Energy Networks Association - Response to Consultation from Ofgem

Background

Please find below the response from Energy Networks Association to the Ofgem Call For Evidence on Distributed Generation.

About ENA and our members

Energy Networks Association (ENA) represents the companies that operate and maintain the gas and electricity grid network in the UK and Ireland. Serving over 30 million customers, they are responsible for the transmission and distribution network of "wires and pipes" that keep our lights on, our homes warm and our businesses running.

Introduction

This document is the response to the questions asked on Ofgem's 4th August Call for Evidence on Distributed Generation visibility.

The response has been co-ordinated by WS2 of the Open Networks Project, on behalf of ENA. It includes input from relevant Open Network areas including WS2 and WS1B as well as other ENA coordinated groups including the Energy Data Working Group, the LCT Working Group and the ITCG.

As well as this ENA co-ordinated response, it is anticipated that network companies will also provide individual responses to the Call for Evidence.

General Comments on Responses

The questions focus on the collection and dissemination of DG data and the related costs to do this. As well as collecting further DG data, and making this more widely available to electricity industry stakeholders, we believe that a key means to improving whole electricity network resilience will be the increased exchange of data between network companies (e.g. DNOs and ESO) so that there is greater whole network visibility and awareness when planning and operating electricity networks.

Ofgem Questions & Responses

- *DCUSA modification DCP350 will provide data on a number of characteristics for DG greater than 1MW. Are there additional characteristics for DG, such as real-time MW/MVAr output, load factors and protection settings, which would aid in the prevention of, live management, and recovery from loss of supply events?*

In general, the more data that is available from DG to electricity network companies, the better that network companies can plan, develop, and operate networks for a range of different purposes, including the management of loss of supply situations.

Whole network operation will be improved by collecting further DG data and also by sharing additional data between network companies so that the ESO and DNOs are more informed about what DG is connected, what DG is operating at a particular time, what DG is contracted to provide system services etc. With improved sharing of this information between network companies, resilience to loss of supply events is also improved.

Ongoing Open Networks Work

Different areas of ENA's Open Networks (ON) project are already directly involved in i) making DG data more visible (e.g. WS2 Product 1 on Embedded Capacity Registers (ECRs)), and in ii) improving the data exchange between network companies to improve whole electricity network planning and operation including the management of loss of supply events (e.g. WS1B Product 3 on real-time data exchange and WS1B Product 4 on planning data exchange).

Whilst the ECR development in WS2 Product 1, and the planning data changes being delivered through WS1B P4, are primarily focussed on supporting customer and network company planning, much of this data will also enable improved network operational planning and management of loss of supply events. The data exchange being developed under WS1B Product 3 is primarily intended to improve whole network operation including the management of loss of supply events.

Relevant work from these products is detailed below.

Workstream 2 Product 1 – Embedded Capacity Registers

The ON WS2 Product 1 team developed the resource registers that form the basis of the DCUSA modification DCP350 and the ECRs that have subsequently been established. ECRs are updated on a monthly basis and include data on Distributed Energy Resources (DER) including DG greater than 1MW. The ECR requirements largely cover static asset and network data and don't provide a real-time view of DG operation.

For generation greater than 1MW that is already connected to networks, ECRs provide data on the names of the connected parties, generator locations, network connections, generator technology and fuel types and export capabilities. DNOs go further than the requirements of the DCUSA obligations and also publish data on network reinforcements and on the services that are

being provided by DER to DNOs. Information on the services in particular should be helpful in planning how to deal with real-time problems. An illustration of the type of data provided on DER services is shown below.

Distribution Services							
Asset Reference	Aggregated Service? (Yes/No)	Service Reference	Grid Supply Point	Type of Service	MW Provided	Contract End Date	Exclusivity? (Yes/No)
Resource Reference	Yes	CM Zone 1	GSP11	Constraint Management 1	1.000	01/06/2021	No

Further DG Data that might be included in ECRs

The value of extending ECR's to include resources of less than 1MW capacity is being assessed as part of the 2020 ON WS2 Product 1 scope. A number of Use Cases have been identified for such data. These Use Cases and the value that they might provide is being explored with industry stakeholders through to December 2020. If there are incremental benefits identified, further work will be done to assess the potential costs and therefore the feasibility of extending the ECRs to include additional data as part of the ON programme in 2021. One possible Use Case to support the inclusion of this data is improved resilience to, and recovery from, loss of supply events.

Additional data such as DG MW/MVAr operating ranges and voltage control capabilities could be included in ECRs where this can be made available and where there are clear benefits through holding the data. DG protection settings could also be recorded by DNOs and IDNOs at commissioning and maintained in ECRs so that they are available for planning or for network investigations following incidents. These areas of data are not being assessed for inclusion in ECRs at this time but could be considered as part of future ON work if there is shown to be value in sourcing and maintaining the data.

Data on ESO Network Services

The sharing of data on the network services being provided by DER to the ESO is also being considered and may be included in ECRs if feasible and appropriate. Sharing this information will require the ESO to consult with service providers to change their contract terms. To facilitate more quickly the operational co-ordination benefits the ESO is now working with balancing service providers to share their locational information with DNOs. Improved understanding of the DER providing network services will enable network companies to better secure these resources during periods of network disruption including loss of supply events.

Workstream 1B Product 3 – Real Time Data Exchange

Under ON WS1B Product 3 "Real time Data Exchange", the exchange of network data between DNOs, TOs and the ESO is being developed to help manage various network activities including the management of system incidents and loss of supply events. These activities include the operational intertripping of DG to reduce transmission network power flows following transmission faults, the efficient operation of DER within prevailing network conditions and the

avoidance of conflicts between transmission and distribution service requirements.

The data areas that will be exchanged to enable operational intertripping include the levels of DG that are available to be tripped or reduced, the levels of DG in different grid supply point areas and ESO requirements for operational intertripping. The impacts of Active Network Management (ANM) arrangements are also taken into account.

Data exchange between the ESO and DNOs is via ICCP (Inter-Control Centres Communications Protocol) links that are being established. (ICCP links are the preferred means for the secure transfer of data between control centres.)

Currently there is little visibility of DG in real time to the ESO. The N-3 operational intertripping work being reviewed under ON WS1B Product 3 is a major step forward in that DG data is being shared between network companies in real-time to improve whole network operation.

Further areas of data transfer between network companies are also being assessed by WS1B Product 3. These include data on distributed generation operational status, real-time supergrid transformer power flows and information on ongoing ANM arrangements and impacted DG. The exchange of this information will allow greater understanding of neighbouring networks and more efficient whole electricity network operation.

WS1B Product 3 is also assessing what data should be exchanged between the ESO and DNOs in the operational planning phase. This could include expected DG operation, network conditions that might affect DG operation and ongoing network service requirements from DG. The exchange of these areas of data in operational planning timescales from a few weeks ahead of real time to a few hours ahead of real time would allow the ESO, TOs and DNOs to better plan actions to manage contingencies including loss of supply events. Where particular operational risks are identified, additional services and actions can be put in place.

Workstream 1B Product 4 – Planning Data Exchange

Under ON WS1B Product 4 "Planning Data Exchange", further areas of data exchange between transmission and distribution network companies have been developed primarily to improve longer term network planning and investment processes. However, this work should also enable improved network operation and greater resilience to loss of supply events.

This data exchange which is now being taken forward under Grid Code modification GC0139 includes further information on DG. The data exchange will enable networks to be planned for a greater variety of network conditions in addition to the traditional peak demand condition. (E.g. summer minimum demand and peak solar power conditions as well conditions of high and low power transfers across the transmission system.) This will improve operational awareness by assessing a range of different operational conditions ahead of real-time. Where potential loss of supply events are identified, mitigating actions can be planned to increase network resilience.

Obtaining DG Data

One of the difficult issues for network companies is obtaining data from DG. ENA fully endorses the recommendations of the Energy Data Taskforce (EDTF), which should help to address this. ENA has setup a Data Working Group (DWG) to help deliver the recommendations of the EDTF, including leading the delivery of recommendation 5, the Digital Systems Map.

One of the other key recommendations, improved registration and recording of all DER connections (including domestic), is critical so that DG impacts under different conditions and time-of-day can be forecast in real-time. ENA has a number of connection processes (namely the EV and Heat Pump connection process for demand, and G98/G99 connection processes for generation) which could be adapted to better obtain this data. We are considering how we can digitalise these processes going forward and align them to the wider registration strategy recommended by the EDTF. We would encourage Government to accelerate this asset registration recommendation, as progress has been relatively slow.

DG Contact Information

Another area where DG data could be improved is owner/operator contact information. This has been problematic recently in respect of contacting DG and DER regarding Loss of Mains protection and should be more readily available to help manage network resilience.

Customer names and site information for DG and DER greater than 1MW are now published in ECRs based on the data that DNOs hold. These are often based on information gathered through the connections process to establish connection terms. However, these details can change over time as sites are known to change hands from the initial developer and funders to new owners (through acquisitions). As the DNO bills Suppliers for DUoS and not the DER customer, the contact details DNOs holds may become outdated.

To ensure that DNOs and IDNOs maintain up to date and accurate information on the ownership of connected sites, further obligations may be required. These might be placed on DG owners or operators or even Suppliers as these parties maintain contact with the current site owner through registering the export (and import) MPANs and striking contracts for power purchase and other services, with ongoing financial transactions. Some change in this area would be valuable in assisting DNOs in maintaining registers.

- *What value will these additional characteristics provide to improving the planning, security and real time operation of the GB transmission and distribution systems?*

Again, in general, the more data that is available from DG to Electricity Networks, the better that Networks can plan, develop, and operate the Networks. In addition, if network companies can share information with each other on the status of DG, how network conditions may be impacting

DG, and on what DG is providing services, this will improve whole network resilience and management of loss of supply events.

In respect of the Open Networks products outlined in the previous question, the following paragraphs summarise why these products are focussing on the development of particular areas of DG data and data exchange between network companies.

Workstream 2 Product 1 – Embedded Capacity Registers

For further data that might be made available through ECRs, the following value may be accessed:

- Inclusion of DG of less than 1MW capacity would provide additional information on resource types and locations so that system and network risks can be better assessed. In respect of the Use Cases being assessed to understand the value of further data, these already include customer connections, the potential for flexibility services, further capacity market efficiencies and policy effectiveness. A further Use Case exploring the value of improved visibility of DER less than 1MW to network resilience will also be considered.

Workstream 1B Product 3 – Real Time Data Exchange

For further data that might be exchanged between the ESO and DNOs, the following value might be accessed:

- Inclusion of DG operational status and ANM status will enable the ESO to better assess levels of generation at risk from a GB system perspective and enable improved planning for operational contingencies.
- Visibility of GB transmission system actions affecting DG and other DER would enable DNOs to take appropriate actions on D-networks when systems are under stress.
- Visibility of distribution system parameters (e.g. running arrangements) will assist operational decisions on the transmission system where distribution networks are operated in parallel with the transmission system.
- Improved data exchange in the operational planning phase (e.g. expected levels of DG, expected service requirements) will allow the ESO and DNOs to better understand network and DER service risks and put in place additional contingency plans where needed.

Currently there is little visibility of DG in real time to the ESO. The N-3 operational intertripping projects are an early step in this area of data exchange and will provide improved management of transmission circuit faults.

Workstream 1B Product 4 – Planning Data Exchange

The additional data transfers developed under this product and being progressed under Grid Code modification GC0139, and under a related Distribution Code modification, will enable whole electricity networks to be planned against a wider range of network conditions such that potential loss of supply events are more likely to be identified during investment and operational planning.

- *What value will the above characteristics provide to improving DSO function delivery by the DNOs or other stakeholders? DSO functions may include network management, flexibility procurement, and service conflict avoidance.*

DSO functions:

The information needs for system security and recovery from loss of supply events will be similar to that needed for DSO functions.

The data exchanges being developed under ON WS1B Product 3 are primarily intended to support DSO functions including ***System Coordination*** and ***Network Operation***. The linkages to these functions are further explained in the Open Networks DSO Implementation Plan . Examples of the wider value to network companies through these data exchanges include:

- Better understanding of congestion so that network capacity can be better matched to generation and demand needs in real-time.
- More effective scheduling of flexibility services so that the services being taken by different network companies from distribution resources (including DG) don't conflict.
- Understanding real time energy flows and hence an improved ability to operate networks efficiently and reconfigure networks where necessary.

The ON WS1B Product 3 data exchanges will also support the DSO function ***System Defence and Restoration*** (for example through improved operational awareness of DG), and the DSO function ***Services and Market Facilitation*** (for example through improved flexibility scheduling and service conflict avoidance.)

Providing data more widely through ON WS2 Product 1 and the ECRs supports the DSO function ***Services and Market Facilitation***. The linkages to this function are further explained in the Open Networks DSO Implementation Plan . The wider benefits to industry stakeholders include:

- Easier identification of connection opportunities by understanding where to connect and where there is capacity. The data also allows improved connection queue management.
- Identifying opportunities for the use of flexible services and opportunities to involve DG and other assets in the provision of those services.
- Improved efficiency of the Capacity Market and improved understanding of how wider policy initiatives are impacting DER development and siting.
- The identification of resources locally that might support local smart energy/community energy initiatives.

Other benefits may be identified by industry stakeholders and the ongoing work to better understand the value of including resources of less than 1MW will look to uncover these.

- *At what temporal resolution (instantaneous, seconds, minutes etc.) would real time data on DG be valuable to improve the resilience of the GB electricity system in the prevention of, live management, and recovery from loss of supply events?*

In general, higher resolution data will provide greater insight but all resolutions of data should be helpful. Fairly course information (e.g. >1 minute) should be sufficient in most instances to allow risks to be identified and mitigating actions to be planned.

For example, for the data transfers being implemented to confirm what levels of DG are available for operational intertripping, updated data is provided every 10 seconds. In this case, the 10 second resolution is a limitation due to the current IT systems being used by the ESO and DNOs. IT system changes in the future could support higher data resolutions that will improve accuracy.

In many cases (e.g. where DG is not connected via ANM arrangements or is not part of an operational intertripping scheme), the time resolution will depend on communications limitations. Given the number of communications links that would need to be established to include DG of lower size, the costs of establishing datalinks and communicating data could be many £m.

In relation to data storage, it may be not be necessary to retain all data that is exchanged between network companies. The retention of data for limited timescales would reduce data storage requirements. Should a loss of supply event occur, sufficient data could be retained to enable investigators to better understand the situation in the run-up to the event.

- *What investment would be required for monitoring, collecting, storing and disseminating real time operational data associated with DG? Which party should be responsible for these investments? How does this vary, based on the size of visible DG at 1MW or 50kW?*

Assets Registration Costs

There will be costs associated with asset registration system updates, to digitalise processes. Any system updates will need to be aligned to the ultimate asset registration recommendation from the EDTF, as well as any standardised digital energy structure that is agreed from the Ofgem/BEIS/InnovateUK Modernising Energy Data Access (MEDA) competition. In-house DNO systems will then also need to be updated to accommodate these changes

Planning Data Costs

The extension of Embedded Capacity Registers (ECRs) to include further information such as MVAr capabilities, load factors or operating regimes would require this date to be sourced and maintained in ECRs. Ultimately this could be achieved through network code change to obligate network users to provide this data to network companies. However, it is also likely that network

companies would have to carry out work to build up data for existing assets in their licence areas. Based on previous assessments, the potential cost to do this could be significant. If these areas of further data visibility were to be of benefit, the costs and case for further extending ECRs could be assessed as part of Open Networks 2021 work.

Gathering and retaining data for smaller DG connected at lower voltages is likely to require a project to be established to identify and interface with DG operators. It may be that this data will have limited value as the bulk of DG (by MW volume) is connected at higher voltages.

Extension of ECRs to include further resources <1MW will greatly increase the volume of assets managed in existing ECRs and new solutions would be required. The costs of the solution would be significant. There is also a risk that by increasing the volume of data in the registers, the ECRs will become more difficult to use and the more relevant data will be masked. If our ongoing 2020 work to better understand the Use Cases for resources < 1MW demonstrates wider benefits, then the costs of extending the ECRs would be further assessed in 2021.

Real Time Data Costs

The real-time exchange of further data would utilise new DNO control systems (or extensions to existing EMS systems), improved operational telecommunication networks and require the establishment of ICCP links between network companies.

Overall, the costs to establish a dedicated communications network to support data transfers from DG and provide real time monitoring could be many £m. (Individual network companies are better placed to provide indicative estimates for these costs.) For new DG and DER connections, it is possible that obligations can be put in place to install metering and associated communication at the connection stage. However, for existing DG and DER connections it is likely it would be more expensive to return to sites to install the appropriate metering and communications where these are not in place. As well as network company costs, it is likely that DG and DER owners would need to invest in control and communications equipment.

The costs of establishing ICCP links between the ESO and DNOs are also significant. So far, the ICCP links that have been established have been part of the Regional Development Programme (RDP) work being carried out between the ESO and certain DNOs. There are also ongoing maintenance costs to support the ICCP links.

ENA Digital Systems Map

Real time data could also be made available through the ENA Digital Systems Map in the future.

Wider Cost Considerations

Further information on investments and their staging to support DSO functions are provided in the Open Networks DSO Implementation Plan . For DNOs, further assessment of costs will be part of RIIO ED2 planning.

- *What are the credible technical, regulatory (industry codes, licences and governance) and legal barriers and costs associated with increasing the data collected, stored and shared regarding DG operations, and in obligating parties to do so?*

Regulatory Framework

DCP 350 and the ECR work are largely focussed on DNOs sharing data with third parties and have limited value in improving DG visibility to DNOs. Whilst it may be possible to carry on with workarounds through more code changes, such as DCP350 etc., change can be slow and is very situation specific. The overall framework is not well equipped for the increasing types and volumes of data exchange needed to support whole network operation and the transition to DSO.

DG visibility at present relies on direct contractual exchange through connection agreements and service provision. This is problematic for network companies where whole network operation is increasingly important. For example, the ESO has limited visibility of DG except where services are in place, TOs visibility of DG is limited to wider industry data, and DNOs have very little visibility of the services being provided by DG and DER that might impact network operation

The current legislation which binds us in relation to data sharing in the electricity industry was drafted over 20 years ago and promotes confidentiality of customer data above all else; it does not permit the levels of data sharing now preferred for a modern digitalised energy system as set out in the recent Energy Data Taskforce report. Examples of such barriers to data sharing include section 105 of the Utilities Act - which makes it a criminal offence to share information obtained from customers except in limited specified circumstances, and the Distribution Code DIN6 - which also requires customer data to be kept confidential.

Ongoing Network Code Requirements

DG connections already need to meet relevant connection requirements (e.g. frequency performance, voltage performance).

Several requirements are already in place for larger generators (Type C & Type D, >10MW) to provide system monitoring (Grid Code ECC.6.6 on Monitoring). This includes fault recording and dynamic system monitoring. Extending these requirements to cover smaller generators (Type A & Type B, <10MW) would require an extensive programme of work given the numbers of generators already connected to the GB networks.

For the Embedded Capacity Register (ECR), the inclusion and publication of data for DG < 1MW would require further DCUSA changes to extend existing obligations on DNOs and IDNOs. The inclusion of resources below 1MW will also be impacted by data privacy regulations as many of these resources will be owned and operated by individuals rather than limited companies.

If additional metering and communications requirements are to be placed on DG and DER, Distribution Code changes would be required to mandate connected customers to provide

information on their DER installation.

Data Collection & Asset Registration

Barriers to the collection of DG and other DER data include the need for improved asset registration processes across the energy industry. In some cases, developers are unaware of the need to provide data to network companies leading to a lack of visibility of some assets. Greater consistency across the energy industry in how data is collected and what standard it is in should help address this. The EDTF and MEDA work has started to address this and their work to date should be built on.

Asset registration is spread out among many different bodies and needs to be consolidated or made interoperable as per the EDTF recommendation. BEIS is showing leadership in this area which is welcome, but there is a need for a truly cross-department initiative as energy cuts across many sectors; DfT, OLEV, Geospatial Commission, DEFRA, DCMS, etc.

In addition, current DNO connections processes (for demand and generation), have largely rudimentary data collection processes (word forms and excel files) and need to be digitised. Likewise the increased exchange of planning and operational planning data between network companies may require new solutions such as the adoption of CIM. The costs and business changes of improved data registration and exchange processes will need to be further assessed and funding for changes will need to be considered as part of RIIO-2.