set by dividing the total revenue exposure by the difference between the maximum penalty score and the industry target score.

The time to connect incentive aims to encourage DNOs to reduce the overall time to connect smaller LV connections to the DN. This incentive operates on a reward only basis, with the maximum reward exposure set at 0.4% of base revenue, with 0.1% base revenue reward exposure each for the time to quote and time to connect.

The ICE is a new incentive that aims to ensure DNOs focus on understanding and meeting the needs of major connection customers. The maximum penalty that can be incurred under this incentive is 0.9% of annual base revenue.

The strengthening of related incentives is an admiral aim that should only result in improved levels of services. The fixing of targets to encourage the sharing of best practice among DNOs is a welcome addition to the incentives.

[13] https://www.ofgem.gov.uk/publications-and-updates/consultation-riio-ed1-customer-service-and-connection-incentives

4.6 International comparison

As noted in DECC's *Community Energy Call for Evidence*[14], other European countries have more focused policies to support community energy projects. Community energy projects in both Denmark and Germany operate at a much larger-scale than in the UK.

In Denmark costs of DG connections are socialised and renewables receive priority grid connection, conventional energy generation are obliged to reduce their feed-ins if necessary. This priority is despite the changes to government policies in the last 10 years, in part due to the clear grid connection policy it has in place. Under the arrangement of priority grid access, turbine owners pay to connect to the nearest technically suitable point of the grid, and utilities pay if the grid requires reinforcement.

The grid connection procedure in Germany is transparent. Once a connection application has been submitted, the generator receives a detailed timetable for the establishment of grid connection, on request the grid system data required to test the grid and a cost estimate within eight weeks of submission. Renewables also receive priority access to the grid in Germany and approximately 50% of renewable energy projects are community-owned. However, grid operators are required to purchase power from renewable energy generators and to extend and reinforce the grid where necessary to provide access for renewable energy generators.

Denmark and Germany are not alone on priority grid access for renewables, it should be noted that approximately a third of European countries provide renewables with priority access to the grid, including Italy and Spain. This is successful for these countries, and we believe there is the potential for a similar policy to be successful when applied to community energy projects.

In areas of limited "spare" capacity, community energy projects would receive priority access to the grid over other generation, reducing the likelihood that network reinforcement is required, therefore reducing the costs and providing collateral benefits in terms of timing for connection.

5 Recommendations

A package of measures is recommended to facilitate the connection of community energy projects to the DN. These are:

1. good practice among DNOs should be identified and codified;
2. there should be a pre-application dialogue with the DNO, for all connections, not solely projects that fall under G59/2, to give an appreciation of the relative importance and interaction of cost, risk and programme management;
3. the connection process should be underpinned by a consultative, iterative process with defined standards of customer service and pro-active information provision by the DNO;
4. DNOs should provide a clear break-down of the costs for community energy grid connection based on standardised costings;
5. there should be facilitated communication between DNOs and community energy projects. This could be provided alongside the DNOs' LTDP, which they are obligated to provide annually. This would act to strengthen the incentive to deliver good customer service through the BMCS, which is being maintained under the RIIO-ED1; and
6. the communication strategy should be underpinned by a much more comprehensive information portal, supported by a help-desk facility that can sign-post key information for community energy

[14] Community Energy *Call for Evidence*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207920/community_energy_call_for_evidence.pdf

developers. Such information should be in plain-English and take on board the fact that many community energy proponents are not energy industry specialists.

While these six informational/ communication remedies will ease the connection process for community energy projects, we believe the following additional measures are necessary to significantly increase the uptake of community energy projects. These include:

7. providing priority grid access to community energy projects;
8. allowing generators to pay back the site-specific costs of connecting a community energy project to the DN over time. One option for this would be for community groups to pay these back through their FiT payments over 20 years;
9. connection offers should be based on standard cost assessments with any differences in actual costs being recovered through general cost recovery by DNOs; and
10. similarly, there should be socialisation of the wider costs of reinforcement works to reduce the financial burden on reinforcement works on one generator.

The combined effect of recommendations 9 and 10 is that the overall cost of achieving connection to the grid should be "shallow", not "deep".

Taken together, these changes would provide a standardised and predictable connection process, giving all community energy projects an equal opportunity independent of location, reducing the effect of the current "postcode lottery". Ideally they would be combined within a single industry standard underpinned by clear unambiguous policy.

Appendix A: SLC 14. Charges for Use of System and connection

This condition ensures that the DNO's two charging statements, which charges will be made for use of system and which charges will be made for the provision of connections to the DN, are available at all times in a form approved by the authority.

Compliance of charging statements with charging methodologies

Except with Ofgem's consent the charging statements must:

- in the case of the *Use of System Charging Statement* be prepared in accordance within the meaning of standard condition 13, 13A or 13B; and
- in the case of the *Connection Charging Statement* be prepared in accordance with relevant charging methodology within the meaning of standard condition 13.

Other general requirements in relation to the charging statements

Except with Ofgem's consent the charging statements must:

- be presented in a manner that would enable any person to make a reasonable estimate of the charges for which they could become liable in respect of use of system or the provision of connections to the DNO's distribution system; and
- be published in a way to ensure adequate publicity.

The charging statements must be reviewed annually and any necessary changes to ensure the information is accurate in all respects must be made at least once in every regulatory year. In addition the DNO must provide a copy of the charging statement when requested, although a charge may be made for this service (without exceeding that set out by Ofgem).

Use of System Charging Statement

The DNO must include in its *Use of System Charging Statement* a schedule of charges, a schedule of adjustment factors to be made for distribution losses, charges which may be made in respect of administrative costs, charges made for providing and installing an electrical plant at entry or exit points and the maintenance of such plant. A DNO must also include information of any use of system rebates given or announced in the preceding 12 months.

Every arrangement entered into by the DNO with the purpose of providing use of system must ensure the DNO's use of system charges comply with the *Use of System Charging Statement* in the form in which it is in force at the time except in specific circumstances with Ofgem's consent.

Prior to making any amendments the DNO must provide Ofgem with a revised *Use of System Charging Statement* setting out the changes and implementation dates.

Before any modification of its use of system charging methodology comes into effect the DNO must provide Ofgem with the revised *Use of System Charging Statement* setting out the amended charges and the date from which they come into effect.

The DNO must not give Ofgem a notice setting out those proposals or send a copy of a notice to any person who has entered into an agreement within three months of the proposed date amend its use of system charges in respect of any agreement for use of system. The DNO can only amend its use of system charges if it has given notice of the proposed amendment and when made the amendment conforms to proposals set out in the notice except with Ofgem's consent.

Connection Charging Statement

A DNO must include in its *Connection Charging Statement* a schedule that lists items of significant cost that are likely to be required for connection. The statement must also set out the costs surrounding reinforcement or extension works, the disconnection and removal of power lines, the provision of any

equipment needed to enable those party to the *Balancing and Settlement Code* (BSC) to be compliant and any charges for maintenance and repair.

Every arrangement entered into by the DNO for the purpose of providing a connection or modifying an existing connection must ensure the charges comply with the *Connection Charging Statement*.

These charges are to be set at a level that enables the DNO to recover the appropriate proportion of the costs incurred when carrying out any works for extension or reinforcement of the DN or for the provision of maintenance, repair and replacement or removal of lines or plants following disconnection.

To determine the proportion of cost, the DNO must have regard for the future benefit either to itself or others from the extension or reinforcement of the DN including its ability to recover these costs from third parties.

The DNO must understand that connection charges:

- do not generally take into account distribution system reinforcement carried out at more than one voltage level above the voltage of the connection;
- do not generally take into account the cost of repair and maintenance;
- may include a small amount of reinforcement on the DNO's DN; and
- will not cover costs that are covered by the use of system charges.

Information on circuit capacity, power flows and loading

It is the responsibility of the DNO to provide if requested a report that shows the current and future circuit capacity, power flows and loading on the areas requested. The report must include:

- information to allow the person who has made the request to identify and evaluate the available opportunities on the DN when connecting; and
- if requested commentary by the DNO that provides its views on sustainability of parts of the system in respect of new connection or additional quantities of electricity.

This report must be given or sent to the person who requested it as soon as possible but within 28 days and within 10 days of receiving the request the DNO may provide an estimate of its costs for preparing the capacity report and its obligation to provide the statement comes into effect when the person requesting the information agrees to pay the amount estimated.

A DNO may with Ofgem's consent omit details about any of the above should Ofgem believe it would compromise the commercial interests of the DNO or third party. The DNO may also omit information that would result in its disclosure placing it in breach of licence condition (Independence of the Distribution Business and restricted use of Confidential Information).

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Appendix B: Example connection costs for community energy projects

Project	Area	Capacity (MW)	Technology	Cost of connection feasibility (ex VAT)	£/MW connection feasibility stage	Connection timescale	Final MW requested connection	final cost of connection	£m/MW final	transmission constrained
1	West Highland	0.182	Hydro	£950,000	£5,219,780	2020	0.09	£21,201	£116,489	yes-2020 earliest
2	Caithness	2.7	wind	£500,000	£185,185	2020	2.7	£1,321,896	£489,591	yes- 2020
3	Dumfries	0.5	AD	£1,300,000	£2,600,000		dna	dna	dna	not known
4	West Highland	2	Hydro	£5,250,000	£2,625,000	2018	dna	yes	dna	yes- probably 2018
5	West Highland	0.9	wind	dna	£0	2020	0.9	no data available	dna	yes- 2020
6	West Highland	0.9	wind	dna	dna	2018	0.9	£498,782	£554,202	yes - 2018?
7a	Argyll	0.3	Wind	£200,000	£666,667	2015	dna	dna	dna	2015
7b	Argyll	0.9	Wind	£230,000	£255,556	2015	dna	dna	dna	2015
7c	Argyll	1.8	Wind	£320,000	£177,778	2015	dna	dna	dna	2015
8a	Argyll	0.1	Wind	£100,000	£1,000,000	2017	0.1	£175,951	£1,759,506	2017
8b	Argyll	0.5	Wind	£3,720,000	£7,440,000	2017	dna	dna	dna	2017
8c	Argyll	0.9	Wind	£3,730,000	£4,144,444	2017	dna	dna	dna	2017
9	Argyll	0.4	Hydro	dna	dna	2014	0.4	£215,000	£537,500	no longer transmission constrained-2014
10a	Argyll	0.33	Wind	£500,000	£1,515,152	2017	0.33	£220,000	£666,667	no longer transmission constrained-2014
10b	Argyll	0.9	Wind	£3,000,000	£3,333,333	dna	dna	dna	dna	2016
10c	Argyll	2.7	Wind	£3,200,000	£1,185,185	dna	dna	dna	dna	2016
11a	Argyll	0.675	Wind	£100,000	£148,148	dna	dna	dna	dna	2015
11b	Argyll	0.25	Wind	£800,000	£3,200,000	dna	dna	dna	dna	2015
11c	Argyll	1.125	Wind	£1,150,000	£1,022,222	dna	0.9	£218,000	£242,222	2015
12	Argyll	6.9	Wind	£1,200,000	£1,066,667	2015	6.9	£1,893,547	£274,427	2016

Project	Area	Capacity (MW)	Technology	Cost of connection feasibility (ex VAT)	£/MW connection feasibility stage	Connection timescale	Final MW requested connection	final cost of connection	£m/MW final	transmission constrained
13	Western Isles	0.9	Wind	dna	dna	dna	0.9	£577,570	£641,740	connected
14	North Wales	0.27	Hydro	£150,000	£555,556	dna	dna	dna	dna	dna
15	North Wales	0.185	Hydro	£156,000	£843,243	dna	dna	dna	dna	dna
16	North Wales	0.099	Hydro	£154,000	£1,555,556	dna	dna	dna	dna	dna
17	Wales	1.8	Wind	£500,000	£277,778	dna	dna	dna	dna	dna
18	Scotland	4.6	Wind	£2,300,000	£500,000	dna	dna	dna	dna	dna
19	Scotland	0.5	Wind	£1,200,000	£2,400,000	2016	dna	dna	dna	dna
20	England	1.5	Wind	£500,000	£333,333	dna	dna	dna	dna	dna
21	East Sussex	0.25	Solar	£70,000	£280,000	dna	dna	dna	dna	dna
22	dna	1.1	Solar	£600,000	£545,455	dna	dna	dna	dna	dna
23	dna	0.225	Solar	£53,000	£235,556	dna	dna	dna	dna	dna
24	dna	0.04	Solar	£1,500,000	£37,500,000	dna	dna	dna	dna	dna
25	South West England	0.225	Wind	£16,853	£74,902	dna	dna	dna	dna	dna
26	South Wales	4	Wind	£270,000	£67,500	dna	dna	dna	dna	dna

dna = data not available

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Appendix C: Condition 25A. Distributed Generation: Connections Guide and Information Strategy

Introduction

This condition applies on and after 1 April 2010 for the purpose of ensuring that the DNO:

- makes information available in the public domain that will assist any person who might wish to enter into arrangements with the DNO that relate to the connection of DG to the DNO's Distribution System ("DG connections") to understand and evaluate the process for doing so; and
- implements a DG Information Strategy in respect of that information and also of other information more generally related to DG connections.

Scope and contents of the DG Connections Guide

Where Ofgem gives the DNO a direction to do so, the DNO must work collectively with such other DNOs as are also subject to a direction under this condition ("relevant DNOs") to prepare and maintain a common set of documents, approved by Ofgem and to be known as the DG Connections Guide, that:

- is in such form as may be specified in the direction for the purposes of this condition; and
- contains such information as the DNO can reasonably provide that identifies or relates to the matters specified in paragraph 25A.3.

25A.3 Those matters must (without limitation) include:

- details of the statutory and regulatory framework (including health and safety considerations) that applies to DG connections;
- the likely costs, charges, and timescales involved in the application process typically operated by Electricity Distributors in respect of such connections;
- details of the arrangements and opportunities available for competitive activity in the provision or procurement of such connections; and
- engineering and other technical matters relevant to the commissioning, energisation, and maintenance of such connections.

SLC 25A.4:

the DNO must, together with other DNOs:

- Prepare and issue the DG Connection Guide, as approved by Ofgem, within a period of three months after the date of the Ofgems direction; and
- Except with Ofgem's consent, review and where appropriate revise the Guide in each following Regulatory Year to ensure that, so far as is reasonably practicable the information contained in it is up to date and accurate in all material respects.

DNO's DG Information Strategy

Where Ofgem gives the DNO a direction to do so, the licensee must prepare a DG Information Strategy, for the approval of the Regulator, which sets out how the DNO intends to ensure that all existing and potential users of its Distribution System are able to receive an adequate level of information and a satisfactory standard of service in relation to the DG connections process and matters relevant to it.

The DNO must submit the DG Information Strategy for the approval of Ofgem within the time period set out in the direction (which must not be a period of less than 28 days).

In particular, the scope and contents of the DG Information Strategy must cover how the DNO will provide information to all such users, by type of user, in a form and manner tailored to their particular needs and designed to help them to:

- understand the DG connections process and the likely range of the costs and timescales involved in obtaining such connections;
- form an indicative view, by reference to the likely costs and timescales involved, of the most (and the least) advantageous locations within the DNO's Distribution Services Area in which to obtain such connections;

- understand in appropriate detail the connection opportunities available to DG schemes in a specified locality within that area, and the factors driving any constraints;
- make an indicative assessment of the connection costs applicable to any specific DG scheme within that area; and
- request a formal quotation for the connection of a specific DG scheme to the DNO's Distribution System.

The DNO must implement its DG Information Strategy, as approved by Ofgem, with effect from such date as may be specified by the Regulator when it approves the Strategy.

Review and revision of the DG Information Strategy

The DNO must review its DG Information Strategy at least once a year with a view to ensuring that it remains fit for the purposes envisaged by paragraph 25A.5 and, with the consent or at the direction of Ofgem must make any changes to the strategy that may be necessary to enable it to better achieve those purposes.

Procedure for directions under this condition

Before Ofgem gives a direction under this condition, whether in accordance with paragraph 25A.2 or 25A.5, it must inform the DNO of its intention to do so in a Notice that**:**

- states the date on which it is proposed that the direction should take effect;
- sets out the proposed contents of the direction with respect to the form in which the DG Connections Guide or the DG Information Strategy (as the case may be) is to be prepared and maintained for the purposes of this condition; and
- specifies the time (which must not be less than a period of 28 days from the date of the Notice) within which representations with respect to the proposed direction may be made.

Ofgem must consider any representations that are duly made and are not withdrawn.

A direction under this condition, whether in accordance with paragraph 25A.2 or 25A.5, may be given at any time in a Regulatory Year.

Availability of the Guide and the Strategy

The DNO must give Ofgem a copy of the DG Connections Guide and the DG Information Strategy and of each revision of either document.

The DNO must also:

- give or send a copy of the DG Connections Guide to any person who requests one and who makes such payment to the DNO as it may require (which must not exceed such amount as Ofgem may from time to time approve for that purpose in respect of the document); and
- publish the DG Connections Guide in such manner as the DNO believes will ensure adequate publicity for it (including by making it readily accessible from the DNO's Website).

Consolidated conditions are not formal Public Register documents and should not be relied on

Interpretation

The requirements of paragraphs 25A.10 and 25A.11 may be satisfied by action taken before, as well as by action taken after, the commencement of this condition.

In this condition, DG has the meaning given in Charge Restriction Condition 2 (Definitions for the Charge Restriction Conditions) and DG is to be read as a reference to that term.

Appendix D: SLC 15A. Connection Policy and Connection Performance

Ofgem may issue a DG Standards Direction for the purposes of this condition in accordance with the provisions of Part I below:

- The DNO must comply with the requirements of a DG Standards Direction;
- A DG Standards Direction is a direction the purpose of which is to ensure that with effect from 1 October 2010 there are standards of performance in place in relation to DG Connections that are equivalent to the standards of performance prescribed for the licensee by the Connection Regulations in relation to the demand connections to which those regulations refer.

Accordingly, a DG Standards Direction must, in particular, include provision for**:**

- the specification of the standards of performance that are to apply to DG Connections in relation to the matters and activities covered by regulations 4, 6 and 9 of the Connection Regulations in respect of demand connections;
- the DNO's performance of those standards within prescribed periods or by reference to agreed dates that are defined in terms consistent with the definitions given to those terms in the Connection Regulations in respect of demand connections;
- the exemption of the DNO from the specified standards of performance in relation to DG Connections in the same terms as apply under regulation 15 of the Connection Regulations in respect of demand connections;
- extensions of time in relation to those standards of performance as they apply to DG Connections in the same terms as apply under regulation 16 of the Connection Regulations in respect of demand connections;
- the resolution of disputes between the DNO and DG Operators in relation to any of the matters covered by sub-paragraphs (a) to (d); and
- any other matters in relation to the achievement of standards of performance in relation to DG Connections that are consistent with, or incidental to, the fulfilment of the purpose described in paragraph 15A.18 above.

Subject to paragraph 15A.21, a DG Standards Direction may also require the licensee to give undertakings to Ofgem as to the circumstances in which, and the levels at which, compensation will be payable to DG Operators in respect of contraventions of the standards of performance imposed by the direction.

The circumstances giving rise to a requirement to pay such compensation, and the levels of the compensation payable, must be consistent with those that apply under the Connection Regulations to contraventions of the standards of performance prescribed by those regulations in relation to the demand connections to which they refer.

Part I: Procedure for issuing a DG Standards Direction

A DG Standards Direction may be issued by Ofgem at any time up to and including 30 June 2010, but may not take effect before 1 October 2010.

Before issuing a DG Standards Direction, the Regulator, by Notice given to all Electricity Distributors, must**:**

- state that it proposes to issue the direction and specify the date on which it proposes that it should have effect;
- set out the text of the direction and Ofgem's reasons for proposing the direction; and

- specify the time (which may not be less than 28 days from the date of the Notice) within which representations or objections with respect to the proposal may be made.

Ofgem must consider any representations or objections that are duly made and not withdrawn.

The requirements of paragraphs 15A.23 and 15A.24 may be satisfied by action taken before, as well as by action taken after, the commencement of this condition.

Part J: Amendment procedures for a DG Standards Direction

Notwithstanding any other provision of this licence, a DG Standards Direction duly issued in accordance with Part I above may only be amended in accordance with the procedures that would apply to that direction if it were in fact a standard condition of this licence subject to modification under section 11A of the Act.

Part K: Derogations

Ofgem may, after consulting with the DNO, give a direction ("a derogation") to the DNO that relieves it of its obligations under this condition to such extent, for such period of time, and subject to such conditions as may be specified in the direction.