Greater Access to the Distribution Network in Northern Ireland

Consultation Document – Appendix 2

This Appendix outlines the full responses received from non-confidential respondents.

Contents

1. ANDY FREW

Q1) I agree with the definition, except that providing both heat and power should be included in optimisation to find least cost solutions e.g. To providing decarbonisation, security of supply.

Q2) Contingency planning should be included as a DSO function. In particular, as more heating and transport loads are introduced onto the grid, they should be interruptible, so that essential loads such as communications and personal access aids/ stair lifts are prioritised and still remain connected in any supply emergencies.

Q3) Yes.

Q4) No comment.

Q5) Yes, but not in a way that prevents the early or profitable entry into the market of other methods to provide system security that can provide larger responses when fully developed e.g. Fast shedding of electric heating loads. The DSO should not be awarded an early monopoly in a market it cannot fully supply i.e. The large Demand Side Responses needed to accommodate more variable renewable energy.

Q6) NIE Networks should adopt smart solutions and a more dynamic approach to operating the network, but this should begin with exploiting the existing unused capacity 'headroom' that exists on the network at most times of the day, and especially at night e.g. To provide electric heat to existing thermal stores such as hot water cylinders. Such smart heat solutions can also make fuller use of new capacity investment, achieving carbon reductions at low cost until this capacity is required by expanding electric vehicle fleets.

Q7) Only if restricted in number until reform of tariff and charging methods. With falling PV costs there is a danger that too much PV is connected, reducing the contributions to network and winter power costs from PV owners and transferring most of these costs to those without PV systems. Installing more of these systems can erode the viability of onshore wind farms that are more economic.

Q8) Only if restricted in number until reform of tariff and charging methods, and with an allocation for micro wind or hydro systems where there is a better correlation between winter power output values and dynamically rated line capacities.

Q9) Yes.

Q9b) Yes.

Q9c) Future electrically powered space heating systems will be responding dynamically to prices of electricity and other heating fuels, to external temperatures, to temperatures within homes and to expected heating requirements. The DSO will need more visibility of this data and the remotely generated switching signals based on it. There is a case for a secure multi-use data channel reaching to homes e.g. To allow a user to pay for heating oil instead of overloading an electric heating system in the winter peak.

Q10a) Greater metering functionality is needed, and might extend to other heating fuels so that they can meet peak heating demands instead of using electricity at critical times for the grid. More consumer choice is needed e.g. Individuals should be allowed to have more detailed time of use metering, or control systems to allow them to take advantage of market rates for electricity, or to be paid for providing grid services using equipment they have paid for.

This does not require a rollout of 'Smart' load switching, meters, and communications for everyone.

Q10b) Yes, it is important that data is available to inform the development of new offers to consumers, that might include both new heat and power storage installations, with new tariff or service offers based on integrating energy supply with network and system support. There can be a case to create a non-proprietary data and switching 'pipeline' that can be accessed by customers and their home systems at one end, and companies providing both energy and data analysis at the other. Customers could then switch to the companies providing the most competitive offer of energy supply and responsiveness to their preferences e.g. Pay As You Go services for heating oil with pre-heating homes cheaply with a heat pump, frost or damp prevention, PV energy sales to neighbours.

Q11) Yes. This should include the local diversion of power to the heating of hot water and rooms, or to batteries, in nearby properties.

Q12) No. Existing tariffs are not fit for purpose. For the fuel poor with non-electric heating systems, the absence of fixed charges is welcome, but this makes heat pump systems too expensive to run. The 60 Amp rating of domestic supplies amounts to a massive unfunded liability, as this certainly cannot be delivered to all homes at once. Electricity supply for lighting and communications and the operation of heating systems is the basis for social inclusion and a civilised life, but the current system of tariffs does not provide appropriate incentives for the changes required to decarbonise energy supply e.g. There is no incentive to use more zero carbon renewable energy at times when it is most available, or to avoid using electric fires or immersion heaters in the winter peak. Fractional tariffs should be available for domestic consumers e.g. With normal consumption via a normal supplier, but with a variable and interruptible heating tariff linked to market prices and grid conditions.

Q13) Yes. The local situation is unusual, with a massive wind energy resource available. To exploit this tariff it needs to be associated with automatic control, especially at night, and concessions should be offered at first to speed the adoption of suitable technologies to exploit this resource. e.g. removing many grid charges at times of otherwise low demand, or introducing negative charges, to make electricity more competitive with other heating fuels at times. The benefits in this should be assessed. e.g. Making a more constant zero carbon resource available for export via interconnectors, and exploiting variations in wind or solar outputs between weeks months and years. DNOs can invest at much lower interest rates than their customers, so they should invest for the future. The higher interest rates paid by consumers can make it appropriate to provide a bigger incentive for consumers to invest in energy storage and control systems, by temporarily introducing negative system charges for a minority of the time, to prompt early investment and the innovation that will reduce costs and increase benefits for everyone over time.

Q14) No. Domestic customers can be active consumers when provided with appropriate interfaces supported by online communications, remote databases, and payment systems. Businesses such as Ebay, Amazon, PayPal, AirBNB, and budget airlines demonstrate that customers will use new services that provide them with an expanded range of benefits. The means of controlling home

energy systems are very underdeveloped, with over 50% of fossil oil systems without even basic thermostatic controls, for example.

Q15) I usually work with domestic systems on behalf of low income households.

Q16) Householders will be paying for energy and related communications infrastructure, so it is important that the total of benefits to them justifies the investment, also when this means expanding the range of accessible benefits beyond those of traditional electricity supply. e.g. Having the ability to monitor and control oil consumption, and to enjoy the ability to pay for oil in small amounts, perhaps with a credit offering, can be a valued customer benefit. It also benefits the energy system, by preventing the operation of electric fires in the winter evening peak due to a lack of oil. Appropriately controlled heating systems, which use the same fuels as electricity generation, can ensure that conditions inside homes are healthy and safe, by being operated so as to control damp and promote good health.

To make these benefits accessible it will not be appropriate that only the DNO has access to secure data channels from the home, but that consumers can control who they allow to have access to their energy and home temperature data, and can allow this data to be processed to activate their energy systems according to their preferences. Retail 'Smart' thermostats already upload temperature data and heating demands from homes, but if this is data is not used systematically with data on renewable electricity generation and distribution, the costs of decarbonisation will rise for consumers.

Q17) A policy of gas network expansion without a roadmap to decarbonisation may distract from the task of making more use of renewable electricity.

Q18) Also providing a heat metering and billing service in addition to electricity metering would make a broader range of microgeneration technologies available over a broader geographic area. e.g. Sharing the thermal output of combined heat and power systems powered by agricultural wastes enables systems to generate more electricity per unit of fuel, as larger engines are more efficient. Initially implementing advanced load controls and promoting microgeneration in limited areas would be likely to be more economic, as the controls and communications would be more intensively used. e.g. In rural areas with a large wind resource.

Q19) The same secure communication channels needed for efficient network control can have capacity to provide other consumer benefits including affordable Pay As You Go heating services, fire, health or intruder alarms, remote service diagnostics, the use of lower cost electricity for hot water and heat, keeping homes comfortable and damp free, access to historic energy use. e.g. When renewably generated zero carbon electricity is used to displace the use of heating oil, this reduces the cost of decarbonising other sectors of the economy and has potential to reduce energy related costs overall.

Q20) There would need to be protections and assistance in place for vulnerable consumers. e.g. Price caps for those who will not switch to new types of energy services, or who cannot invest in or operate new technology themselves.

General Comments: Being able to distribute large amounts of intermittent and lower cost wind energy can be a massive economic benefit for important sectors e.g. Boosting light levels for horticulture, crushing stone, storing heat for long periods in 'thermal reservoirs' before using it on the coldest days. Slowing the development of the wind generation sector may be a particular danger when cheaper electricity storage technologies are likely to become available in time, and when we are

now alert to the deficiencies in how we currently bill for essential energy services and subsidise the use of high carbon heating fuels.

2. CHOICE HOUSING IRELAND LTD

Q1) N/A.

Q2) N/A.

Q3) Yes, although any cost implications would need to be understood, particularly if these were to be passed on to customers.

Q4) N/A.

Q5) Yes, although any cost implications would need to be understood, particularly if these were to be passed on to customers. Measures to reduce electricity costs for customers are welcomed. It would also be beneficial to understand if any of these measures have consequences or impacts on any other organisations who may be able to offer solutions to deliver customer savings.

Q6) A dynamic approach would appear to deliver the most cost effective solution for customers, based on the evidence provided and so this would be our preference due to the impact on customer's energy bills. This approach may also present opportunities for social housing (and other landlords) in relation to DSR.

Q7) Yes. This approach would enable customers to use more generated renewable electricity onsite (through battery storage) and also potentially participate in future DSR activities e.g. charging during the night to increase loads when more renewable generation is likely to be on the grid (wind) and discharging during peak demand to reduce load. Allowing a 'fit and inform' approach would encourage the uptake of this system due to more certainty around grid connection costs and timeframes for approvals.

Q8) Yes. This would support the uptake of this approach as timeframes would be reduced, encouraging future participation in DSR activities.

Q9a) N/A.

Q9b) N/A.

Q9c) N/A.

Q10a) N/A.

Q10b) Yes. There are numerous benefits in providing increased customer access to network data. For example, more real time data across all electricity tariffs would facilitate energy management, with organisations such as social housing providers (or energy brokers or consultants acting on behalf of a customer) able to interrogate electricity consumption and identify areas for improvement, such as equipment failure or behavioural changes. Increased data would also facilitate future improved procurement opportunities as customers would be able to provide more data to electricity suppliers as part of any procurement activity to enable them to provide more accurate pricing and reduce risk, leading to cost savings for the customer.

Q11) N/A.

Q12) We believe it would be beneficial to review existing tariffs to ensure they deliver a benefit to all customer types.

Q13) This is clearly a complex area and further detailed information and proposals in a consultation document would be beneficial. Fuel poverty is a significant concern in Northern Ireland, driven by high energy costs, low income and energy efficiency, and it is a particular concern within social housing despite comparably high energy efficiency levels. Re-balancing of electricity charges could lead to an increase in standing charges which could a significant impact on the approx. 800,000 domestic customers, particularly those in social housing. A separate concern is that investment in renewable technologies such as solar PV systems has reduced significantly in recent years due to the removal of financial support mechanisms, and so any proposed changes need to consider the impact on the renewables sector. Social housing bodies have installed these systems in the past to attempt to reduce costs for our customers and so careful consideration needs to be given to the balancing of potential future investment with the charges passed on to tenants. It should be highlighted that within social housing it is often the landlord who is responsible for installing and maintaining systems such as solar PV, whereas the customer normally benefits in the form of reduced electricity costs and so changes in tariffs could impact upon savings delivered for these customers. A further driver are building regulations and we would encourage further engagement with the Department for Finance (and any other relevant bodies) in relation to future potential changes to building regulations and the impact these may have in terms of technologies which will be used in new homes. As an example, the Department for Communities currently have an optional standard for new homes which exceeds current minimum building regulations, with technologies such as solar PV or Heat Pumps likely to be required in order to achieve these standards, particularly in areas where natural gas is not available. In these instances the tenant will not own or maintain these systems and the benefit of these systems could be impacted upon (positively or negatively) by future tariff changes, with an opportunity to explore opportunities in relation to DSR.

Q14) Whilst the identification of customer groups may be helpful, within social housing a customer may fall into a number of these groups. It appears to be assumed within these definitions that equipment fitted within a home (or associated with a home) links directly to the characteristics of the bill payer but this may not be the case within social housing. For example, a bill payer or tenant may be perceived as a 'passive consumer' with regards to their interest or interaction with the electricity grid, however their home may have technologies such as solar panels or heat pumps installed, and so they could also be classed as 'passive participants'. In this example, the owner of the property e.g. a Housing Association, may have installed this equipment as an 'energy conscious customer' or alternatively due to requirements within recent building standards such as NI building regulations or the Code for Sustainable Homes. As per our response to Q13 this also highlights a benefit in NIE ensuring there is significant consultation with relevant Government Departments around future building standards in NI and the impact these may have upon the electricity grid, with the likely increase in the use of technologies. In the above example, the same properties could also come under the definition of 'system service providers' or 'active participants' if social housing providers, who own the equipment, were to examine ways to engage further in the market through DSR. This could also include other areas associated with domestic properties such as landlord electricity supplies within apartment blocks or specific types of accommodation such as sheltered housing. Opportunities exist in relation to the use of renewable technologies, DSR and smart technologies in social housing and so it would be beneficial to have further engagement between NIE and social housing bodies in this area to consider these opportunities in more detail, and ensure that any proposals facilitate innovation appropriately.

Q15) As per our response to Q14 we feel there is an overlap between the various customer groups and as a social housing provider we may identify with or represent any or all of the four groups.

Q16) We believe that proposed changes could have a significant positive or negative impact on social housing providers and so this needs to be carefully considered and we would welcome the opportunity to engage further in this area. Potential changes to tariffs for example, could have a negative impact upon social housing tenants if overall costs were to increase as a result, impacting on fuel poverty levels. Tariff changes could also encourage or discourage the future investment in renewable and smart technologies, at a time when some parts of this industry in NI e.g. Solar PV, are struggling due to the removal of financial incentives. As we appear to be the only part of the UK and Ireland with no financial incentives for renewables, this means that social housing providers have reduced opportunity to invest in this area to deliver savings for our tenants, and so we would need to clearly understand how proposed changes could impact future potential investment (and existing investments) in terms of savings for our customers. A consequence of the lack of financial incentives in this area is that maintenance of renewable technologies is more challenging, unlike other areas such as RoI, where the uptake of heat pumps is significant. Whilst NIE are not responsible for introducing any financial mechanism to support renewables, the impact of tariff changes would need to be considered, especially if there are bespoke tariffs created for specific technologies.

We have an interest in opportunities which could be identified for Housing Associations or similar bodies, who could be classed as 'system service providers' or 'active participants' and may have the potential to engage in the DSR market in the future. A distinction needs to be drawn between the bill payer and the customer as in some instances such as social housing, the bill payer may not own their property or any equipment or technologies which have an impact on the electricity grid. This also highlights the need to incentivise measures such as DSR, through measures which are not exclusively related to the tariff or electricity meter i.e. if a social housing provider is interested in investing in measures to support DSR then it would be beneficial to have some method of direct financial incentive for the landlord.

Q17) N/A.

Q18) N/A.

Q19) As noted in our response to Q10b there are benefits in providing additional data to customers, which include energy efficiency/energy management and more information to facilitate procurement and lower energy costs.

Q20) Complexity may be a challenge for some domestic customers, as introducing additional tariffs or making changes to pass through charges etc. may add complication for some customers who are classed in this document as 'passive consumers'. Any reviews should therefore attempt to consider the needs of all customers as far as possible and enable those who are less interested in any future changes to avoid unnecessary complications.

General Comments: N/A.

3. CONSUMER COUNCIL NORTHERN IRELAND

Introduction

The Consumer Council is a non-departmental public body (NDPB) established through the General Consumer Council (NI) Order 1984. Our principal statutory duty is to promote and safeguard the interests of consumers in Northern Ireland.

The Consumer Council has specific statutory duties in relation to energy, postal services, transport, and water and sewerage. These include considering consumer complaints and enquiries, carrying out research, and educating and informing consumers.

General comments

The Consumer Council acknowledges that the way electricity is generated, transported and consumed is changing and that this change will accelerate in the future. We believe that new technology and innovation can deliver a carbon free, lower cost energy sector that responds to consumer demand. We believe that NIE Networks has an important role to play in the transition of the Northern Ireland energy sector and we welcome this initiative by NIE Networks.

Some active energy consumers have already embraced the opportunities that new technology presents. However, the vast majority of domestic and small business electricity consumers remain passive with regard to their energy supply. They take energy supply in the form and at the price that it has traditionally been presented to them. Active energy consumers should be encouraged in their endeavours and passive energy consumers encouraged to be more active as the energy sector transitions to a carbon free future.

Those consumers who are unwilling or are unable to be more active with regard to their energy supply should not be penalised for being so. In NI the high level of fuel poverty and low incomes level relative to the UK indicate that there is a vulnerable consumer base that will require protection.

Within the complex technical issues discussed in the 'Call for Evidence', there are potentially important social policy issues to be considered. We see this for example in the allocation of network costs across consumers who will have different and changing requirements of the network. We do not believe that it is appropriate for NIE Networks or the Utility Regulator to make these decisions alone. These are social policy decisions that are for the Northern Ireland government to decide.

The future structure of the electricity distribution network and how it provides the outcomes that consumers want is at the heart of an energy strategy for Northern Ireland. The current Strategic Energy Framework will end in 2020, but is already out of date. There is an urgent need for a new energy strategy for Northern Ireland that capitalises on the changes that are taking place in the energy sector and guides those changes for the benefit of consumers.

The Consumer Council recently hosted an event attended by the Northern Ireland energy network companies and the Utility Regulator which presented the 'Consumer Principles'. These principles can be traced back to a 1962 speech given by John F. Kennedy to the US Congress. They have since been developed and ratified in the United Nations' Guidelines for Consumer Protection which gave legitimacy to the whole notion of "consumer rights", and provide the support and guidance necessary for developing consumer protection legislation in nations around the world.

We believe that as NIE Networks, along with the energy industry and stakeholders work to deliver a new electricity distribution system that meets the needs of consumers, the principles can provide a

framework for assessing how any proposed changes can be engineered to meet the needs of consumers.

The 'Consumer Principles are:

The issues discussed in the 'Call for Evidence' are at times technical and complex in nature. We urge NIE Networks and other key decision makers such as the Utility Regulator to remain engaged at each step with consumers, using plain language to communicate.

During the development of the NIE Networks RP6 Price Control, The Consumer Council, as the statutory representative of energy consumers in Northern Ireland, worked with NIE Networks, the Utility Regulator and the Department for the Economy in the Consumer Engagement Advisory Panel (CEAP). We suggest that a similar group be set up to engage with consumers as the detail of this project develops.

Such a development should not inhibit NIE Networks from engaging with consumers on a wider basis and publicly.

Question in the call for Evidence:

Q5) If there is potential within the existing assets of NIE Networks to provide cost efficient solutions to the TSO in balancing the network, this should be explored. However NIE Networks should not be given preference over other solutions if they are available and offer a better outcome for consumers. One of the key determinants will be the level of risk to the system resilience, which the different options present. Any risk should be assessed against the Consumer Principles and in a transparent way.

Q6) NIE Networks should not continue to invest in a network if it is no longer required. NIE Networks should adopt and integrate smart incremental solutions to reduce and deliver network costs through a more dynamic approach to operating the network. Progress towards this objective should be undertaken in a transparent manner, with ongoing engagement with stakeholders. In this way any risks identified can be considered and responded to by all affected parties.

Q12) The current construction of tariffs for domestic and small business consumers is something that is out of their control. Looking to the future it seems inevitable that there will be a need to amend tariff structures to make the most out of new technology. In considering changes the Consumer Principles of 'Fairness' and 'Representation' must be addressed. The majority of domestic and small business consumers are passive. It is essential that these consumers, particularly vulnerable ones, are not penalised with higher energy bills for their lack of engagement.

We recognise that opportunities are emerging to empower consumers to take greater control of both the cost and the nature of their energy supply. Enabling this through the amendment of tariffs may be an option and should be considered. At each step the proposals and discussion must be the subject of a public debate which includes representatives of all stakeholders. Consumers must be represented in this discussion.

Where there is a conflict between the financial outcomes for different consumer groups, it is an issue of social policy and it will be necessary for the Northern Ireland government, as the appropriate policy making body for Northern Ireland to decide.

Q15) The Consumer Council represents both domestic and business energy consumers.

Q16) Even at this early stage in the utilisation of new technologies we can see the potential benefits for consumers. The issues discussed in the Call for Evidence, indicate that consumers may benefit by a reduction in the cost of their energy supply, a network that provides the services they want, when they want it and by a decarbonisation of the energy sector.

4. DALY RENEWABLES

Q1) Under G83/1 the installation of a renewable energy system is capped at 3.68 kw. At the discussion held by Spire 2 in the Culloden Hotel on 20th September Ian Baillie spoke about how consumption will treble in the coming years with the addition of heat pumps and electric cars to the energy mix. An average house using 4,000 kWh per annum could then require another 4,000 kWh to feed a heat pump and the same for an electric car. A 4kw peak Solar PV array will generate on average around 3,400kwh per annum. We would like to see the limit being increased to minimum 8kw from 3.68 so that the consumers can become more self sufficient in generating power for their home from the likes of Solar PV panels. With regard to exporting the PV inverters can be set to 0 export if that proves to be an issue for the grid. The increased use of battery storage and energy managers will also assist homeowner's reliance on the grid.

Q2) A tariff that encourages reduction in energy consumption. A generator lowering their usage as they have invested in renewables and batteries should be rewarded with a stepped down tariff depending on annual consumption. For example the first 1,000kwh used is more expensive than the next 1,000 and it reduces on a sliding scale.

Q3) A tariff that encourages the operation of the network to operate heat pumps and charge electric cars at night time to balance the requirements of the network, reducing the peak loads in the evening when people arrive home from work. In continental Europe certain appliances like heat pumps cannot be used at peak times. There is no reason why that cannot be applied here.

5. DEMAND RESPONSE AGGREGATORS OF IRELAND

The Demand Response Aggregators of Ireland ("DRAI") is an association of ten Demand Side Unit (DSU) and Aggregated Generating Unit (AGU) providers in the SEM. Collectively, we believe there is a significant role for demand-side participation in any future market arrangements in Ireland and are committed to the development of this market. Our purpose is to provide a single voice on policy and regulatory matters of common interest -- in response to the recent consultation we have developed the response set out below, and trust that you will consider it in your deliberations.

WHY DR/DSU ARE IMPORTANT?

DR/DSUs are capable of responding to signals from the system operator within an hour and therefore provide an effective means of reducing the demand requirement, which can assist in balancing the system and avoiding constraints. Facilitation of DR/DSUs increases demand flexibility and improves overall system stability by:

- providing reliable distributed capacity to the system;
- contributing to avoided investment in peaking plant by delivering peak load reduction;
- providing flexibility to mitigate the uncertainty of wind output; and
- helping mitigate transmission and distribution network constraints.[1]

This capability is expected to become increasingly important as the proportion of generation from variable renewable energy sources continues to grow. We therefore consider that Demand Response ('DR') is well positioned to support the TSO in meeting its objectives of market efficiency and security of supply.

RESPONSE TO CONSULTATION QUESTIONS

Please see below the DRAI response to questions set out in NIE CfE on *Greater access to the distribution network.*

Q1) Agree.

Q2) No.

Q3) Yes.

Q4) Yes.

Q5) No. If NIE Networks provide System Services to the TSO they will be competing directly with other System Services suppliers. This gives NIE an unfair advantage in the market as they control the current System Services supplier's capacity to deliver System Services by means of Instruction Sets and MEC's. This has the potential to reduce competition in the market.

[1] Single Electricity Market (SEM) (2011), Demand side Vision for 2020 Decision Paper, SEM/11/022

Q6) NIE should adopt and integrate smart solutions in the short term to maximise the potential of the grid capacity within the current infrastructure. Conventional Investment still needs to be made to ensure longer term capacity as smart solutions are limited to the capacity they can deliver.

Q7) No.

Q8) Yes.

Q9a) Yes.

Q9b) Yes.

Q9c) Yes. The DSO needs to rollout smart metering across domestic consumers which will give live data on the levels of demand and generation on the domestic consumer side. The scale of this market is too great to operate of quarterly meter readings while trying to implement a smart grid solution.

Q10a) Yes. The DSO needs to rollout smart metering across domestic consumers which will give live data on the levels of demand and generation on the domestic consumer side. The scale of this market is too great to operate of quarterly meter readings while trying to implement a smart grid solution.

Q10b) Yes. Customers should be provided with data informing them about times of high and low demand and generation. This data in association with smart metering will give customers the information required to manage their electrical load and play a vital part in the overall management of grid capacity.

Q11) Yes.

Q12) Yes.

Q13) No comment.

Q14) Yes.

Q15) System Service Providers and Active Participant.

Q16) System Service providers and Active Participants should be able to secure additional MEC and have more favourable Instruction Sets.

Q17) No.

Q18) No.

Q19) No comment.

Q20) No.

6. IPOWER SOLUTIONS LTD

Q1) I agree.

Q2) No.

Q3) Yes.

Q4) Yes.

Q5) No. If NIE Networks provide System Services to the TSO they will be competing directly with other System Services suppliers. This gives NIE Networks an unfair advantage in the market as they control the current System Services supplier's capacity to deliver System Services by means of Instruction Sets and MEC's. This has the potential to reduce competition in the market.

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Q16) System Service providers and Active Participants should be able to secure additional MEC and have more favourable Instruction Sets.

Q17) No.

Q18) No.

Q19) No Comment.

Q20) No.

General Comments: N/A.

7. NATIONAL ENERGY ACTION

About NEA

NEA is the national charity working to secure affordable warmth for disadvantaged energy consumers. NEA's strategic aims include influencing and increasing strategic action against fuel poverty; developing and progressing solutions to improve access to energy efficiency products, advice and fuel poverty related services in UK households and enhancing knowledge and understanding of energy efficiency and fuel poverty.

NEA seeks to meet these aims through a wide range of activities including policy analysis and development to inform our campaigning work, rational and constructive dialogue with decision-makers including regulatory and consumer protection bodies, relevant Government Departments, the energy industry, local and national government and develops practical initiatives to test and demonstrate the type of energy efficiency programmes required to deliver affordable warmth.

Based on the most recent House Condition Survey findings in 2016, Northern Ireland currently has a rate of fuel poverty at 22%. It is estimated that there are approximately 33,000 households in extreme fuel poverty spending over 25% of their total income to heat their homes. One in five households are living in relative poverty and 19% of working age adults in the private rented sector spend more than a third of their income on housing[2].

The cold kills, and between August 2015 — July 2016 there were 640 excess winter deaths in Northern Ireland.

Additionally, and unique to Northern Ireland, 68% of all households are reliant on home heating oil, a non-regulated fuel which leaves us vulnerable to the vagaries of all this economic. Specifically, in relation to Brexit, the falling pound and the recent increase in wholesale costs all impacted on all fuels but the almost immediate impact on oil prices can be catastrophic and will put severe hardship on individuals and families. Recent increases have demonstrated that already, prices are rising steadily.

Fuel Poverty Overview

- Fuel Poverty is the nexus of 3 factors; low income, high energy price and energy inefficiency.
- Fuel Poverty has multiple consequences including mental and physical health impacts.
- 640[3] excess winter deaths occurred across Northern Ireland in 2015-2016 with 30% attributable to living in cold homes[4].
- Improving the energy efficiency of the house is the most effective way of reducing fuel poverty, alongside maximising income and reducing the cost of energy to the householder.

The latest Northern Ireland Housing Executive House Condition Survey was released in May 2018 and provides an overview of the housing stock in Northern Ireland, as well as the latest fuel poverty statistics.

Key findings:

[2] Joseph Rowntree Foundation, Poverty in Northern Ireland, 2018
[3] https://www.nisra.gov.uk/publications/excess-winter-mortality-201516
[4] http://www.euro.who.int/__data/assets/pdf_file/0003/142077/e95004.pdf

- There are approximately 780,000 domestic dwellings in Northern Ireland.
- Owner Occupier is the largest tenure at 63% with the Private Rented sector and Social Housing sector at 17% and 16% respectively.
- **Fuel Poverty decreased to 22%, 160,000 households.**
- **The mean SAP rating improved from 59.63 in 2011 to 64.84.**
- 99% of dwellings had central heating.
- Oil remains the largest type of heating source at 68% of households.
- More than half (52%) of households living in old properties (Pre-1919) were living in fuel poverty.
- 55% of households living in fuel poverty had an annual income of less than £10,399.

NEA would like to provide the following comments in relation to the call for evidence.

The electricity industry is changing in response to the clean energy package & consequential drive for decarbonisation.

We appreciate the impact that this will have on the traditional role of a Distribution Network Operator (DNO) and the need to transition to a Distribution System Operator (DSO) which will enable customers to be both producers and consumers. Our concern, as always will be the impact that this move will have on those experiencing fuel poverty and any upward pressure or undue distribution of costs across energy bills.

This means that the design of the transition will be key, and it will be essential to identify the winners and losers and embed appropriate protections to protect those who cannot avail of the new model either due to vulnerability or low income.

We welcome the opportunity to respond to this call for evidence and offer our support in the design and protections we would like to see built into the new model. We believe that this can be done with you and indeed other key players such as the Consumer Council Northern Ireland.

We also would like to reiterate our key call in ensuring that energy efficiency and the role that it plays in reducing the energy we use is maximised both upstream and in customer homes. It is helpful when organisations such as NIE Networks reinforce this message.

In brief, our key concerns are:

- The cost of providing greater access and choice for customers who wish to participate in the developing system services market.
- What will be the distributional cost to all other customers and those who cannot due to low income not avail of a view and emerging DSO?
- The present lack of protections for vulnerable and low income.

The following bullet points outline where we require further clarification:

- What is cost of upfront capital required to be a producer?
- How can we ensure the fuel poor or vulnerable are able to engage in smart technologies?
- Distributional fairness.
- The continued need to investing in energy efficiency.

We look forward to the next stage of this process.

8. NORTHERN IRELAND RENEWABLES INDUSTRY GROUP

The Northern Ireland Renewables Industry Group (NIRIG) represents the views of the renewable electricity industry in Northern Ireland, providing a conduit for knowledge exchange, policy development, support and consensus on best practice between all stakeholders. Committed to making a positive difference, we promote responsible development, support good community engagement and deliver low-cost electricity generation from sources such as onshore wind, tidal, solar and storage using our greatest natural resources.

NIRIG welcomes the opportunity to respond to NIE Networks' Call for Evidence on Greater Access to the Distribution Network in NI. We believe that this Call is an opportunity to discuss important aspects of NIE Networks' role in the future and examine elements of the legal and regulatory framework that underpins our energy sector.

The further decarbonisation of our entire energy sector is a crucial element of our contribution to national and international targets. Low-carbon growth will enable high-value jobs and inward investment, and the Clean Strategy sets out how the low-carbon sector can help to increase the competitiveness and productivity of our economy in the decades ahead. A key aspect of decarbonisation will be the need for increased levels of renewable electricity. This will deliver increased potential for decarbonisation (through electrification and potential hydrogen production) of both the heat and transport sectors.

While we recognise the importance of some of the issues raised in this Call, we continue to urge for conventional reinforcement as a network solution in parallel with, rather than instead of, more innovative solutions. Optimised future infrastructure development will still be necessary to maintain security of supply for all consumers, and to de-risk the network to support future business growth and attract investment.

We note the potential for significant change arising from this Call but note that there may be other issues that have not been addressed, and we refer to some of these below.

We would welcome a meeting with NIE Networks in the coming weeks to discuss our response to this Call for Evidence.

<u>Definition of DSO</u>

Q1 We believe that the growing complexity of network operations may lead to increasing digitalisation which requires capabilities that traditional network operators may not be able to provide. Given the far-reaching changes that the energy sector faces in the coming years we suggest that additional models need to be considered. For example:

DSO as market facilitator: The responsibility for data management, including collection of data and construction of the necessary information infrastructure, would be allocated to the DSO, who would be responsible for the electricity network as well as information infrastructure, data storage and management of the exchange of data.

Information management as the responsibility of the network operators: One option is data management as a task for the network operators, separated from their regulated business. Another is

based on the concept of an Independent System Operator (ISO), where one entity takes responsibility for operational activities (system operation) and is independent of transmission asset ownership.

Third party: Delegate responsibility for data management to third parties, i.e. a party that is only responsible for data management. This could be an independent and neutral third party market facilitator (centralised) or a competitive market whereby independent and unregulated service providers (decentralised) can be chosen by each consumer.

More specifically, based on the proposed definition we note that given existing grid capacity constraints, reference should be made to the use of innovative methods (relative to conventional methods) such as smart metering, energy storage etc. to optimise and balance the system use, as this may not be immediately apparent from the 'active distribution' description.

Role of DSO

Q2) NIRIG firmly believes that within the function descriptions, conventional reinforcement should still be considered as a network solution in parallel, as opposed to instead of, more innovative solutions. Optimised future infrastructure development will still be necessary to maintain security of supply for all consumers, and to de-risk the network to support future business growth and attract investment. Additionally, improved transmission-distribution interface processes around connections, planning, system operation should be prioritised, whether this activity is carried out (and described) under one of the existing functions already listed, or under a new function heading.

The seven DSO functions described define the functions needed to transition from DNO to DSO (acknowledging that these functions do not fully define all the business practices). However, as noted above we believe that other, more fundamental questions may need to be asked about the role and function of the system operator in the context of increased digitisation.

We would highlight one potential consideration: the number of transactions to secure the required volume of ancillary services is likely to increase significantly as many distributed generators and consumers will provide services that are currently centralised. Opportunities may be provided by block chain technology in this context, providing a basis for different markets that focus on products for ancillary services and at the same time reduce market entry barriers for smaller devices.

DSO functions

Market facilitator

Q3) If moving from the current static annual instructions to more dynamic instruction sets facilitates reduced constraints and maximises the use of network capacity this then NIRIG is supportive of this approach. Market participation should be facilitated as longs as these objectives are met.

System services provide valuable support for energy system management and will require ever-increasing levels of information provision.

Q4) Yes. NIE Networks have already trialled technology which would support a solution: in 2016 a Nodal Voltage Control Pilot project was begun with the aim of making better use of the available MVArs at distribution level to support the transmission voltage while maintaining voltages on the distribution system within acceptable limits.

If nodal voltage control is available to the TSO and they can call upon Nodal VARs in the same manner as any other TSO generator then the DSO generators controlled by the DSO Nodal Controller should be able to participate in the market.

Service provider

Q5) It is important to enable a competitive approach for the provision of these services. Broadly-speaking cost-effective solutions are welcome to enable a more flexible and balanced system, but a range of companies should be able to provide these services. It is vital to ensure continued investment in transmission and distribution network to accommodate decarbonisation.

Congestion management

Q6) Yes. This is of vital importance. There is still a strong need for NIE Networks to invest conventionally, i.e. upgrading existing and new transmission circuits and investing in existing substations to bring up to modern standards. In parallel with this conventional investment there a need for NIE Networks to consider smart solutions that can maximise the use existing and new assets.

As mentioned in all NIRIG responses to recent NIE Networks, NIAUR and SONI consultations there is an immediate need for NIE Networks and SONI to bring forward the appropriate conventional and smart transmission solutions to provide firm transmission access for all contracted wind generation. We understand that although generators can connect with non-firm access the system operators are responsibly for advancing the necessary transmission works to provide firm access for these generators.

We are concerned that for a substantial capacity of non-firm generation the transmission works are either not advancing or progressing extremely slowly. We request that these works are prioritised going forward and SONI and NIE Networks communicate regularly with generator on progress on these works.

NIRIG continue to strongly support the new North-South 400kV interconnector. It is an example of how conventional transmission infrastructure has proven to still be central to the development of the all-island transmission system.

Britain and Northern Ireland will have to continue to decarbonise its electricity sector to meet national and global commitments to addressing climate change. This will drive the requirement to connect substantially more renewable generation onto the NIE Networks' transmission and distribution system. NIRIG acknowledges and supports that the electricity system will have to become 'smarter' to allow this change. This includes changes of how both demand and generation connect and operate.

However, this will not take away from the need to continue to develop the transmission system with conventional technologies. Some of the best wind resources and sites for new wind projects will continue to be in the West of Northern Ireland whereas the demand and export points will continue be in the East of Northern Ireland. This will require the continued development of the transmission system, both upgrading the existing circuits and the construction of some new circuits. Considering the long timeline to develop transmission infrastructure it is critical that SONI and NIE Networks start works on new projects that can increase the capacity of the transmission system in the West of Northern Ireland.

Microgeneration

Q7) Yes.

Q8) Yes.

Data provision

Q9a) As more generation is now deployed at distribution level than ever before, it becomes critical for the efficient development of both distribution and transmission systems that there is visibility over the power flows on a real-time basis on the system. Such visibility would allow for a reduction of curtailments and would release new capacity for new generators.

In order for power systems to operate more effectively they must be controlled at greater depths of granularity and much shorter control cycles than is currently enabled. Sufficient information is required from each level of the network and the control cycle needs to be nearer to real time.

The control and reduction of capacity constraints will enable more access for low-carbon and smart generation.

Q9b) Please note our response to question 1 regarding the model of System Operator going forward.

Should the model of 2 SOs be taken forward, we recommend full visibility. The boundary between TSO and DSO should not represent a barrier to data flow. The DSO could assist the TSO by 'deconstructing' disturbances aggregating below 110kV. Similarly, the effect of TSO level disturbances need to be reflected down the voltage levels as the DSO could mitigate impacts by deploying flexibility from customers on lower voltage levels.

We urge improved communication and processes to enable full use of data across all system operators. We also believe that consideration needs to be given to how data collection and management can be fully utilised (see answer above).

Specifically, we would like to highlight the example of UKPN (DNO) and National Grid (TSO) in GB. They have been testing successfully the 'Kent active system management' which aims to have both systems achieve reciprocal visibility on the control rooms through SCADA.

Q9c) Please see answer to Q1.

Given that most new installed generation is wind or solar (non-dispatchable), the sharing of forecasting tools across DSO-TSO is also very important to align the above-mentioned power flows and avoid any unnecessary curtailment.

The compilation, retention and standards of storage and retrieval should be mandated and monitored by an appropriate regulatory body. Any System Operator should have the ability to use the combined data to further refine network design.

Q10a) Yes, we believe that whichever system operator approach is taken forward (see answers above), data provision and visibility will be vital to ensure efficient management of the network. Metering is currently too simplistic and limited for the challenges ahead. A data gathering, analysis and provision capability based on factors such as flexibility, response and compliance to grid standards should be considered as a requirement for participants in a new market.

Q10b) Yes, we believe that smart and efficient management of the network will require all customers to have greater visibility of energy use, generation, cost and storage. Smart metering will provide information on energy usage but will not enable customers to respond to market signals or manage energy use based on self-generation, for example. Customers should be able to access their own data and consideration should be given to wider data (anonymised) so that they can understand their choices for new services. Service Providers should also be required to provide data (anonymised where necessary).

The regulatory function needs to be amended to reflect their role as clearing house for data sources and guardian of data standards.

We note above the importance of deciding upon a model for system management. There should not be an assumption that the existing TSO or future DSO is the only or most effective model for system management in an increasingly digitised age.

Network management

Q11) NIRIG believe that investment in both technologies and operational philosophies to reduce constraint is vital to facilitating future renewable build out. With increased curtailment likely in the coming years due to the lack of capacity and increased renewable generation, implementing solutions to minimise the dispatch down of generation for events other than curtailment is vital. Allowing special protection schemes and operating dynamically rather than in N-1 scenarios will all contribute towards reducing constraint on the network.

We believe that NIE Networks should be continually looking to maximise the efficient and economic operation of the grid network through all means available. For example, Active Network Management and real time monitoring with improved signalling/ communications would allow both generation and demand to flex with the grid to ensure this is possible.

We would point out that any assets or technologies that could be installed and operated by third parties should be open to competitive tender.

Q12) NIRIG believes that it is inevitable as more and more self-generation users connect to the distribution system that the mechanism for socialising DUoS will need to change. NIRIG are in favour of a transparent, fair solution with visibility of costs into the future. Over-complex charging methodologies with too many variables introduces uncertainty and will discourage new self-generation investment.

Existing tariffs do not provide sufficient visibility and flexibility for customers to respond to price signals or influence customer behaviour. A smart system with storage, demand-side response and maximised efficient network use will require greater incentivisation of customer flexibility and active network management. Tariffs must be prepared to facilitate this in a fair and transparent way, while incentivising innovation and greater provision of services.

We agree with the assumptions in the CfE that the tariff structure should be reviewed to cater for the future expectations of how the electricity network will operate and interface with customers.

We would like to point out the recent findings of the Energy System Catapult study into Cost Reflective Pricing. This report indicates that a review of the tariff structure for NI needs to take account of storage, demand, heat and transport:

https://es.catapult.org.uk/news/shift-in-energy-bill-charges-could-boost-low-carbon-heating/

Regulatory models may have to be extended to embrace new paradigms where data capacity is also valued and potentially rewarded. Further studies are required. However, the solution proposed to re-balance DUoS charges seems a logical solution, which values the "always available" capacity provided by the distribution system.

Q13) Yes. NIRIG believes the area of changes proposed are appropriate. Further studies and worked examples are required to identify the most suitable charging methodology moving forward.

What this means for our customers

Q14) We believe that the high level customers identified are a good baseline to work from and would assume that as customers develop in terms of technology and participation, (e.g. prosumers) that the groups could flex to accommodate a customer's needs and requirements.

Q15) "System Service Providers" and "Active Participants".

Q16) Customer type – other.

Q17) NIRIG believes that a fundamental review of the policy and legislation underpinning energy in Northern Ireland is required.

New technologies, new markets, increased interconnection, the growth in flexible demand and an increasing number of disruptors will all mean that the energy system in the next decade will be significantly different to the current one. NIAUR and policy-makers must prepare for these changes by ensuring that policy and regulation facilitates and promotes decarbonisation, flexibility, coordination, innovation and cost-effective modernisation.

For example, existing legislation only facilitates competition in the supply and generation of electricity, which effectively restricts competition in the distribution of electricity. It allows exemptions for connections based on capacity, which is now impacting upon the connection of low-carbon generation. It prevents rapid responses to necessary policy changes such as rebate policy we understand that it is hampering EV charge-point delivery. There are likely to be other issues that cannot be progressed under existing legislation.

Regarding the evolution to DSO, please note our response to Q1 which outlines alternative models which we believe should be considered and consulted upon.

Should the existing model be adopted we urge that the interface between SONI as TSO and NIE Networks as DSO will require a streamlined and barrier-free communication mechanism. Our members have experienced delays and miscommunication in certain cases of generator connections involving both SONI and NIE Networks. If the interface between SONI and NIE Networks is not able to function effectively at this stage then it does not give confidence that more complex interactions will run smoothly.

We recommend a comprehensive and clear Transmission Interface Agreement, developed with appropriate consultation and deploying rapid response mechanisms for identifying and rectifying any problems as they may arise.

We recommend a review of the duties and obligations of public bodies, including to strengthen requirements for sustainability, and a review of NIAUR powers to enable more flexible policy-making.

Q18) Upgrading existing and new transmission circuits, investing in existing sub-stations, modelling and delivering battery requirements for system management, developing innovation mechanisms that enable the rapid deployment of flexible responses.

There is an urgent need for NIE Networks to invest conventionally, i.e. upgrade existing and new transmission circuits and invest in existing substations to bring them up to modern standards. The network has been 'sweated' to enable a 40% renewable electricity target but this will not suffice for the additional renewable generation required to reach even more ambitious decarbonisation targets for electricity, heat and transport.

In parallel with this conventional investment there a need for NIE Networks to consider smart solutions that can maximise the use existing and new assets. As mentioned in all NIRIG responses to recent NIE Networks and SONI consultations there is an immediate need for NIE Networks and SONI to bring forward the appropriate conventional and smart transmission solutions to provide firm transmission access for all contracted wind generation.

NIRIG would recommend that NIE Networks reviewed the reactive power requirements for generators that are embedded on the distribution system. The requirement introduced in 2010 into the distribution code are too onerous (0.95 to 0.95 power factor) and drive unnecessary upgrades or unviable generator connections. If reactive power is required there are probably better methods of providing the reactive power such as appropriately located reactive power devices rather than a blanket generator requirement.

Q19) Potential for greater participation in system services market, especially if this is enabled by aggregators.

Q20) No.

We look forward to engaging further with NIE Networks, SONI and NIAUR as this important consultation progresses. We would like to request a meeting with NIE Networks to discuss our response.

We look forward to hearing from you.

9. NORTHERN IRELAND WATER

Q1) Agree with DSO definition.

Q2) The data provision function should also include exchange between the DSO and Consumer and the DSO and Participant; both Active and Passive variants.

Q3) Yes.

Q4) Yes. Providing all electricity customers with the opportunity to participate in the delivery of reactive power system services is essential to delivering savings whilst democratising grid revenues. The technical solution that will enable this will utilise secure ICT infrastructure.

Q5) As a neutral facilitator of an open and accessible market, NIE Networks as the DSO should be allowed to provide cost effective solutions to the TSO that reduce costs for all customer types.

Q6) Given the likely scale and speed at which the electrification of transport and the electrification of heat will stress the resilience and security of the network, it seems likely that a blend of both approaches will be required. The integration of smart incremental solutions should be prioritised through secure enabling ICT infrastructure with functionality to support an open and accessible market.

Q7) This needs to be considered vis-à-vis a strategic direction provided by Northern Ireland energy and economic policy. With appropriate ICT infrastructure that provides greater visibility of the network, the integration of smart solutions could be delivered at a speed and scale that would preserve network security and resilience.

Q8) A G100 managed connection process may result in a slower connection process with additional connection costs, but ultimately lower pass through costs for consumers. Again, this needs to be considered vis-à-vis a strategic direction provided by Northern Ireland energy and economic policy.

Q9a) Yes. Secure high-resolution ICT systems that facilitate data exchange between the distribution network and transmission network and NIE Networks and consumers, will enable access to a greater number of revenue streams for a greater number of customers.

Q9b) Yes.

Q9c) Yes. The secure enabling ICT infrastructure, with functionality that will support an open and accessible market, should permit visibility of a wide range of relevant data sources, such as the IOT, Industry 4.0 and EV charging.

Q10a) Yes, though greater metering functionality is a subset of the secure enabling ICT infrastructure that will be required to support an open and accessible market.

Q10b) Yes. The vast majority of electricity customers are also water customers. Customer access to network data is an essential enabler for the democratisation of grid service revenues.

Q11) By adopting secure enabling ICT infrastructure, with functionality that will support an open and accessible market, NIE Networks will create the environment by which generation constraints on the distribution network will be managed.

Q12) With the continued growth of DERs and the near term wide scale adoption of EVs, electricity tariffs will need amended to deliver benefit to all customer types. This should be explored in the context of a strategic direction dictated by Northern Ireland energy and economic policy.

Q13) Yes.

Q14) Broadly speaking yes, though the Active Participant customer category should include provision for contracts for services with TSOs and DSOs through community energy schemes.

Q15) Active Participant and System Service Provider. Identify – All.

Q16) Providing all of these consumer groups with the opportunity to participate in the delivery of TSO and DSO services is essential to delivering consumer savings, whilst simultaneously democratising grid service revenues.

Q17) The pace of change in the electricity sector is unprecedented. Regulators face practical limitations when not able to reference up-to-date policy. A strategic direction that balances long-term economic objectives against long-term energy objectives is required.

Q18) Secure enabling ICT infrastructure, with functionality that supports an open and accessible market, will drive new business models around the IOT, Industry 4.0 and EV charging.

Q19) Yes. Increased energy awareness through visibility of time-of-day consumption, data availability and choice.

Q20) Cyber security risk. This must be managed through secure ICT systems that are still able to enable the democratisation of grid service revenues through free data exchange. The 2018 Network Information Systems Directive encompasses electricity and water provision, has significantly expanded the scope of cyber security regulation in the UK, and provides a useful common framework with which to develop secure ICT systems.

General Comments: None. / Importance of Smart Grid piece?

10. ORACLE

Q1) Yes, we agree with the DSO definition. "A Distribution System Operator (DSO) securely operates and develops an active distribution system comprising networks, demand, generation and other flexible distributed energy resources (DERs). As a neutral facilitator of an open and accessible market it will enable competitive access to markets and the optimal use of DERs on distribution networks to deliver security, sustainability and affordability in the support of whole system optimisation. A DSO enables customers to be both producers and consumers; enabling customer access, customer choice and great customer service."

Q2) Aggregators should also be included in the evolution to a DSO - Third party intermediaries specialising in coordinating or aggregating DERs response from individual consumers to better meet industry requirements. The DSO should be able to support interaction with 3rd party.

Q3) Yes – NIE Networks should develop more dynamic instruction sets based on real time power flows, voltages and network topology, potentially providing system service participants with greater access to the network for the provision of system services and protecting the network from sudden changes.

Q4) Yes.

Q5) Yes.

Q6) NIE Networks should adopt and integrate smart incremental solutions to reduce network costs and deliver the network security through a more dynamic approach to operating the network.

Q7) Yes – NIE Networks should take advantage of the lower cost alternative shown in Figure 8b that limits demand <16A/3.68kW output but with the combined storage so it can fully utilise all carbon-free solar PV resource when most needed.

Q8) Yes - installations similar to that illustrated in Figure 8c, if fitted with a G100 export limiting device should be allowed to connect on an Engineering Recommendation G59 "fast track" process.

Q9a) Yes – increased data is absolutely required to safely operate and optimise the network.

Q9b) Yes.

Q9c) Yes – all customer-level loads as well as individual customer DER device attributes including IEEE 2030.5 controllable smart inverter communication controls.

Q10a) Yes – greater customer metering functionality is required that will include at least 15-minute interval data of forward and reverse kW and kvar, and voltage, as well as outage and voltage violation alarms.

Q10b) Yes – Customers should have access to network data that affects their service. In addition, customers should have data to support customer investments to provision cost-effective non-wires alternatives to traditional NIE Networks capacity requirements.

Q11) Yes – in order to provide safe, reliable, and cost-effective service, NIE Networks must be able limit generation on the distribution network. NIE Networks must also maintain history for audit/validation purposes.

Q12) Existing tariffs need amendment to deliver benefit to all customer types.

Q13) Yes, NIE Networks should also support controllable loads (distributed sense-and-respond) that could be provisioned to trip off for short periods of time for voltage and frequency violations and safely reconnect in order to maintain system stability and safe network voltage and frequency levels (with very limited customer impact).

Q14) Yes.

Q15) We identify with system service providers.

Q16) • System Service providers: provide services to the DSO and to create market opportunities and engage participants as active resources for the DSO to leverage to provide safe, reliable, and cost effective service.

• Active Participant: access to systems and data to optimise their own performance. Dynamically updating options to achieve the greatest value.

• Passive Participant: Set and forget options enable the Service providers to get the most value for the passive participant yet the passive participant could always opt out or move to an active participant.

• Passive Consumer: While these consumers do not directly participate, but would benefit from lower energy costs and societal benefits of carbon reduction derived by the active and passive participants. These consumers should be viewed as future passive (or active) participants as they become more familiar and comfortable with the DSO ANM concepts and as they modernise their large appliances that could participate.

Q17) Yes – Both building and consumer appliance standards, as well as local/regional energy regulation must enable end-use customers to play as active participants in a sustainable energy future. Appliance standards should support OpenADR or other supported DR protocols. All new inverters should be smart communicating inverters (e.g. IEEE 2030.5). New regulations, policies, and standards must enable utilities to provide meaningful customer engagement and investment that creates societal value and grid optimisation.

Q18) Yes – the DSO should support distribution locational marginal pricing (D-LMP) at the customer level in order to provide location specific value-based participation. Participant or aggregator home/building energy management apps could identify the local opportunity and determine active participation on D-LMP. This also requires secure interactions between Market Facilitator, DSO, and participants. DSO and aggregators must provide meaningful customer engagement tools that create clear societal value and grid optimisation benefits.

Q19) Yes – Will create a more sustainable energy future getting consumers more in touch with their energy and carbon footprints. As this happens, more innovative smart energy home & building energy management apps will be developed that draws more consumers to want to play in the market making it more fun and impactful.

Q20) Yes – Cyber security will be a big deal and must be inherent into the overall system and process. The market exposure to network capacity limitations and (D-LMP) could expose where network vulnerabilities exist. This information needs to be protected and only made available to the specific participants.

General Comments: Yes – These are exciting times in the energy industry and Oracle looks forward to being the platform provider to support the DSO and engage customers as active participants.

11. POWER HOUSE GENERATION

Q1) The definition appears to be appropriate for the current development of the distribution system.

Q2) It is understandable that the DSO should look to enable DERs to participate in the electricity markets (not the TSO markets) and in the provision of System ancillary services, to the TSOs and others. This role should be impartial and ensure no conflict of interest. It should enhance the ability of customers to connect to the network and their ability to utilise the network.

There is however concern over the intention of the DSO to become a service provider. This is a potential conflict and liable to raise the attention of other service providers. The assets that could be used have been paid for by the consumers and not for the benefit of the DSO to become a service provider.

Q3) Due to the fast changing and evolution of the electricity system, it is a requirement that the DSO develop modern and sophisticated management systems. Dynamic instruction sets may provide this, however customers could be exposed to financial penalties should the dynamic component become too flexible and unknown to the customers.

Q4) Nodal control and such like is an acceptable level of control on the distribution system and would be seen as part of the technical solution that the developing system requires.

Q5) The assets that could be used have been paid for by the consumers and not for the benefit of the DSO to become a service provider. There is however concern over the intention of the DSO to become a service provider. This is a potential conflict and liable to raise the attention of other service providers. Any service provision could impact on the ability of others to provide such service provision due to System congestion etc. This would impact on investment by others in attempting to provide these, and other, services.

Q6) The proposed distinction of a dynamic approach versus a convention investment should not be looked on as an 'either/or' solution. Whilst a dynamic approach is commendable, and likely to be the acceptable approach in the short term, it is more likely that the increase in connection application shall require the additional conventional investment approach in parallel. It is best to have the system capability increased as soon as possible, despite the investment, as this would bring benefits to the consumer.

Q7) No comment.

Q8) No comment.

Q9a) Due to the fast changing and evolution of the electricity system, it is a requirement that the DSO develop modern and sophisticated management systems. The management of system data information would be a key part of that and the DSO should be allowed to collect and process it.

Q9b) The collection and use of information is likely to benefit customers and the DSO via the increased efficiency operation of the System. There should however be a limited circulation of the data and a predefined methodology.

Q9c) No comment.

Q10a) Metering provides increased knowledge of the operational parameters of the System, and can help with dynamic analysis of the system. Greater metering functionality could be advantageous, however the cost of such metering should not be placed on the customers, either directly or postalised in system charges.

Q10b) The utilisation of data is beneficial to all those involved, and providing the customers access to the data would dilute the requests to the DSO to provide such data. This would reduce the DSO overheads. Forecast data that would be specific to locations within the DSO arena would be of benefit. This should include weather as well as system outages and power flow capabilities.

Q11) It would be to the ultimate benefit of the consumers and also to customers if there was an increase in the availability of generation through the reduction of constraints. This would offer greater support to the operation of the system and may avoid higher generation and ancillary services costs.

Q12) No comment.

Q13) It may be suggested that ongoing charges should reflect the changes in the system, where the load may move or new generation impacts localities. Whilst this may be seen as being flexible it would weaken any investment financial plan due to the uncertainties.

Q14) No comment.

Q15) System Services provider and Active Participant.

Q16) No comment.

Q17) No comment.

Q18) The DSO should accommodate connections with Non-Firm Access. Firm Access Quantity (FAQ) has been used in the electricity markets to differentiate between multiple generators behind a grid constraint. The new services, such as Ancillary Services, can operate without the need of Firm Access.

When there is recognition of a number of services being required in a locality then these should be grouped in a tender, so that service providers can provide an overall lower priced service through the investment in the combination of multiple capabilities.

Q19) No comment.

Q20) No comment.

General Comments: It is important that investment signals remain steady, projected incomes are realised, and any flexible operation of the system by the DSO compensates the customer for any revenue reduction. This could be as a DS3 revenue reduction due to a reduction in provision of ancillary services as a result of dynamic instructions. These dynamic instructions may improve the overall function of the system and reduce/delay investment by the DSO but that should not be at the detriment of the customers.

12. POWER ON

DSO Definition

Q1) The market facilitation role is well explained in the Call for Evidence. The Service Provider role is also clear in the upward direction to TSO. There is however scope for conflict between the 2 roles as the market and capabilities develop. For example in the area of Distributed Energy Storage

"Storage facilities placed...at the consumer could alleviate the pressure on the grid, increasing the stability of the supply and demand at the point of …consumption. "[5]

Under the DSO definition provided the DSO should be facilitating access of such services, provided by a 3rd party, but this may conflict with the DNO 'legacy thinking' and process design that reserves issues of pressure on the grid to the DNO.

In order to ensure facilitation that is unbiased and truly open the role of UR needs to be clearly articulated.

The regulator needs to

- Regulate for how consumers consume and prosumers generate and provide services, not based on business models that incumbents have chosen to evolve towards
- Regulate for system optimisation to deliver the most productive, efficient, clean flexible and affordable system
- Regulate to promote transparent, cost reflective and open markets, based on Open Data
- Regulate for where security of the system is truly at risk.[6]

This definition of security needs to address the whole system risk of failure as currently envisaged by TSO and DNO at Transmission and Medium Voltage levels but also address the local risks and issues that our data is showing to be persistent and prevalent at LV and below. The issues of voltage rise, voltage step, thermal issues and flicker are just as important to domestic and small commercial customers as their installed equipment becomes as sensitive as commercial plant.

Q2) Data provision is a key issue in the DSO evolution. The paper talks about provision up to the TSO but the issue is more complex.

In order for distribution power systems to operate more effectively they must be controlled at greater depths of granularity and much shorter control cycles than currently pertain. Granularity is needed to ensure that sufficient information is available from each level of the network down to LV and the control cycle needs to be nearer to real time. Traditionally this level and complexity of data was uneconomical. Providers of services are emerging who can gather, harness and make economic use of such detail. Greater economic efficiency derives from the higher degrees of control enabling system operators to reduce margins that have been added to system capacity to compensate for the

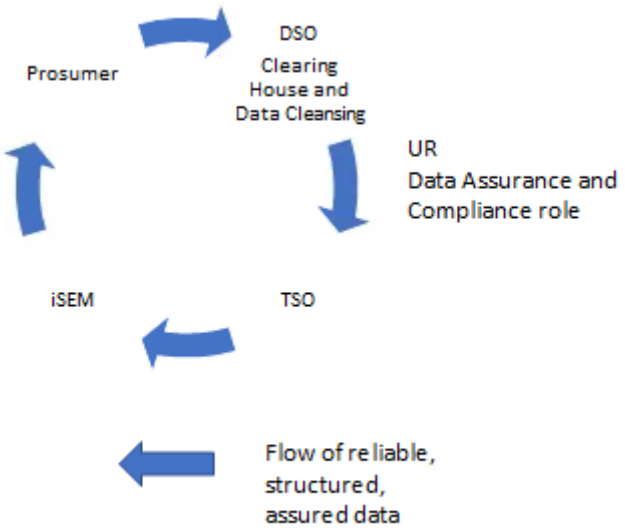
[5] EU COMMISSION STAFF WORKING DOCUMENT Energy storage – the role of electricity, Brussels, 1.2.2017 SWD(2017) 61 final

[6] Catherine Mitchell, Future Energy in Northern Ireland, The role of Consumers, Spire2, Sept 2018

inability to control the system. The control and reductions of capacity constraints will enable more access, providing those allowed onto the system can contribute in 'full-feature data' mode.

Adoption of 'data dumb' loads should be discouraged by pricing signals that reward the 'data compliant' entrant and heavily penalise the 'data-deficient' entrant. The regulatory models may have to be extended to embrace new paradigms where data capacity is valued in tandem with electrical capacity. The appropriate model may be Data Incentive, the inverse of a Carbon Tax. If a provider brings rich, reliable data sets into the market they should be rewarded.

A role for DSO could emerge as the clearing house. UR oversight would be required to ensure impartiality.



Q3) Yes, but the Instruction sets not only need to be more dynamic, they need to be more granular, localised and Open. PowerOn, trademark The Electric Storage Company, have data and systems that can demonstrate the granularity, reliability and control that a localised network support would require.

Q4) Our data shows that the clustering of EV, Domestic Energy Storage and Renewable Generation could be an effective contributor to mitigating voltage and frequency disturbances that are clearly evident on the local networks. The evolution of DSO cannot simple be uni-directional towards TSO. The local issues that customers face also need to be addressed. See below voltage and frequency analysis on the network at 2 different customer locations.

Q5) Nothing to add to this debate from our work.

Q6) Our data analysis confirms that smart solutions can defer traditional investments and offer new capacity for more entrants to localised renewable generation. Leading commentators agree.

"Storage facilities placed .. at the consumer could alleviate the pressure on the grid, increasing the stability of the supply and demand at the point of …consumption. "[7]

According to leading commentators energy storage technology has been voted by the industry as one of the top ten transformative technologies in the utility space. This is because it may prove to deliver a range of benefits and solutions to networks, such as being able to soak up and store electricity at times of high supply from renewables, shave off the peak demand levels by supporting 'in-situ' consumption and assist further by releasing the energy back into the grid to support voltage and/or frequency issues. Equally importantly it could help stimulate the electricity market, as measured by enhanced reliability and lower consumption costs for customers along with opportunities for DNOs to reduce their 'cost to serve' energy storage customers. Our use cases include EV, ground and air sourced heat pumps. In regard to EVs we would respectfully suggest that the scenarios for uptake of EVs are understating the potential uptake. Most of the customers we are including in our trail are actively contemplating EV purchase, several have EVs. In addition you should note that demand for EVs in UK, and Northern Ireland is constrained by issues of supply of vehicles, rather than absence of demand. We would also refer you to our recent Tweet re a new analysis by Transportation & Environment which finds that in the UK and Europe, 95% of all EV charging events occur at home or work. https://bit.ly/2zu0mIo

Q7) Our research and development project to date confirms several issues that are pertinent to this question. Firstly the standards of knowledge, skills, training and compliance for installers/vendors need to be much higher than has been the case to date. It is useful to note that in ROI the training requirements are much more extensive and that a registered installer approach is being used. Our concern would be that in the absence of a high standard, customers will be exposed to shoddy workmanship, mis-sold products and no contribution of meaningful data to further advance the agenda of using the grid more intelligently. The experience of other technologies and sectors is that of a Klondike effect where companies rush into the new market ill-prepared and poorly authorised for high-value, potentially dangerous installations.

The fit and inform process proposed will have the unintended consequence of promoting 'sell it quick and move on' attitude from unscrupulous, passing players in this sector.

Fit and Inform should be altered to a 'Prove it, Fit it, Share it' approach.

Q8) As regards Fast Track we would argue that a fast track is only suitable for those who have proven they are fit to drive. Our comments under Q7 apply here also. In addition your 8c scenario needs to reflect the advent of hybrid inverters that serve both PV and Battery requirements.

We cannot stress enough the risks of battery storage benefits for grid, market and customers being debased by an overly 'laissez faire' approach from the DNO, particularly when the DNO has aspirations to transition to DSO. DSO will require many sources of reliable data and services can only be built on a solid foundation.

Q9a) In order for distribution power systems to operate more effectively they must be controlled at greater depths of granularity and much shorter control cycles than currently pertain. Granularity is needed to ensure that sufficient information is available from each level of the network down to LV and the control cycle needs to be nearer to real time. Traditionally this level and complexity of data was uneconomical. Providers of services are emerging who can gather, harness and make economic

use of such detail. Greater economic efficiency derives from the higher degrees of control enabling system operators to reduce margins that have been added to system capacity to compensate for the inability to control the system. The control and reductions of capacity constraints will enable more access, providing those allowed onto the system can contribute in 'full-feature data' mode.

Adoption of 'data-deficient' loads should be discouraged by pricing signals that reward the 'data-compliant' entrant and heavily penalise the 'data-deficient' entrant. The regulatory models may have to be extended to embrace new paradigms where data capacity is valued in tandem with electrical capacity. The appropriate model may be Data Incentive, the inverse of a Carbon Tax. If a provider brings rich, reliable data sets into the market they should be rewarded.

Data gathered by our field trial confirms that the voltage and frequency disturbances that DS3 is aimed at mitigating at system level also occur and cause customer issues at lower voltage levels. The tendency within the industry to assume that problems must be solved at the centre and the highest voltage levels needs to be examined carefully. Perhaps a decentralised mitigation method needs to be developed.

Q9b) The patterns of disturbance and potential disruption at TSO level may be composed of disturbance or network deficiencies at several layers of network. Similarly the effect of TSO level disturbances need to be recognised down the voltage levels as DSO could mitigate impacts by deploying flexibility from customers on lower voltage levels.

Q9c) DSO should be able to acquire, with appropriate compensation mechanisms, historical data from Distribution level Flexibility Providers data repositories. The compilation, retention and standards of storage and retrieval should be mandated and monitored by UR but DSO then have the ability to use the combined data to further refine network design.

Q10a) Metering is too simplistic and limited a function for the challenges ahead. A data gathering, analysis and provision capability based on factors such as flexibility, responses and compliance to grid standards should be a mandatory requirement for participants in a new market that recognises the limitations of kWh as our measurement.

Q10b) Customers should be able to access their own and Open Data suitably anonymised so that they can understand their choices for new services. Providers of service to customers should have access to Open Data. Transport for London made Open Data available recently and saw over sixty new services being provided by independent providers.

Service Providers should also be required to provide data. The regulatory function needs to be amended to reflect their role as clearing house for data sources and guardian of data standards.

We can provide examples of this data but are not prepared to submit them in an open Call for Evidence.

Q11) Nothing to add to this debate from our work on the BSP example quoted however we see in our analysis scope for support at lower voltages for ANSO feeding arrangements from customer owned assets, providing they are capable of control akin to SCADA. AN example would be persistent low voltage or flicker on a stretch of LV network at peak times that could be ameliorated via export from suitably equipped and controlled customer owned equipment. Therefore, we would contend that NIE Networks should invest in technologies but should also promote, encourage and facilitate customer owned assets to the requisite specification.

Q12) A review of charging is required, as per the UR forward work plan. The review needs to have access to data that shows that rather than the common modes of behaviour you cite, there are much richer analyses available. Demand Side Response needs to be appreciated as having several dimensions; flexibility of demand, predictability of demand, scope for pro-active shaping of demand should all be reflected in the new tariff structure for DUoS.

Q13) Redacted.

Q14) Our customer experience would challenge your term Passive Consumer. We would also suggest that social housing consumers may have more complex tariff choices.

Q15) The Electric Storage Company is aiming to serve customers in all four of your categories.

Q16) We have analysed this DSO evolution and see several areas of benefit. This analysis is supported by our R&D project which draws data from many use cases to understand customer behaviour and network performance in substantial granularity and detail. The detail is available to NIE Networks and UR but will not be set out in this submission.

Q17) No comment.

Q18) No comment.

Q19) We have already referred to Open Data and the potential for it to foster new thinking. The degree of innovation in the industry needs to accelerate away from the complete control of data that NIE Networks retain.

Q20) Power networks and current market arrangements favour the large and the rich. The extreme example are those corporations who have the capital to ‘go private wire’ and pass the burden of remaining assets to a smaller, and less well-financed, rump of customers. This could be exacerbated if greater access to the network results in large consumers with sufficient capital, or large public sector players with access to cheap public sector funding, ‘grabbing’ a disproportionate share of the flexibility and system services value that could be available when greater access to the distribution network becomes available.

Large and rich should not trump numerous, dependent and vulnerable in a correctly regulated market.

13. RICARDO ENERGY & ENVIRONMENT

Q1) Yes, the high-level definition works well.

However, there are key differences between the Northern Ireland power sector when compared to GB, for example, there is already a high penetration of distributed generation and renewable generation, separate regulation and system operation, and a different market and customer base. These differences will impact the detail of the implementation of DSO in Northern Ireland and mean that tailored solutions and approaches are required.

Q2) We recommend that NIE Networks think about the following in addition to what is described

• Local services – services requested and managed by the DSO itself, for example to support voltage or constraint management on the local distribution level.

• Customer engagement and education – customer education can be a valuable way of increasing engagement and customer satisfaction, and encouraging community thinking.

• Community energy – it could be an important part of the DSO role to support the evolution and adoption of a range of new business models, including community energy models.

• Collaboration with grid edge parties (e.g. Nissan, Google, aggregators etc.) – these parties will have an increasing impact on the requirements on the system, and could pose significant opportunity or risk on system operation. Collaboration with these parties will ensure that opportunities are leveraged, and that aspects such as interoperability and data sharing are agreed to manage risk.

Q3) Yes, more dynamic instruction sets would enable a more beneficial and flexible service. Another approach would be to develop local services to feed into the wider system services, allowing the needs of local networks to be incorporated into service decisions

Q4) Reactive power is best provided as local to the requirement for managing voltage control as possible. We note that the Distribution Code and the draft ER G99NI have minimum requirements for generators in respect of reactive power provision. If additional voltage control is needed then this could be requested as a local reactive power system service. It is our understanding that the TSO does not call on Distribution connected Centrally Dispatched Generating Units to provide reactive power in which case there ought not to be a conflict in respect of reactive power service requirements.

Q5) Yes, this is an example of the DSO service provider function and a good use of innovation project outcomes from GB. The CLASS techniques will need to be investigated to understand how to translate this into the Northern Ireland context, given that there is a different system operator and regulatory system, as well as physical differences between the networks.

Q6) Conventional reinforcement alone is unlikely to be the optimum solution. There is significant uncertainty about the take up of low carbon technologies such as electric vehicles, and also about the customer behaviour when they are taken up. This uncertainty means that investing conventionally in network reinforcement may result in stranded assets.

Use of smart incremental solutions could minimise the likelihood of stranded assets, and defer or mitigate the need for investment in reinforcement in many cases. This can include small, incremental

changes, but should also be more far-reaching and holistic changes, and should not be constrained by today's rules as they can be changed to support system and customer benefits. In all cases, they should be developed with business-as-usual transition in mind.

Q7) The ESQCR exclusion states that the source of energy must not produce an electrical output exceeding 16A per phase.

Strict interpretation of this would appear to prevent installations similar to those illustrated in Figure 8b from connecting under a fit and inform basis. However, we consider that because the inverter is rated at 16 A/phase there is an argument that the source of energy from the ac electrical networks perspective is the inverter. Hence, we believe that installations similar to those in Figure 8b should be allowed to connect under a fit and inform basis.

Q8) Yes, this proposal follows that adopted in GB known as the Integrated Micro Generation and Storage procedure. Each DNO is currently running its own process but these have recently been consolidated for inclusion into Engineering Recommendation (ER) G99, Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019. The consultation to this modification to ER G99 has just closed (25/9/18) and the revised version of G99 is expected to go to Ofgem for approval shortly.

Q9a) Yes, data is an essential part of transitioning to DSO. Increased network visibility enables optimisation for efficiency, fast event mitigation, and informed planning.

There is a risk with data collection that results in large volumes of data being collected and stored, which is costly, but there is little understanding of what should be done with it and how to gain value. It is therefore essential to understand what data is required, in what location and with what granularity. The requirements for data for real time operations and planning are very different therefore consideration must be given to how data collected can be turned into useful, actionable information. The Distribution Network Visibility project Ricardo undertook for UK Power Networks is a good example of using data to provide business information. Consideration should be given to how data collection can be optimised to get highest value out of minimum data collection, storage (local and / or central) and processing.

Q9b) Yes – effective sharing of information and data is an important part of DSO and TO optimisation. This is particularly important for forecasting and planning, real time optimisation, and for undertaking validation with historic data.

The data passed between the DSO and TO should be targeted, relevant information, and the format developed so it is accessible and compatible between the two organisations.

Q9c) A DSO should have visibility across the voltage levels of their network, and the capability to optimise in real time. Customer level data can be highly valuable, particularly if they are providing services, however this should be handled carefully to maintain individual privacy.

External data sources, such as weather data and forecasts, price signals from the SO, events calendar etc. can be built into forecasting and adaptive optimisation models.

Q10a) Increasing the functionality of metering has significant potential to bring valuable information into the DSO. However, it has a direct impact on the customer, requiring access for fitting and the collection and storage of more detailed usage data, so it has to be carefully considered and thought through. It is very possible that the customer benefits of a smarter, more optimised network, the ability to offer dynamic and more tailored tariffs, and the opportunity of providing more useful usage information to the customer themselves, outweighs the downsides of increased metering.

Many other countries have implemented smart half-hourly metering for domestic customers, or are in the process of doing so. Lessons from these experiences can be a useful resource for Northern Ireland, though there are key differences in the nature of the market in Northern Ireland that should be considered as well.

Q10b) Customer information and customer education can be a powerful way of supporting DSO activities. For example, information and data should be shared so that those wanting to connect load or generation can make informed choices early in their design. The data provided should be related to the system service markets, such as congestion management or charging.

Data and information must be shared in an accessible way, and made available so that individuals can access the most relevant information to them. For example, supporting schools to provide informed lessons to students, producing adverts so that the general public understand the DSO activities and the benefit to them, and targeted information to people trying to access the network and services market.

Q11) Yes, it is an important part of the role of a DSO to provide for and support connection of customer technologies and supporting the connection of low carbon embedded generation supports progress towards decarbonisation.

Reducing generation constraints will be enabled by increased network visibility, real time rating and optimisation, use of storage, and managed connection and meshing of networks.

Q12) The existing tariff structure will become less and less fit for purpose as customers adopt low carbon technologies such as EVs, heat pumps, energy management, storage and generation. These technologies will drastically impact the shape of demand on the network, and therefore the required capacity of the system.

This change must be carefully managed, as it is important to support customers who are willing to adopt low carbon technologies, manage their energy use, and provide system and local services, however, those who are not participating in this way need to be protected against unfairly high costs.

Q13) The changes as outlined have the potential to successfully rebalance the tariff structure and mitigate issues caused by changing demand profiles. Managing this impact through local services and time of use pricing can reduce the negative impacts of these technologies, and therefore effectively support transition towards a low carbon future.

Q14) The customer group definitions are useful, and seem to be a logical set.

Further clarification could be brought out through exploring customer examples, and where they would sit. For example: A customer with a domestic scale battery who has a contract with an aggregator to manage charge and discharge to provide system services – 'Active Participants' are described as larger demand customers and aggregators leading to an expectation that the customer in the example fits as a 'Passive Participant', however, the description of this category states that low carbon technologies are 'unlikely to be actively managed'. How does this fit?

Q15) N/A we are Consulting Engineers

Q16) The DSO evolution should help all customer groups, by resulting in a more efficient, resilient and optimised network and tailored appropriate service offerings to customers. There are also significant benefits to society as a whole, as we transition towards a low carbon future, meeting carbon reduction and air quality targets, while managing costs and developing a modern and capable power system.

In detail:

- System service providers and active participants will have a more dynamic and valuable service market in which to participate, and more opportunity to be involved as network constraints and constrained connections are reduced. This could be a valuable business case for a number of parties in this category, supporting ongoing investment in low carbon technologies and technologies that are capable of providing required system and local services.
- Passive participants will have more opportunity to leverage their investment in low carbon technologies, for example by choosing a suitable time of use tariff, or using the services of a technology or third party to manage and get value out of the technologies for them. This should result in lower bills, full access and benefits to their low carbon technologies (e.g. use of EV for mobility, and HP for space heating), and knowledge that they are supporting their community in carbon reduction and a cost-effective power supply.
- Passive consumers will enjoy all of the society-wide benefits of a more efficient, lower carbon, resilient and optimised power supply. However, as they are not participating, they will not necessarily have access to all of the financial benefits. Careful management is therefore required, to ensure that these customers are not paying a disproportionately high price for their services to the benefit of the other customer groups. There must be a balance between encouraging beneficial engagement with the power system, while not unfairly disadvantaging those who choose not to participate.

Q17) As the transition to DSO progresses it will be important for regulation to appropriately keep pace with the change. For example whilst individual customers responding to a price signal or providing a DSR service individually may not seem to have an effect on overall system security, the aggregation of such services needs to be adequately secured.

Q18) N/A.

Q19) DSO transition will bring significant benefits to society as a whole, as we transition towards a low carbon future, meeting carbon reduction and air quality targets, while managing costs and developing a modern and capable power system. In addition to the benefits set out in the response to Q16, further benefits may become possible with the development of new and innovative business models, for example through community energy programmes or the development of new service

offerings from grid-edge parties. It is not possible to know how such markets will develop, however these may be significantly beneficial to customers, the power system, and society as a whole.

Q20) In developing the power system to adopt a DSO model, there is risk of potential downsides, for example:

- Cyber security regarding personal data – with smart technologies, improved network and customer metering, dynamic tariffs, and engagement in services, it is likely that there will be increased personal customer data including detailed power use from which customer habits and occupancy can be derived. Therefore, the cyber security of transferring and storing that data will need to be carefully considered.
- Digital resilience risk for more connected and controllable systems – as networks become 'smarter', with more data collection and remote optimisation, there will be increased risk to resilience in the event of a cyber attack, potentially increasing customer interruptions and creating risk of a major resilience event.
- Complexity of potential service offering – while increased customer choice will be a benefit to some, others may find it confusing, and this may be a barrier to adoption.
- Potential discrepancy of service offering – It is likely that not all customers will have access to the same opportunities for engagement in the power system, for example, if data connectivity is not possible in certain areas of the country or if network constraints prevent participation in services. This may cause customers to be disenfranchised by this engagement.

General Comments: N/A.

14. SONI

Introduction

SONI welcomes the opportunity to respond to the NIE Networks Call for Evidence on “Greater Access to the Distribution Network in Northern Ireland”. SONI is the Transmission System Operator (TSO) for Northern Ireland. SONI is responsible for planning and operating the Northern Ireland transmission system safely and securely to ensure a reliable supply of electricity. SONI also operates the All-Island wholesale electricity market with EirGrid (the TSO in Ireland) through the Single Electricity Market Operator contractual joint venture.

These wholesale market arrangements have been in operation since November 2007, and were recently integrated with the wider European electricity market. This has introduced ex-ante trading and a one hour gate closure for the balancing market.

SONI is also the operator of the capacity market, which operates through auctions taking place both four years ahead of delivery and also one year ahead of delivery.

We provide a substantive response on the many questions asked in the Call for Evidence and the approach NIE Networks are proposing to take in the context of these roles.

Throughout our response we refer to the need for whole system thinking i.e. distribution and transmission. This is due to the potential for significant implications for the transmission system if the proposals within the Call for Evidence are considered only on a local distribution basis. As such we would urge any impact assessment, cost benefit analysis, trial or lessons learned to be based on whole power system thinking and engage all relevant parties to ensure the proposed evolution is right for the Northern Ireland customer.

Structure of Response

We start this response with some overarching comments setting out the key points that SONI would like to make in response to this call for evidence. We follow this with answers the specific questions asked within the consultation document.

Key Points

SONI has reviewed NIE Networks’ call for evidence in the context of its role as Transmission System Operator and also as Market Operator. In this latter role we have visibility of the costs across the electricity value chain. We are very aware that the power system on the island of Ireland is evolving, with this change taking place across all voltages. SONI has worked with EirGrid, as TSOs, to develop and implement the DS3 Programme with the wider industry and Regulators. It will be important to ensure that the interfaces between transmission and distribution are effective and that the changes we are making complement each other.

With this in mind, it will be essential that the approach adopted for the distribution network takes account of the evolution at transmission and that the approach to evolving the transmission system takes account of the opportunities available at distribution. This will require both the exchange of information and close working to ensure that the optimum solutions are developed.

To this end, SONI envisages the need for a fully developed and focused set of Distribution Interface Arrangements, as envisaged in both of our licences. This will require considerable effort from both parties to develop and implement, although it should be possible to leverage the working arrangements and responsibility allocations set out in the European Network Codes.

A number of key themes permeate our responses to the questions posed in the Call for Evidence. These can be summarised as:

- The market structure and obligations on participants differ significantly between GB and NI. The solutions chosen will need to add value in the context of the SEM gross mandatory pool. In many of the subject areas discussed, the solutions that are appropriate for NI will vary significantly from the appropriate approaches for GB DNOs. We would urge engagement with SONI on this as soon as possible to ensure NIE Networks has a clear understanding of the impacts that some of these proposals could present.
- If the correct assessments are not undertaken, there is a risk that the solutions chosen at distribution voltages could have unintended consequences in terms of:
    - system stability;
    - safety;
    - costs in the wholesale market; and
    - financial risks that would to be borne by market participants.
- If NIE Networks were to operate as a service provider and a market facilitator, there is a risk that perceived or potential conflicts of interest could be introduced.
- Additional information feeds have the potential to be useful and facilitate more efficient outcomes for all parties, but these will need to be provided sufficiently ahead of market timeframes if they are to be effective.
- The Call for Evidence references DS3 and System Services in several places; again this is an area for which we would urge engagement with SONI. The DS3 programme is a multi-year industry wide transformational innovation programme. As NIE Networks are considering a multi work stream programme of change over several years, we would urge a similar approach to that adopted for DS3 i.e. ongoing relevant stakeholder engagement in all work streams, with appropriate consultation and oversight throughout.
- Where appropriate, low tech/low cost approaches to achieve desired benefits should be considered first (with a consideration given to an incremental approach) rather than a high tech/high cost approach to achieve marginally more benefit (on a whole system basis).

Throughout our response we highlight the need for engagement with SONI and other industry partners to ensure the evolution is carried out in a way that provides benefit to all NI customers (not just the connecting embedded generation).

As this programme progresses, and proposals become more developed, it will become possible to further consider how the outcomes of the proposed changes will impact upon the whole system. It is not currently possible to assess the full range of customer benefits and impacts without this detail. It will be imperative to assess the impact of these proposals on the full power system, not just the local distribution network. To take the narrower view would lead to misleading conclusions and distort the overall impact or benefit to all customers in Northern Ireland.

SONI will be happy to work with NIE Networks to ensure that the benefits of this transformation are unlocked for customers

Response to Questions

In this section, SONI sets out its response to the individual questions raised in the Call for Evidence.

Q1) The proposed definition requires more clarity in the Northern Ireland context. The operation of generation on the distribution network (including distributed energy resources) needs to align with the wholesale market rules that apply.

The Northern Ireland Grid Code mandates all generators larger than 10MW are to be centrally dispatch by the TSO and their licences oblige them to participate in the I-SEM balancing market. They are also required to establish any Final Physical Notifications that they submit to SONI, alongside their bids into the balancing market, through the I-SEM ex-ante markets. Their licences also oblige participation in the I-SEM Capacity Remuneration Mechanism (CRM). They are therefore exposed to the financial risks related to all of these markets.

Any active management by the DSO should not introduce unnecessary risk to the commercial operational of embedded generation or the security of supply. Given the number of markets that generators and demand side units are able to operate in, clarity is required around what markets are referred to in the proposed definition.

It is also important to note that operation of the distribution system will have a direct impact on whole system optimisation (whole system including transmission and distribution). As such any action should take place in a coordinated manner, as not to introduce costs or technical problems on other parts of the system.

As the TSO, SONI maintains system frequency within the operating limits. Any action to change the generation and demand balance on the whole system will impact this system frequency. This whole system consideration is an overarching stability criteria that should be of foremost concern and as such it is not optimal to have uncoordinated action by multiple parties in this area.

Q2) **Market Facilitator** – This is a function, which if executed properly, could produce customer benefits and help deliver overall system security, sustainability and affordability, through facilitating access to the wholesale energy market and DS3 System Services payments. However, care will need to be taken to ensure that important signals are not distorted to the detriment of customers.

Service Provider – It is unclear how this function can be completed whilst fulfilling the Market Facilitator function of maintaining a neutral market position. This function has the potential to introduce a perception of a conflict of interest, even if the DNO does not benefit commercially, in this context we refer you to the assessments undertaken by the SEM Committee in 2016[8].

Congestion Management – More clarity is needed on “market based solutions” because it would be problematic if any market signals contradicted or distorted the wholesale market signals. It is important to note that system wide considerations (for example, frequency) are the overarching

[8] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-16-041%20I-SEM-%20DS3%20Mitigations%20for%20Potential%20Conflicts%20of%20Interest%20in%20EirGrid%20Group.pdf

factors that underpin safe and secure system operation. It would not be acceptable for an action to be taken to address a local congestion problem that would have an impact on overall system frequency. To do so, would potentially introduce cost into other parts of the system and risk to system operation. In this regard, it is important to note that the SEM Committee is continuing to assess the signals to DSUs and their bidding behaviour in the I-SEM[9].

Connections – Innovative connection options should be considered holistically. Innovative connection options still need to meet standards and drive a benefit to the overall system, not just for the connecting customer. A wide range of "one off" connection methodologies will have an overall negative impact on system operation by introducing an unnecessary level of operational complexity. Standards will need to be set prior to any innovative connection options being offered to customers, as not to introduce precedent. These will also need to be agreed by all impacted stakeholders. SONI suggests a caveat is included, whereby NIE Networks would only connect where the additional generation is only connected if it does not increase total system costs.

Data Provision – Data frequency, granularity and quality should all be assessed in this context. Co-operation with the TSO is essential to ensure any improvement in data provision results in realisable benefit. Data provision should focus on information that can be used to increase competition in the market or benefit real-time operations, driving down prices sufficiently for customers to offset the cost of collecting, storing, processing and transmitting the data.

Network Management – In the event that any of these tools or operational procedures will impact the whole system, it is important they are developed in co-ordination with the TSO.

Charging – It should be highlighted in the consultation paper that this only relates to distribution charging. The signals sent by distribution charging will need to remain consistent with the wider market signals, so as not to introduce distortions or unintended consequences.

Q3) The current process is not efficient and not providing an efficient solution for the TSO, the DSU or the end customer. The introduction of dynamic instruction sets has the potential to enable the generator to provide energy and/or system services to the system for more periods that the current process allows.

The benefit of providing these instruction sets in real time should be carefully considered, as timelines will need to be aligned with the wholesale market design and timeframes to avoid unintended adverse consequences.

For example, if a generator bids into a T-4 capacity auction on the assumption that the DSO will facilitate access at peak times, but that doesn't materialise, there will be a financial impact on the generator and also a potential supply issue.

Any dynamic instruction sets will only facilitate customer benefits if the information is available sufficiently far ahead of energy market timeframes, particularly the ex-ante and balancing market gate closures.

[9] https://www.semcommittee.com/sites/semc/files/media-files/SEM-18-158%20SEMC%20Info%20Note%20on%20DSU%20Bidding.pdf

NIE Networks should give consideration to the level of effort required to make a single large jump from static to fully dynamic, because there may be a large amount of benefit that can be realised from updating input assumptions in the current static approach.

The TSO would welcome engagement with NIE Networks on this to ensure the capability developed by the DNO is usable for the TSO and that any investment will provide benefits.

Q4) As the generation portfolio on the system becomes more changeable i.e. times of high weather dependant RES generation and times of low/no weather dependent RES generation, it is important to make use of the existing reactive power capability in the system when it is available.

In order to deliver the benefit however i.e. facilitate the TSO agreeing contracted terms with distribution connected parties to provide the relevant System Services, it is important that the capability made available to the TSO is maximised and made readily available and accessible directly to the TSO.

We would note that the TSO requires the functionality as discussed, but is not stating that the nodal controller proposal is not the only method available.

Consideration to the roll-out of any such scheme is necessary in terms of cost, timelines and overall methodology.

SONI would welcome engagement with NIE Networks throughout the development process to ensure the end goal of facilitating distribution customer's participation in the System Services market is achieved.

Q5) There is a risk of a perception of conflicts of interest between the roles of market facilitator and service provider. The SEM Committee[10] has already opined on this and SONI would expect similar measures to be required of NIE Networks.

It is not clear how these actions can be taken by the DNO and not have a knock on impact on existing services providers connected to the distribution network in Northern Ireland.

Any consultation should include analysis to support the claim that NIE Networks providing these services would help reduce bills for all customer types. SONI will be happy to work with NIE Networks on this assessment.

Q6) In making distribution network investment decisions NIE Networks should ensure that these are fully assessed on an economic cost benefit analysis on a whole system basis.

In identifying potential network solutions NIE Networks should be cognisant of the cumulative impact of a given technology on the safe, secure and economic operation of the whole system and SONIs role of Transmission System Operator. The potential to trigger unnecessary costs in the wholesale market will also need to be assessed.

[10] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM%20-%2016%20-%20041%20-%20I-SEM-%20DS3%20mitigations%20for%20potential%20conflicts%20of%20interest%20in%20EirGrid%20group.docx

SONI would be concerned if any of the schemes had an impact on the transmission system. In these circumstances, SONI should be consulted. Investment decisions relating to the transmission system are a SONI's responsibility, however we will work with NIE Networks to ensure that value is delivered through a coordinated approach.

SONI agrees that NIE Networks should trial smart solutions first, ensuring any solution complies with the TSSPS and DSSPS, and compile lessons learned. If any scheme will be of significance to the transmission system SONI should be a key part of the trial process, noting that most schemes will impact on the market and transmission system if implemented at scale.

The financial assumptions will need to be carefully considered in the context of the SEM, noting that these proposals have a potential to increase balancing costs, under the market rules determined by the SEMC.

Q7) SONI believe this question relates to the ongoing Connection Policy discussions. Given the system wide implications of the suggestions and that it is more appropriate to address these issues in that joint forum. SONI have concerns that further connection of generation on a fit and inform basis may adversely impact on the quality of the information provided to SONI in regard to zero export generation connected to the system.

It is essential that this information is accurate as SONI must understand the cumulative impact of this uncontrollable generation on demand patterns to ensure the safe and efficient operation of the transmission system.

NIE Networks should also be cognisant of the impact that their proposals have on the wholesale market and the potential for cost impacts there.

With these wider and potentially significant impacts in mind, SONI is of the view that connections initiatives should be undertaken jointly to ensure that coordinated solutions are delivered that are in the best interests of consumers.

Q8) As above SONI believe this question relates to the ongoing Connection Policy discussions. Given the system wide implications of the suggestions and that it is more appropriate to address these issues in that joint forum. We also have concerns about the quality and timeliness of information of uncontrollable generation connected on a fit and inform basis.

SONI has further concerns that creating a "Fast Track" G59 process will compromise the quality of network analysis carried out. In particular SONI would have concerns on this "fast track" approach on the quality of fault level information available to SONI.

SONI would therefore caution the assumption of reduced likelihood of considerable grid impact. This connection type at scale would of course have considerable whole system impacts. Consequently, it is not sufficient to consider a single connection when making these recommendations or decisions and a holistic approach should be taken.

With these wider and potentially significant impacts in mind, SONI is of the view that connections initiatives should be undertaken jointly to ensure that coordinated solutions are delivered that are in the best interests of consumers.

9a & b) Clear data exchange processes and formats will benefit all users of the electricity system by enhancing operational security. This is a fundamental objective of Key Organisational, Requirements, Roles and Responsibilities (KORRR) which forms part of the System Operator Guidelines (SOGL) EU Network Code. KORRR will help to develop current processes and formats so that TSOs, DSOs, and Significant Grid Users (SGUs) have clearer principles of communicating information relevant to sustaining operational security. The TSO welcomes the opportunity to engage with NIE Networks to enhance current data exchange practices in light of KORRR.

9c) A key part of KORRR will be its application to SGUs, which includes generators from capacities of 100 kW or greater. As the SGUs that will receive these additional data feeds are primarily connected to the distribution system, the TSO welcomes the opportunity to engage with NIE Networks to develop suitable solutions to fulfil this requirement.

10a) A key part of KORRR will be its application to SGUs, which includes generators from capacities of 100 kW or greater. As these SGUs are primarily connected to the distribution system, the TSO welcomes the opportunity to engage with NIE Networks to develop suitable solutions to fulfil this requirement.

10b) Under KORRR, certain customers will be SGUs. As a result, they will have certain rights which will make relevant data available to them. In the interest of efficiency and value to electricity customers as a whole, processes for data exchange should be clearly defined.

Q11) In making network investment decisions NIE Networks should ensure that these are fully assessed on a cost benefit analysis of the whole system. In identifying potential network solutions NIE Networks should be cognisant of the cumulative impact of a given technology on the transmission system and the boundaries of their distribution licence.

This will be of greatest value if it is developed in a way that aligns with participation in the Capacity Market, particularly T-1 auctions. It should ensure that viable and reliable participants are able to compete in the auction without excessive risk, while ensuring that less reliable plant are not able to displace competitors to the detriment of customers

Q12) SONI acknowledges that the increase of generation on the distribution network, at times changes the direction of flow on that system. NIE Networks is responsible for charging for use of the distribution system in a cost reflective manner. SONI would only be concerned if the signals sent through those tariffs resulted in unintended consequences for or contradicted signals from the wholesale market. NIE Networks Call for Evidence

Q13) SONI would welcome an opportunity to discuss the interaction between the signals sent by distribution and transmission tariffs.

Q14) System Service Providers – SONI and EirGrid have undertaken a major programme that has updated system services provision in the context of the power system on the island of Ireland. If any distribution connected customers are participating in the energy market they are also subject to dispatch by the TSO, therefore it is essential that, if a DSO system services market is created, it will need to work with the TSO market to ensure system security, stability and efficiency, and prevent double payment.

Active Participant – Clarity should be provided that, under the NI Grid Code and I-SEM Trading and Settlement Code, customers actively participating in the energy market will be subject to mandatory

central dispatch by the TSO. This differs significantly from the equivalent arrangements in GB. SONI would welcome more information regarding some of the new terminology e.g. flexibility service operator.

Passive Participant – It is important to note that although the person who has installed the off-the shelf low carbon equipment may be passive in their interaction with the system; the technology they have installed is not. It has the potential to impact flows on the system and it will respond in possibly undesirable ways during system events.

Passive Consumer – It is not clear what is meant by "...in due course could agree smart energy contracts with suppliers and aggregators (at which point the key relationship is between the DSO and the aggregator/supplier, therefore the customer will fall out of these categories)." Any aggregator or DSU participating in the energy market or capacity market is required to submit to central dispatch from the TSO. This differs from GB.

Q15) The TSO is not a customer, however it is a key stakeholder in the energy industry and as such should be consulted with closely throughout this process. Acknowledgement and consideration of the interaction between the distribution and transmission systems will be the key to success and avoiding pitfalls when developing these proposals. Approaching these opportunities in a joined up manner has the potential to result in benefits for all system users, however if the transmission impacts are ignored, this initiative could result in higher overall costs for all customer groups (including transmission customers and wholesale charges) as well as increased system operational complexities

Q16) When assessing the benefit of a change, the cost benefit analysis should cover all these customer groups, and not just provide a benefit to a connecting DER customer. To do this, whole system costs should be considered, not just any potential cost reduction on the distribution system, as this would misrepresent the potential for cost increases on other parts of the whole system caused by these initiatives.

Q17) Without having detailed proposals to review it is not possible to comment on this in a meaningful way. At a high-level, please see previous responses related to potential for an actual or perceived conflict of interest between some of the DSO functions proposed and also the need to be cognisant of the cumulative impact of these proposals on the safe, secure and economic operation of the whole system and SONIs role of Transmission System Operator. Any decisions will need to be consistent with the decisions of the SEM Committee relating to the wholesale market and the transmission system, including the ongoing monitoring of DSUs.

Q18) Greater access should also be defined carefully; the initial interpretation of this document is that the focus is in terms of embedded generation connecting to the network.

Where appropriate, low tech/low cost approaches to achieve desired benefits should be considered first (with a consideration given to an incremental approach) rather than a high tech/high cost approach to achieve marginally more benefit (on a whole system basis).

The emphasis on deferring network investment should be treated with care, if the investment need remains or will return a short time after the implementation of a smart solution and just being deferred, what is the long term benefit. However, if the network is being development in such a way that it caters for a wide range of possible system evolutions - that is money well spent.

As these proposals are being developed further, SONI would welcome engagement with NIE Networks and other relevant parties to ensure that the evolution is relevant in a Northern Ireland context and that it delivers savings across all relevant markets to all customer types.

Q19) Customer benefits should be carefully defined and quantified, because a benefit to one group of customers could have a negative impact on another customer group, or in fact another customer within the same customer group.

Without detailed proposals and consideration of how the outcomes of the proposed changes will impact the whole system it is not possible to assess the customer benefits. We would strongly oppose the methodology of assessing the impact of these proposals on the local distribution network, as this would misrepresent the potential for cost increases on other parts of the whole system caused by these initiatives.

Q20) There is the potential for unintended adverse impacts if the DSO initiatives are not aligned with the wholesale market, for example an increase in dispatch balancing costs which would directly impact the cost to consumers and TSO incentivisation.

The level of complexity of flows at distribution level will make management of the system increasingly difficult. Policies for customers need to be put in place now to ensure the management of the system in the years ahead. The benefit of any increased complexity including additional resources or systems should also be carefully considered on a whole system basis in the relevant economic assessment.

If changes occur on the distribution system and are not considered in a holistic manner with other key stakeholders i.e. the TSO, any benefit to the distribution customer could quickly be undone and possibly overshadowed by the potential increased costs on other parts of the whole system.

15. ULSTER FARMERS' UNION

The Ulster Farmers' Union (UFU) welcomes the opportunity to contribute to this Call for Evidence.

Representing 11,500 farmers and landowners in Northern Ireland, our interest in the Distribution network is four-fold. Firstly, 21,000km of 11kV overhead lines crosses rural NI and consequently the land, which we own/access and is integral to our day-to-day work. Secondly, our members businesses rely upon the 11kV/33kV network for servicing the electricity and power needs of their farms, as well as when connecting new-build farm buildings to the grid. Thirdly, many of our members have connected small-scale renewable generators to the grid. Finally, and possibly most crucially of all, the land based sector still have so much to offer in terms of renewable energy provision and this Call for Evidence is certainly a step in the right direction.

Q1) Based on experience of our members over the last 10 years, the UFU would have concerns in relation the prospects of the increased "digitisation" of the network and in particular, the ability of traditional network operators (NO) to provide the resulting service. Consequently, we would wish to reiterate what our colleagues at NIRIG said and suggest three possible alternative approaches;

DSO to act as market facilitator - Data management; collection of data, construction of the information infrastructure to be allocated to the DSO. As well as the electricity network, they will be responsible for data storage and management of the exchange of data.

Regulatory Position of the NO (Network Operator) - Two approaches to be considered. Firstly, you could treat data management as a task for the NO but it would be separate from their regulated business. Secondly, we could consider the concept of an Independent System Operator, where one specific entity takes responsibility for operational activities (system operation) in the network and is crucially, independent of transmission asset ownership.

Delegate responsibility for data management to third parties - What is important in this context, is that the entity would be solely responsible for data management (as per above definition). This could be an independent and neutral third party market facilitator (centralised) or there could be a competitive market whereby services could be offered via a tender process.

Q2) Conventional reinforcement should still be considered as a network solution in parallel with more innovative solutions. With speculation mounting regarding Brexit and the implications on security of supply, we need to keep our options as broad as possible. We should also repeat on the need for focus on the role and function of the system operator in the context of increased digitisation.

Q3) If any move to a more dynamic instruction sets facilitates the reduction of constraints, maximizes the network capacity utilization and consequently optimizes the decision making process for the customer, then the Ulster Farmers Union are supportive of this approach.

The key goal is a scenario where the information can be analysed by the customer/generator and they can make real-time business decisions on the back of it. For example, if a would-be generator was to have the optimum information available, they would be able to make informed decision which would then have a positive impact upon their business performance.

Market participation should be facilitated, as long as these objectives are met. Also, system services provide valuable support for energy system management and will require ever-increasing levels of information provision.

Q4) Yes. However, the UFU wish to acknowledge that NIE Networks have already embarked upon looking into nodal voltage control projects and these should continue to be rolled out and developed.

Q5) Overall, it is vital to ensure continued investment in transmission and distribution network, for reasons already stipulated. The UFU believe that it is crucial to enable a competitive approach for the provision of these additional services.

Q6) Yes. The UFU are incentivised and encouraged by recognition by NIE Networks of the role of smart solutions going forward and being part of the solution in relation to greater access to the distribution network here in Northern Ireland. In particular, smart solutions such as energy storage, Demand Side Response (DSR), Vehicle to Grid (V2G) technology and in particular the development of Peer-to-Peer (P2P) energy trading.

However, we would be cautious about the perceived benefit of smart solutions in the eyes of this Call for Evidence. This document highlights that smart solutions "can be used to defer capital expenditure on the network and therefore deliver financial benefits to the general customer base". The UFU believe that smart solution such as these should be a blue print as to how the future grid will operate, rather than a cost saving exercise. In the short term, conventional investment should be considered alongside smart solutions, but the latter should be the map for future policy.

As we said previously in our response, it is crucial that NIE Networks should continue to invest conventionally, i.e. upgrading existing and new transmission circuits/investing in existing substations. In parallel with this conventional investment there is a need for NIE Networks to consider smart solutions that can maximise the use of existing and new assets.

Despite political stalemate at Stormont, 2020 is only 14 months away and so too is the expiry of the Strategic Energy Framework Direction, which contains our targets for generating electricity from renewable sources. Consequently, Northern Ireland will have to continue to decarbonise its electricity sector to meet national and global commitments to addressing climate change. This will drive the requirement to connect substantially more renewable generation onto the NIE Networks' transmission and distribution system.

The UFU acknowledge and support that the electricity system will have to become 'smarter' to allow this change. This includes changes of how both demand and generation connect and operate. However, this will not take away from the need to continue to develop the transmission system with conventional technologies. Some of the best wind resources and sites for new wind projects will continue to be in the West of Northern Ireland whereas the demand and export points will continue to be in the East of Northern Ireland. This will require the continued development of the transmission system, both upgrading the existing circuits and the construction of some new circuits. Considering the long timeline to develop transmission infrastructure it is critical that SONI and NIE Networks start works on new projects that can increase the capacity of the transmission system in the West of Northern Ireland. Noting that we have a significant proportion of our members in the Western part of Northern Ireland and in rural locations.

Q7) Yes.

Q8) Yes.

Q9a) Such has been the demand for deployment at distribution level, it is more critical than ever for maximum real-time visibility of power flows, on the system. Such visibility would allow for a reduction of curtailments, release new capacity for new generators and allow customers to make more informed business decisions. The control and reduction of capacity constraints will enable more access for low-carbon and smart generation.

Q9b) Please note our response to Question 1.

However, when considering the Two-System Operator model, full visibility is a prerequisite. Any boundary between the Transmission and Distribution System Operator should not hinder improved data flows.

By improving both communication and process efficiency, this will enable full use of data across all system operators. Consideration needs to be given, to how data collection and management can be fully utilised. Reference should be made, to the successful testing of the 'Kent active system management' in GB, which aims, to have both systems achieve reciprocal visibility in the control rooms through SCADA.

Q9c) Please see answer to Question 1.

Given that most of new installed generation is non-displaceable, the sharing of forecasting tools across DSO-TSO is essential to align the above-mentioned power flows and avoid any unnecessary curtailment. The UFU have championed the case of battery storage, and we welcome the recognition by NIE Networks in the call for evidence. Storage (i.e. Standards and Management etc.) and the retrieval of energy will need to be mandated/regulated, and then monitored by the Utility Regulator to ensure fairness and transparency

Q10a) Yes. Metering is currently too simplistic and we believe that it is limited in meeting the challenges ahead. Whichever system operator approach is adopted and taken forward, data provision and visibility will be vital to ensure efficient management of the network.

Q10b) Yes. Smart and efficient management of the network will require all customers to have greater visibility of energy use, generation, cost and storage. Smart metering will provide information on energy usage but will not enable customers to respond to market signals or manage energy use based on self-generation, for example. Customers should be able to access their own data and consideration should be given to wider data (with confidentiality taken into consideration) so that they can understand their choices for new services.

Service Providers should also be required to provide data (again with consideration to confidentiality). The regulatory function needs to be amended to meet data protection standards.

Q11) Yes. With increased curtailment likely in the coming years due to the lack of capacity and increased renewable generation, implementing such solutions is vital. NIE Networks should be continually looking to maximise the efficient and economic operation of the grid network through all possible means. Active Network Management and real time monitoring are two examples which would allow both generation and demand to work with the grid.

Q12) In the future, the UFU want to see visible costs, along with a transparent and fair solution. Uncertainty and the discouragement of investments, result from over-complex charging methodologies. Existing tariffs do not provide sufficient visibility and flexibility for customers to respond to price signals. Smart system with storage, demand-side response and maximised efficient network use will require greater incentivisation of customer flexibility and active network management.

Q13) See above.

Q14) Yes, it establishes a good baseline. Going forward, customers should develop in terms of technology and participation, (e.g. prosumers such as our members). Hopefully, beyond those who are currently in the market.

Q15) System Service Providers, Active Participants and Passive Consumers

Q16) The UFU welcome the recognition by NIE Networks on "Prosumers" as this encapsulates our members. We are also encouraged by the mention of Peer-to-Peer Energy Trading as this is something we have been calling for the last decade.

Q17) The UFU believe that an overarching review of the energy policy and legislation Northern Ireland is required. Starting with DfE making clear about how the Strategic Energy Framework will evolve post 2020 as this has been forthcoming from the start.

New technologies, new markets, growth in flexible demand and an increasing number of small-scale generators will all mean significant changes to the energy landscape going forward. The Utility Regulator, SONI, NIE Networks, Government and all policy-makers must prepare for these changes by ensuring that policy and regulation facilitates and promotes this new focus.

Regarding the evolution to DSO, please note our response to Question 1 which outlines alternative models which we believe should be considered and consulted upon. However, should the existing model be adopted we urge that the interface between SONI as TSO and NIE Networks, as DSO will require a streamlined and barrier-free communication.

The UFU recommends a review of the duties and obligations of bodies such as the Utility Regulator, to enable more flexible policy-making.

Q18) Upgrade existing and roll out new transmission circuits/invest in existing sub-stations/modelling and delivering battery solutions. As we said previously, NIE Networks must invest conventionally. The network has been merely "tweaked" in the push in meeting demand from generators connecting to meet the 40% renewable electricity target, without any significant investment particularly on the 11kV lines. Going forward, this will not suffice in meeting post-2020 targets, should they ever emulate from government. In parallel, NIE Networks must open up consideration on smart solutions which can maximise existing and new assets.

Q19) There needs to be greater recognition of the role, both present and future that small-scale generation (SSG) within the land-based sector can play in energy security of supply in Northern Ireland. We have the resources and capabilities to be an integral part of the solution. It has been proven that in terms of rate of response, SSG is quicker and this should be rewarded by offering a capacity payment. This would be possible with the interaction of on farm SSG (wind turbine etc.) and a storage array/diesel gen set. There are likely to be land availability issues surround the further development of sub stations, however, the strength of the land-based sector is the availability of land.

Q20) No.

General Comments: The UFU welcomes NIE Networks acknowledgement that there is a new direction of travel in distribution network operation, with not only an significant increase in transport and heat electrification, but also the role to be played by SSG. However, it is the recognition of more consumers producing their own electricity, after many years of lobbying by the UFU and acceptance that energy storage is part of the solution and the mention of Peer-to-Peer Energy Trading where the UFU are particularly enthused.

Even before the NIRO closed, the UFU were heavily lobbying for alternative ways to access the grid to be considered. We included this in our formal submission to both RP5 and RP6 consultations, as well as in written and oral presentations to both Stormont and Westminster Government Committees, press articles and meetings with Ministers and industry stakeholders.

Today, more than a third of farmers and growers are using wind, the sun, farm by-products and energy crops to produce clean low-carbon energy. A variety of farm-based renewables already provide electricity and heat for on-farm use, sometimes also supplying local businesses and homes in rural communities. The push on NIROs meant that much of the renewable energy produced is exported directly to the grid.

Greenhouse gas emissions from British farming have been cut by 20% since 1990. Climate-friendly energy produced on farms could reduce UK greenhouse gas emissions by up to 17 million tonnes of CO2 by 2020. Agriculture could be the source of more than one-quarter of national renewable energy needs.

AD plants, wind turbines large and small, solar roofs, solar fields and biomass boilers are all becoming more commonplace in the countryside, and the UFU believes that they are very much part of the future of the agricultural economy.

Vehicle-to-Grid Considerations - As far as plug-in electric vehicles (PEV) are concerned, the potential exists to use on-board energy storage of the actual vehicles as a "distributed energy storage" platform. This would be available to the grid for as long as the PEV is plugged in and recharging. By discharging back to the grid, this has the potential to improve grid utilization and level out the demand for electricity.

However, there are reoccurring concerns in relation to the potential mismatch between PEV load and renewable generation. This could be addressed by smart grid technology where "time-of-use" price would be enabled.

The Call for Evidence is recognition by NIE Networks that they need to plan for a future with increasing demand levels on the distribution system through the electrification of heat, transport and data centers, as well as increasing levels of renewable energy. NIE Networks have also significantly acknowledged two key areas, which need to be considered and these have been central tenets of UFU policy over the last decade;

- Energy storage technology is rapidly improving and its use growing accordingly.

- More consumers now have the ability to produce their own electricity.

In their assessment, NIE Networks have identified "prosumers", which is the name for customers, who use and produce electricity in their homes and businesses. These are the very interests that the UFU Rural Enterprise Policy Committee are representing, namely farm-based small scale renewable generators; wind turbines, solar PV units, AD plants etc. who are producing renewable energy which is in turn in most instances is used in their farm businesses.

Such collective technology is referred to as Distributed Generation, and over the last decade, we have seen rapid growth, which has in turn led to problems on the electricity grid, namely significant capacity constraints which have been prevalent during this time.

In both RP5 and RP6 consultations, the UFU suggested alternative solutions to conventional reinforcement (which is recognised as being expensive) and up until now, been mostly unrecognised by the relevant authorities.

As part of our response, we are again calling for all key decision makers to acknowledge the role of agriculture in energy production. DAERA for example, have refused to date, to look beyond conventional food policy. Namely, such landowners should be looked upon as energy producers as well as that of food.

One of the failings of renewable policy in Northern Ireland has been the lack of integration, with, to date, no policy pursuing the development of the storage of excess generated energy. Whilst the UFU has called for the development of conventional battery storage solutions, we have also recently called for research to be advanced into ways that energy could be stored organically as this could be facilitated by the use of locally grown crops.

The new direction set out by NIE Networks needs to maintain momentum and go further. Namely, there needs to be a move from a supply-side infrastructure to "the other side of the meter", in other words, a bottom up approach. This

would go a long way towards bringing about the integration of distributed generation sources and work towards allowing the ability to “switch-on” controllable site-loads.

For example, specific policy suggestions are; Regen have produced a series of animations for Western Power Distribution (WPD), that describe innovative ways of connecting, supplying, managing and storing energy on the electricity network. By controlling when and how much electricity is generated and exported, better use could be made of the network; three options could be considered;

Option 1 – Use technology that limits the amount you export to the network.

Option 2 – Only export electricity at specific times of the day.

Option 3 – Active Network Management.

The UFU are still pushing for consideration to be given to “Local Supply”. This is where a local farm could produce renewable electricity via wind turbine/AD unit/solar PV and supply it locally. Two options could be considered. Option 1 – Avoid the network completely, through a direct connection between the generator and the end user i.e. a Private Wire. Another Option would be to match electricity generation and use at a local level. This balancing of demand and supply is normally done at a national level. However, this balancing could be done locally. One example would be the use of smart meters, which whereby a portion of the electricity used would supply locally, the remaining usage would be met using a “time-of-use” tariff. This could better reflect the cost of power at that point in time. Local Supply would give more control over the price of electricity and keep more money in the rural economy. This would benefit the wider rural economy and improve energy efficiency.

Consideration should also be given to “Zero-Net Energy”. This is where the renewable energy produced on a farm meets the exact needs of the business, with no spill or wastage.

Local supply/zero-net energy will only be possible if on-farm energy storage solutions are advanced and this call for evidence is a much welcomed and needed step in the right direction towards achieving these policy goals and this will form basis of the UFU response.

The UFU point is that should these suggestions be considered, it could usher in a world where new generators could be encouraged to enter the world of small scale renewable generation, without subsidy and without the risk that has beset so many of their peers.

16. ULSTER UNIVERSITY

Ulster University welcomes the publication of this Call for Evidence and the opportunity to respond. UU is currently engaged in a number of major research programmes which focus on consumer-owned, distributed energy resources (DER), which impact directly on NIE Networks' transition from Distribution Network Operator (DNO) to Distribution System Operator (DSO).

UU strongly supports widening access to the NI distribution network for DER, and the consequent change in role for NIE Networks. We hold the view that that the success that has been delivered over the past 10 years in integrating world-leading levels of wind energy using traditional TSO-controlled resources must now be built upon using smart, dynamic systems at network level. This will require NIE Networks, as a DSO, to have a much more prominent and significant role in the active management of generation, loads and network infrastructure.

Our response to this call for evidence is predicated on the view that greater access to the network is essential to deliver benefits to NI consumers, and should be based on the following simple principle;

The network is ultimately owned by the consumers who pay for it; therefore, where consumers need network access in order to monetise value that they can deliver, this should be facilitated as far as possible.

Q1) Yes, we agree with this definition, however, see note below.

Q2) Rather than the broad reference to 'markets', the definition should specifically mention new performance incentives and competitive earnings to facilitate the development of network-level electricity markets (often referred to as transactive energy), where consumers can monetise locational and temporal value for flexibility and consumer-owned energy resources in real time.

Q3) Yes.

Q4) Yes.

Q5) No. These services should be delivered through markets in which consumer-owned DER are incentivised to compete.

Q6) NIE Networks should adopt and integrate smart solutions. However, this should happen urgently rather than incrementally.

Q7) Yes.

Q8) Yes.

Q9a) Yes, bearing in mind that customer data is owned by the customer.

Q9b) See previous answer.

Q9c) The emergence of digital communications means that the DSO can, and we believe should, have real-time visibility of all network assets down to, but no further than, the customer meter.

Q10a) Yes, greater metering functionality is required in NI, however the cost of this should be borne principally by whoever receives the benefits.

Q10b) Yes. The development of markets for flexibility and consumer-owned DERs depend on access to data.

Q11) NIE Networks should develop a 'flexibility first', least-cost approach to constraint management, which considers non-wires alternatives to conventional reinforcement. This should be based on an open competitive tendering process, similar to that recently launched by UK Power Networks.

(https://www.ukpowernetworks.co.uk/internet/en/news-and-press/press-releases/UK-Power-Networks-announces-25-flexibility-first-zones.html)

Q12) No.

Q13) Yes.

Q14) Yes**.**

Q15) N/A.

Q16) The development of the NI power system has historically been based on incentivising corporate players to provide goods and services, whether this be capacity subsidies for obsolete fossil fuel generators, or ROCs subsidies for large-scale wind generators. The transition of NIE Networks from DNO to DSO provides, for the first time, an opportunity to reward consumers for value that they can deliver. We believe that this transition to a more decentralised, consumer-based system will ultimately deliver benefits to all consumer groups.

The delivery of these benefits can be maximised by the urgent, rather than incremental, transition of NIE Networks from DNO to DSO.

Q17)

- The absence of an executive and the failure to develop energy policy since the Strategic Energy Framework of 2010 means that NI consumers are paying for an outdated system, which has not been able to reap the benefits of the technological changes which have taken place in the energy sector since then.
- The existing RAB-based, 'lines and poles' revenue model for NIE Networks is outdated. A performance-based model would be a critical first step in helping NIE Networks to deliver a smart, dynamic network. The regulator should urgently assess the impacts of new network revenue models being implemented by, for example,
    - New York state (https://rev.ny.gov/);
    - California (http://www.caiso.com/participate/Pages/DistributedEnergyResourceProvider/Default.aspx);
    - Rhode Island (http://www.ripuc.org/utilityinfo/electric/PST_home.html).

Q18) N/A.

Q19) The move towards a decentralised, DSO-led system also creates potential for the electrification of heat and transport. The displacement of kerosene, natural gas, diesel and other hydrocarbons from heat and transport, in favour of a clean local power, not only leads to reductions in CO2 emissions, but a reduction in other forms of pollution including particulates, carbon monoxide, oxides of sulphur and nitrogen, volatile organic compounds, etc.

Q20) No.