Greater Access to the Distribution Network in Northern Ireland

Consultation Document – Appendix 1

This Appendix provides a more comprehensive summary of the responses received to the Call for Evidence on Greater Access to the Distribution Network in Northern Ireland and is accompanied with NIE Networks' associated views.

RESPONDENT	RESPONDENT COMMENT	NIE NETWORKS' RESPONSE
	Question 1: In the Northern Ireland context do you agree with the DSO definition? If not please state how you believe the DSO should be defined.	
ANDY FREW	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.	NIE Networks agrees that the longer term objective to achieve a decarbonised economy is to look at the whole energy market. However, such a strategy for Northern Ireland is beyond the remit of NIE Networks' current licence obligation and the scope of this consultation.
ANONYMOUS RESPONSE	While the definition of the DSO is clear, it would be useful to provide clarity to any changes to the future role of the TSO if any. Do you anticipate reduced investment on Transmission Network infrastructure?	NIE Networks does not believe that the evolution from a DNO to a DSO will fundamentally change the role of the TSO, but rather evolve the existing roles and responsibilities of the DSO to deliver whole system coordination and customer benefits. However, even if changes to the role of the TSO were expected NIE Networks does not believe it to be appropriate for the role of the TSO or any changes to its role to be included within the DSO's definition. This DSO evolution should not materially affect Transmission Network investment.
ULSTER FARMERS UNION	Based on experience of our members over the last 10 years, the UFU would have concerns in relation to 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	Whilst NIE Networks recognises that there are variations of network operator model as presented by some respondents, the model being proposed by NIE Networks is an extension of existing DNO processes and systems and does not require wholesale license and/or statutory regulation changes. For this reason the DNO to DSO evolution proposed by NIE Networks is considered as a low risk, least regrets approach. It

	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 service could be offered via a tender process.	should be noted however, that the adoption of the proposed evolution in the short to medium term does not preclude the transition to more radical models in the longer term if it is proved more efficient. Regarding the recommended use of innovative or smart methods on the network (relative to conventional methods), in RP6 NIE Networks will be running six innovation projects to understand how successful innovation projects can be transitioned into Business as Usual in the Northern Ireland context.
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	
POWER ON	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. " 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	NIE Networks acknowledges the concerns regarding the "scope for conflict" between the market facilitator role and service provider role. To consider this further, NIE Networks has identified 4 potential variants of the service provider function: • Maintain the current process. • DSO as system service participant. • DSO as first call provider. • DSO as last call provider. This is covered in further detail in section 4.2 of the consultation

	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. 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.	document. NIE Networks believes that the ENA's definition of a DSO addresses the commercial impact for all customers, by making reference to "enabling competitive access to markets" and "affordability in support of whole system optimisation". Similarly the existing definition does specifically make reference to the delivery of security in the context of whole system optimisation. There are already various markets available which distribution connected customers can participate in and these are likely to increase with additional markets such as, DSO markets for local network constraints. As a DSO, NIE Networks will be responsible for facilitating access to all markets for distribution connected customers in a way that fully utilises the available network capacity without compromising on safety and supply performance experienced by all customers. Regarding regulation in respect of the above, NIE Networks has been operating in a regulated industry since 1992 the result of which has driven cost efficiency for customers. We believe that the existing process of regulation will continue to challenge NIE Networks to deliver efficient network costs whether through conventional investment when necessary, smart solutions were proven or via alternative market driven services when available. In choosing the correct solution, regulatory scrutiny will always be ensuring the correct balance between cost and the network performance experienced by customers.

		Finally, NIE Networks fully appreciates the importance of ensuring that safety, security and quality of supply (including voltage rise, voltage step, thermal issues and flicker) for all customers is unaffected through this evolution. NIE Networks would intend that the envisaged Network Capacity Allocation Platform would ensure this in a transparent manner (section 4.1.1 of the consultation document).
RICARDO	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.	NIE Networks understands the differences between the Northern Ireland and GB power sectors which is why NIE Networks is working on an Northern Ireland specific DSO plan.
SONI	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	NIE Networks believes that within the existing definition of a DSO there is sufficient emphasis placed on the commercial impact for all customers, making reference within the definition to “enabling competitive access to markets” and “affordability in support of whole system optimisation”. Similarly the existing definition does specifically make reference to the delivery of security in the context of whole system optimisation. NIE Networks therefore believes that the definition does not require any additional reference regarding the risk to the commercial operation of embedded generation or the security of

	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.	supply. NIE Networks is conscious that there are various markets available which customers can participate in and furthermore in the future there are likely to be additional markets that customers can participate in, for example, local DSO markets. NIE Networks believes that as a DSO they will be responsible for facilitating access to all markets for distribution connected customers and therefore believes that the use of the generic term “markets” within the definition is appropriate. Finally, it should be noted that NIE Networks is not proposing uncoordinated action across the system. The evolution from a DNO to a DSO is seeking to coordinate actions between the TSO and DSO.
	Question 2: Are there any additional functions which you feel should be included in the evolution to a DSO? If so, please provide a detailed description of the function(s).	
ANDY FREW	Contingency planning should be included as a DSO function. In particular as more heating and EV loads are introduced, they should have the possibility of being interrupted to provide capacity for essential loads such as communications/personal access aids/stair lifts are prioritised and still remain connected in any supply emergencies.	As part of its RP6 Business Plan submission NIE Networks performed contingency analysis for the uptake of Low Carbon Technologies. Within this analysis a low, medium and high uptake was considered and the resulting impact on the network identified. NIE Networks will continue to periodically perform contingency analysis on the uptake of LCTs. Since this function is already embedded within NIE Networks Business as Usual processes it is not

		considered necessary to include this function within the proposed DSO functions which represent new functions or functions which will be subject to significant change.
ULSTER FARMERS UNION & NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	Respondents highlighted the need for continued conventional network reinforcement alongside these proposed innovative solutions.	NIE Networks believes that a "smart incremental" investment approach should be adopted. This investment approach will still require significant conventional reinforcement. In general smart solutions or market based solution will be installed to defer traditional reinforcement, not eliminate it.
ANONYMOUS RESPONDENT	A common concern raised among respondents was the need for the DSO's role to remain impartial and ensure no conflict of interest when participating in the electricity markets and in the provision of system ancillary services, to the TSO.	NIE Networks acknowledges the importance of considering how the DSO remains a neutral market facilitator whilst utilising network assets to provide services to the TSO. To consider this further, NIE Networks has identified 4 potential variants of the service provider function: • Maintain the current process. • DSO as system service participant. • DSO as first call provider. • DSO as last call provider. This is covered in further detail in section 4.2 of the consultation document.
ORACLE	Aggregators should also be included in the evolution to a DSO.	When DERs were referenced within the Call for Evidence (CfE) document, the document remained agnostic to whether these DERs formed part of an aggregated response or individual response. However, taking respondent's comments on board aggregators/suppliers are more explicitly outlined within the consultation document.

POWER ON	Pricing signals that reward the 'data compliant' entrant and heavily penalise the 'data deficient' entrant were suggested. A role for DSO could emerge as the clearing house. UR oversight would be required to ensure impartiality.	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
DALY RENEWABLES	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.	
SONI	Would like more clarity as to how the Service Provider function can be completed whilst maintaining a neutral market position. Further clarity is also needed on "market based solutions" as it would be problematic if any market signals contradicted or distorted the wholesale market signals. 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. 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.	Intuitively NIE Networks believes that the flexing of assets to provide additional services to the TSO to meet the system needs at lower cost should be encouraged. This represents an extension of the existing processes of offering services during High Impact Low Probability (HILP) events and helps deliver more efficient whole system optimisation as per the DSO definition. NIE Networks has a history of providing services to the TSO, when required during HILP events, to support the security of the system. These services are provided in a very infrequent basis and include: • Load Shedding. • Voltage Reduction to offer system wide demand response. It should be noted that these services are only utilised in system critical events as they impact on the security and quality of supply of customers. These types of services are not

		acceptable for more frequent events. However, there is the potential for the electricity network to offer other solutions, through the flexing of its existing assets, to further support the TSO in system balancing. These services could be utilised by the TSO on a more frequent basis for Low Impact High Probability (LIHP) events to help reduce energy bills and if developed and managed correctly by the DSO can be delivered without compromising the security or quality of supply for customers. However, as pointed out by these respondents there are important questions to consider particularly regarding how the DSO remains a neutral market facilitator whilst utilising network assets to provide services to the TSO. NIE Networks believes that this concern regarding the neutrality of the process can be mitigated through several mechanisms: • The DSO assets will be subject to the same NCAP process, as described in the market facilitator section of the consultation document, with the same principles of access as the other system service providers. • Regular reporting, regulatory scrutiny and transparency of the process. Ultimately, NIE Networks will need to satisfy the UR that neutrality is being continually achieved. • Following developments in ENWL closely and adopting industry best practise. Furthermore, in the consultation

		document NIE Networks has presented the following four potentials variants of the Service Provider function and asked which one, if any, respondents prefer. 1. Maintain the current process. 2. DSO as system service provider. 3. DSO as First Call Service Provider. 4. DSO as Last Call Service Provider. NIE Networks agrees that if operational procedures impact the whole system, it is important they are developed in co-ordination with the TSO.
NI WATER	Suggested that the data provision function should include exchange between the DSO and consumer as well as the DSO and participant; both active and passive participant.	NIE Networks has amended the Data Provision definition from "Provision of detailed data between the TSO and DSO to enable more efficient system development and operation" to "Provision of detailed data between the TSO, DSO and customer to enable more efficient system development and operation".
RICARDO	NIE Networks should consider 4 additional functions, including Local Services (services requested and managed by the DSO itself), Customer Engagement and Education, Community Energy (to support the evolution and adoption of a range of new business models, including community energy models) and Collaboration with grid edge parties (inclusion of aggregators)	<u>Local Services and Community Energy</u> Under the congestion management function NIE Networks will be considering the development of local network services. Such services will include Demand Side Response (DSR) and Energy Storage Services. Through this process, community energy schemes will have the opportunity to participate in local network services. <u>Industry Engagement, Education</u>

		and Collaboration NIE Networks fully agrees that cross industry engagement, education and collaboration is essential to the successful evolution from a DNO to a DSO. To date NIE Networks believes that this has been achieved through the CfE, associated workshop and the issuing of this consultation document. However, to ensure that industry engagement continues beyond this consultation process and into the implementation of this DSO vision, NIE Networks proposes that the overall stakeholder engagement strategy associated with this evolution should be included within the scope of the existing Customer Engagement Advisory Panel[1] (CEAP). Separate sub groups will exist to ensure industry engagement associated with the specific aspects of this evolution e.g. Connections Innovation Working Group (CIWG). Other opportunities for engagement and collaboration will be presented during the delivery of the RP6 innovation projects. Whilst NIE Networks believes that engagement, collaboration and education are required across all the DSO functions they do not feel that this warrants a separate DSO function.
	Question 3: NIE Networks currently use static annual instruction sets. Do you think 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?	

[1] The Panel is made up of designated members of the Consumer Council for Northern Ireland, Department for the Economy, Utility Regulator and NIE Networks.

POWER HOUSE GENERATION & ANONYMOUS RESPONSE	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 allow customers to be exposed to financial penalties should the dynamic component become too flexible and unknown to the customers.	NIE Networks agrees with the respondents that as a DSO, NIE Networks should develop modern and sophisticated network management systems. To address this, under the Network Management DSO function, NIE Networks proposes network management changes to appropriately manage the day-to-day operation of distribution network with high levels of DERs connected to it. As suggested it is important that timelines are aligned with the existing market to avoid unintended consequences and ensure that customers are not exposed to financial penalties should the dynamic component become too flexible and unknown to the customers. As part of the Market Facilitation DSO function, NIE Networks proposes to develop a Network Capacity Allocation Platform (NCAP). This NCAP will provide forecasted network capacity which can be used by flexibility providers for declaration of availability to the market. Importantly, the NCAP will run in real time to ensure that network topology changes or forecasting errors are taken account of; the real time NCAP run must always be respected by system service participants. NIE Networks believes that the approach proposed in this consultation ensures that more often than not the flexibility declared to the market will equal the flexibility available in real time and not have a material impact on the wholesale market. Whilst NIE Networks acknowledges the considerable effort required to move from static instruction sets to the NCAP, to both the DNO and the system service provider we do believe
SONI	Consideration should be given to the provision of these instruction sets in real time, as timelines will need to be aligned with the wholesale market design and timeframes to avoid unintended consequences. NIE Networks should also 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.	

		that this is a necessary evolution, based on the following rationale: 1. 70% of respondents agreed with the approach of moving to more dynamic instructions sets, with the remaining 30% not responding or neither agreeing or disagreeing. This is clear evidence that industry believe that more dynamic instruction sets should be developed. 2. NIE Networks' instruction sets are already considerably granular and therefore there is limited scope, under the existing static instruction set approach, to amend further to enable greater access to the network for the provision of system services. As the number of system providers increases, particularly on the LV network, the existing static instruction set process will not be appropriate to manage the volumes and complexity associated with these services on the distribution network. Therefore, in order to ensure that all customer's safety, security and quality of supply is unaffected, whilst facilitating access to the system services market, NIE Networks believes that it is necessary to move to a more autonomous, dynamic NCAP process.

RICARDO	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.	As part of the Congestion Management DSO function, NIE Networks has secured funding for six innovation projects to implement a “fast follower” approach to successful innovation projects trialled in GB. Two of these projects, Demand Side Response (DSR) and Facilitation of Energy Storage Services (FESS) are seeking to develop local services to manage congestion problems on the distribution network. These services will be used to manage the underlying growth of demand and generation on the network and defer conventional reinforcement. It should however be noted that these local services will not be used to remedy issues associated with the delivery of system services. This would result in an uneconomic situation where customers would be paid to deliver services and other customers, or the same customer, would be paid to provide conflicting response to avoid any network issues. Instead a more economical solution is to only allow providers to deliver the maximum safe level of response on any particular network, as proposed within the consultation document
ANONYMOUS RESPONSE	The current "static" instruction sets are unnecessarily prohibitive. Since all system service participants already have SCADA in place, it is possible for NIE Networks to make use of this real-time data to establish dynamic instruction sets. NIE Networks may need to further invest in their own SCADA, allowing load flows on the LV Network to be analysed in real-time.	Whilst NIE Networks acknowledges that some stakeholders perceive the current Instruction Sets as prohibitive, NIE Networks would state that they are necessary to ensure the safety, security and quality of supply for all other customers connected to the network as described within the consultation document. NIE Networks agrees that investment to increase visibility

		on the network may be required at its secondary substations (11 or 6.6kV/430V) and LV network, in order to analyse the load flows in real time, network topology and establish dynamic instruction sets. This investment may be on the NIE Networks' SCADA system or alternative technology as deemed appropriate by NIE Networks. This requirement will become increasingly necessary as the volume of LV connected system service provider's increase, particularly at domestic level.
IPOWER	The instruction sets not only need to be more dynamic, they need to be more granular, localised and Open.	As proposed within the consultation document, NIE Networks propose developing a NCAP process. This process will provide network capacity on a forecasted and close to real time basis, therefore fulfilling the respondent's request of granularity. The NCAP process will issue system service providers with network capacity based on the local network, therefore fulfilling the respondent's request of instruction sets being more localised. Finally the NCAP process will give system service providers full visibility of their allowable network capacity and regular reporting on the performance of the NCAP, whilst respecting customer confidentiality, therefore fulfilling the respondent's request of instruction sets being more open.
ULSTER FARMERS UNION	If any move to a more dynamic instruction sets facilitates the reduction of constraints, maximises the network capacity utilisation and consequently optimises the decision making process for the customer, then the Ulster Farmers Union are supportive of this	The delivery of the proposed NCAP will help deliver the respondent's objectives whilst ensuring that the safety, security and quality of supply for all other customers are unaffected. NIE Networks' agrees that ever-

	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.	increasing levels of information provision is a necessary enabler for the market facilitator role and have therefore identified a specific DSO function (Data Provision) to deliver this. It is proposed that the NCAP process will deliver both forecasted and real time information to system service providers regarding their allowable volume of system service provision. As part of the Data Provision function, NIE Networks will be issuing "Capacity Maps", providing prospective demand and generator customers with information regarding available capacity on the network. It is anticipated that this increased data provision will facilitate prospective customers in their decision making process.
DALY RENEWABLES	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.	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
	Question 4: Do you agree that NIE Networks should develop a technical solution to enable customers to participate in reactive power system services?	
RICARDO	It is their 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	NIE Networks agrees with the respondent that the dispatching of reactive on the distribution system is a role of the DNO. However, the TSO has developed a system services market for reactive power (Steady State Reactive Power), which some distribution

		connected customers can participate in. To facilitate access to this market whilst protecting the safety, security and quality of supply for all customers it is necessary to develop a technical solution to dispatch reactive power resources in a coordinated manner; hence the development of the Nodal Controller solution. It should however be noted that the Nodal Controller solution will not provide all customers with the opportunity to participate in the steady state reactive power system service market. Due to the inability of reactive power to travel long electrical distances, customers heavily embedded in the distribution network will not be able to influence reactive power at the TSO/DSO boundary and therefore the procurement of reactive power from these sources would be uneconomic. Within the consultation document NIE Networks has proposed a phased approach to the roll out of the Nodal Controller.
SONI	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.	When conducting market research for potential solutions to facilitate access to the system services reactive power market NIE Networks identified two key projects: • ESB Networks' Nodal Controller • UKPN and National Grid's Power Potential Project[2] Both of these projects have the same use case as NIE Networks, particularly the ESB Networks' Nodal Controller project. Based on this market research NIE

[2] http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-2-projects/power-potential/

		Networks felt that it would be prudent to deploy a similar technological solution to that used by ESB Networks and UKPN. Whilst NIE Networks appreciates there may be other methods that could, in theory, be deployed to deliver coordinated dispatch of reactive power, from the market research it appears that this solution is the most developed and commonly considered by local network operators. This approach also ensures greater consistency for customers participating in the Steady State Reactive Power System Service in both Northern Ireland and the Republic of Ireland. Based on the above rationale and the responses received, which clearly demonstrate that respondents agree with the approach of using a Nodal Controller, NIE Networks propose that they continue to develop the Nodal Controller solution. It should be noted that this does not preclude NIE Networks from considering evolving technologies in the future. It should however be noted that the Nodal Controller solution will not provide all customers with the opportunity to participate in the steady state reactive power system service market. Due to the inability of reactive power to travel long electrical distances, customers heavily embedded in the distribution network will not be able to influence reactive power at the TSO/DSO boundary and therefore the procurement of reactive power from these sources would be uneconomic. Within the consultation document NIE Networks has proposed a prudent phased approach to the

		roll out of the Nodal Controller.
POWER ON	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 simply be unidirectional towards TSO. The local issues that customers face also need to be addressed.	NIE Networks agrees with the respondent that the local issues that customers face need to be addressed and that the evolution of a DSO cannot be simply unidirectional towards the TSO. As part of the Congestion Management DSO function, NIE Networks proposes including customer market based solutions when considering how to manage distribution network congestion.
NORTHERN IRELAND WATER	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.	NIE Networks, as part of the Market Facilitator DSO function, is developing a Nodal Controller solution. This solution, if successful, will coordinate the reactive power from some DERs to deliver the required reactive power at the TSO/DSO interface. It should however be noted that the Nodal Controller solution will not provide all customers with the opportunity to participate in the steady state reactive power system service market. Due to the inability of reactive power to travel long electrical distances, customers heavily embedded in the distribution network will not be able to influence reactive power at the TSO/DSO boundary and therefore the procurement of reactive power from these sources would be uneconomic. Within the consultation document NIE Networks has proposed a phased approach to the roll out of the Nodal Controller.
	Question 5: NIE Networks has existing assets on the network which potentially have the capability of providing additional services to the TSO. Should NIE Networks be allowed to provide cost effective solutions to the TSO in balancing the network to help reduce bills for all customer types?	
RICARDO	Agrees with the approach; however the CLASS techniques will need to be investigated to understand how to translate this into Northern Ireland	NIE Networks agrees with the respondent that the techniques involved in ENWL's CLASS project should be investigated to

	context, given that there is a different system operator and regulatory system, as well as physical differences between the networks.	understand how to translate this into the Northern Ireland context. As such, over RP6 NIE Networks will be running six innovation projects to understand how successful innovation projects can be transitioned into Business as Usual in the Northern Ireland context. One of these projects is called Demand Reduction Through Voltage Conservation (DRVC). This project will trial ENWL's CLASS techniques on part of the NIE Networks' distribution network to understand how to translate them into the Northern Ireland context.
ANONYMOUS RESPONSE	The impact of providing such services on these existing assets and the expected equipment life-cycle may be adversely affected and may require new operations and maintenance procedures to be adopted.	The impact on assets by providing services to the TSO will be fully assessed under the RP6 innovation project (DRVC). This will be factored into a Cost Benefit Analysis (CBA) which will form the justification for the wider deployment of the innovative technology. Whilst the impact on the asset and associated cost is undefined at this stage, intuitively NIE Networks believe that the benefits associated with delivering these services will far outweigh the cost including asset life cycle and operational and maintenance impact.
CCNI	We agree with the possibility of NIE Networks participating in the system services market, 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.	NIE Networks agrees that it should not be given preference when a solution is available that offers a better outcome for the consumer. NIE Networks' view is that the solution which offers the best outcome for all customers should be selected. NIE Networks' believes that by using their assets to deliver services to the TSO aligns with CCNI's Consumer Principles. In particular NIE Networks believes that this DSO function delivers

		'fairness' to the customer base, by ensuring that all customers, including passive, can benefit through system services and not just those customers with the financial and technical capability of participating in system services.
ANDY FREW	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.	In the provision of services to the TSO, NIE Networks will not provide the entire system requirements. There will still remain a significant need for the TSO to procure system services from third parties. NIE Networks therefore does not believe that by providing services to the TSO they will be preventing the early or profitable entry into the market of other methods to provide system security.
SONI	There is a risk of a perception of conflicts of interest between the roles of market facilitator and service provider. The SEM Committee 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.	Intuitively NIE Networks believes that the flexing of assets to provide additional services to the TSO to meet the system needs at lower cost should be encouraged. This represents an extension of the existing processes of offering services during High Impact Low Probability (HILP) events and helps deliver more efficient whole system optimisation as per the DSO definition. NIE Networks has a history of providing services to the TSO, when required during HILP events, to support the security of the system. These services are provided in a very infrequent basis and include: • Load Shedding. • Voltage Reduction to offer system wide demand response. It should be noted that these services are only utilised in system critical events as they
ANONYMOUS RESPONSE	NIE Networks would have an unfair advantage in competing for services to the TSO in the system services market.	
CHOICE HOUSING	Agrees with the approach however any cost implications would need to be understood, particularly if these were to	

IRELAND	be passed on to consumers. 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 organisation that may be able to offer solutions to deliver customer savings.	impact on the security and quality of supply of customers. These types of services are not acceptable for more frequent events. However, there is the potential for the electricity network to offer other solutions, through the flexing of its existing assets, to further support the TSO in system balancing. These services could be utilised by the TSO on a more frequent basis for Low Impact High Probability (LIHP) events to help reduce energy bills and if developed and managed correctly by the DSO can be delivered without compromising the security or quality of supply for customers. However, as pointed out by these respondents there are important questions to consider particularly regarding how the DSO remains a neutral market facilitator whilst utilising network assets to provide services to the TSO. NIE Networks believes that this concern regarding the neutrality of the process can be mitigated through several mechanisms: • The DSO assets will be subject to the same NCAP process, as described in the Market Facilitator section of the consultation document, with the same principles of access as the other system service providers. • Regular reporting, regulatory scrutiny and transparency of the process. Ultimately, NIE Networks will need to satisfy the UR that neutrality is being continually achieved. • Following developments in ENWL closely and adopting
DEMAND RESPONSE AGGREGATORS OF IRELAND & IPOWER	NIE Networks participating in system services will give an unfair advantage in the market as they control the current system service supplier's capacity to deliver system services by means of instruction sets and MECs. This has the potential to reduce competition in the market.	
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	
POWERHOUSE GENERATION & ANONYMOUS	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.	
ULSTER FARMERS UNION	The UFU believe that it is crucial to enable a competitive approach for the provision of these additional services.	
ULSTER UNIVERSITY	No. These services should be delivered through markets in which consumer-owned DER are incentivised to	

	compete.	industry best practise. Furthermore, in the consultation document NIE Networks has presented the following four potentials variants of the Service Provider function and asked which one, if any, respondents prefer. 1. Maintain the current process 2. DSO as system service provider 3. DSO as First Call Service Provider 4. DSO as Last Call Service Provider
	Question 6: Should NIE Networks continue to invest conventionally to maintain a high level of network resilience and security but at a higher cost or should they adopt and integrate smart incremental solutions to reduce network costs and deliver the network security through a more dynamic approach to operating the network?	
SONI	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. 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	NIE Networks believes that a "smart incremental" investment approach should be adopted. This investment approach will still require significant conventional reinforcement: In general smart or market based solutions will be installed to defer traditional reinforcement, not eliminate it. NIE Networks, along with consultants, completed a detailed project selection process including a cost benefit analysis for all the projects which will be trialled. This cost benefit analysis will be re-run when the trial is complete to inform the transition to business as usual. NIE Networks has historically worked with the TSO as and when investment decisions on

	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 distribution network impact on the transmission network. We would see this continuing even if the investment is innovative or market based and would see this collaboration increasing with the proposed growth in data being exchanged between the two companies.
ULSTER FARMERS UNION	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 solutions 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 consider 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."	NIE Networks believe that a "smart incremental" investment approach should be adopted. This investment approach will still require significant conventional reinforcement: In general smart or market based solutions will be installed to defer traditional reinforcement, not eliminate it. This process will result in efficient investment at lower average cost thereby reducing the wider network costs. We would also note that transmission capacity and capability investment decisions is a SONI responsibility and is therefore beyond the scope of this consultation.
POWER HOUSE GENERATION	The proposed distinction of a dynamic approach versus conventional 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	NIE Networks believes that a "smart incremental" investment approach should be adopted. This investment approach will still require significant conventional reinforcement: In general smart or market based solutions will be installed to defer traditional reinforcement, not eliminate it. This process will result in efficient investment at lower average cost thereby driving down the wider

	to the consumer".	network costs.
ANONYMOUS RESPONSE	The adoption of a smart integrated approach can bring benefits to both NIE Networks and customers and we strongly encourage this development. We would also like to note that there is a range of smart, innovative technology which can be deployed within the conventional business as usual approach which can bring potential cost savings. Technology which is mature and has been successfully deployed in other areas, e.g. the adoption of digital substation technology based on IEC 61850 and process bus can provide solutions with increased functionality, are more compact, more cost effective and safer. This can help bring a greater level of automation and visibility of the distribution network, and believe the benefits of such technology should be assessed as part of this process.	NIE Networks undertook a detailed project selection process in choosing the 6 projects to trial. These projects involve a greater level of visibility, automation and control of the distribution network. Part of this process involved looking at the successful projects in GB and identifying those projects with high technology readiness levels. NIE Networks also acknowledge the need for continually innovation and as such we are working with industry and academia on a plethora of innovation projects.
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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 of 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 responsible for advancing the necessary transmission works to provide firm access for these generators.	NIE Networks believes that a "smart incremental" investment approach should be adopted. This investment approach will still require significant conventional reinforcement: In general smart or market based solution will be installed to defer traditional reinforcement, not eliminate it. It should be noted that SONI are responsible for bringing forward plans for transmission capacity and capability investment in Northern Ireland.

IPOWER	NIE Networks 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.	
	Question 7: Do you believe that installations similar to that illustrated in Figure 8b, where a total energy source>16A/phase connects behind a single inverter rated at 16A/ phase, should be allowed to connect under an Engineering Recommendation G83/1 arrangement on a 'fit and inform' basis? If so, please set out the detail.	
RICARDO	Ricardo suggested that 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.	NIE Networks has historically been interpreting ESQCR that the "source of energy" refers to the sources themselves and not the inverter rating which the sources are connected behind. This interpretation has facilitated the efficient connection of micro generation in Northern Ireland whilst ensuring that the safety, security and quality of supply on the network are maintained. However, as Ricardo suggest, NIE Networks believe that an argument can be made that the source of energy from an ac electrical networks perspective is the inverter. This position aligns with the interpretation taken by many other GB DNOs and: • Ensures that connection conditions do not form a barrier to the wide spread adoption of LCTs and the decarbonisation of the energy system. • Reduces the risk that customers may connect LCTs behind the meter and not inform NIE Networks. Such a situation would mean that NIE Networks would not have the necessary visibility of schemes and not be able to assess the impact on the

		network. It would also mean that visibility of these schemes could not be passed to SONI, ultimately impacting on the ability to balance the system. • Aligns with G83/2 (in GB) and the upcoming G98 both state that "Where the Micro-generator includes an Inverter its rating is deemed to be the Inverter's continuous steady state rating"
SONI	SONI believe this question relates to 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.	NIE Networks agrees with the respondent that the quality of information on connected generation is essential to ensuring system security; however NIE Networks believes that by not adopting a new connections policy for microgeneration they will be operating against the desire of the majority of customers, will hinder the decarbonisation of the energy sector, particularly at domestic level, and will ultimately lead to poor data and increased cost for customers. Additional rationale is provided within the main consultation document. NIE Networks will continue to update SONI regarding distribution connected generation on a monthly basis. NIE Networks are currently gathering data on the impact of battery storage on domestic load profiles.
DALY RENEWABLES	We would like to see the G83/1 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	NIE Networks do not believe that the "fit and inform" limit should be increased from the existing 3.68kW level. By doing so would be in breach of ESQCR and

	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 homeowners reliance on the grid	would be out of step with GB. NIE Networks believes that the proposed amendments to this process will help the development of the microgeneration market whilst ensuring that the safety, security and quality of supply for all customers are unaffected.
	Question 8: Do you believe that 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? In this case customers would still be required to contact NIE Networks to receive permission to connect; however, due to the reduced likelihood of considerable grid impact NIE Networks would be able to expedite any network assessment and revert to the customer, informing them that they can or cannot connect to the network in reduced timescales.	
SONI	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	As previously discussed, aggregated generation data will be provided to SONI on a monthly basis. SONI can use this data to model the impact of distribution connected generation on transmission fault levels. NIE Networks deem that micro-generation will have little impact on the transmission system, and that battery storage is likely to 'smooth out' domestic demand profiles. G59 fast-track is an inform and fit process so NIE Networks will complete a network analysis prior to approving the connection; therefore ensuring that the appropriate network analysis is performed.

	should be undertaken jointly to ensure that coordinated solutions are delivered that are in the best interests of consumers.	
ANDY FREW	Only if restricted in number until reform or 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	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme. Allowing battery storage in conjunction with PV (the majority of micro-generation) will allow customers to self-consume the vast majority of generated power, thus there will be very little export to the grid which will not overload lines/cables. However, at higher voltage levels where there is significant export from generation to the grid benefit could be derived from the use of "dynamic line ratings". As part of the RP6 innovation projects, NIE Networks will be trailing a dynamic line rating project (Real Time Thermal Rating).
NORTHERN IRELAND WATER	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 strategic direction provided by Northern Ireland energy and economic policy.	The cost of being G100 compliant is likely to be less than being G59 compliant. The process will also be quicker. Whilst the delivery of energy policy, required to influence the uptake of particular types of energy sources, are outside of the remit of NIE Networks', NIE Networks will continue to engage with the relevant parties to help ensure that a joint up approach is taken to the decarbonisation of the energy sector.

ANONYMOUS RESPONSE	The requirement for zero export agreements is likely to increase substantially over the coming years. It is widely recognised across the industry that obtaining an MEC is now extremely difficult, and requires much more careful consideration and assessment. G100 connection applications are not as onerous as standard G59 applications, and need not be delayed by more complex requests for MECs.	Agreed, NIE Networks will ensure that G59 fast track is implemented in a timely fashion.
POWER ON	We would argue that a fast track is only suitable for those who have proven they are fit to drive. 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.	Fast track process will require proof that inverters are type tested, and that G100 export limiting system is in place. The installation is also to be completed by a qualified installer. All inverters utilised for G59 fast-track must be G83 type tested inverters. Hybrid inverters may fall under the new G83 rules. NIE Networks therefore suggest that by following this industry accepted approach, the connection of these schemes will not impact on the safety, security and quality for supply for all customers.
	Question 9A: Do you agree that the DSO/TSO requires increased data to efficiently develop and operate the system help reduce network operating costs and facilitate greater access to the network for existing and future customers?	
RICARDO	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	Whilst NIE Networks appreciates that the storing and interrogation of data needs careful consideration including the internal skill sets required to manage this data, they do not accept that there is little understanding of what should be done with it and how to gain value. NIE Networks currently manages large volumes of data (e.g. in NI NIE Networks owns the customer meter and manages all

	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.	customer metering information for the market) and derives benefit from it. We also have an understanding of numerous use cases for increased data, particularly on the Low Voltage network would deliver, including but not limited to: • Improved forecasting of demand and generation on the distribution network • More efficient network investment decision. • Improved diagnostics of system events
POWER ON	Adoption of data deficient loads should be discouraged by pricing signals that reward the data compliant entrant and heavily penalise the data efficient 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.	When a participant connects to the network they do so under either the Standard Connection Terms and Conditions or a site specific Connection Agreement. Under these agreements the respondent is required to provide information which is set out in the Distribution Code. The information listed is required to allow the DSO/TSO to efficiently develop and operate the network. Through public consultation, the Distribution Code can be amended where necessary to facilitate the continued efficient planning and operation of the network. Therefore it is NIE Networks' view that no additional payments should be made for providing mandated data.
ULSTER UNIVERSITY	Yes, bearing in mind customer data is owned by the customer.	NIE Networks agrees that customer data on the customer side of the meter is owned by the customer, unless it is a requirment of the Distribution Code. Data required under the Distribution Code, the customer's metered data and the DSO/TSO data required to efficently develop and operate the network would be network owned data.

		Four areas where the increased data provision may be required to efficently develop and operate the system are: • Future Data • Real Time Data • Past Data • Publically available Data.
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	NIE Networks agrees that higher levels of visibility is requried on the networks down to the Low Voltage Network, and, whilst there is currently limited real time visibility of generators less than 5MW NIE Networks are rolling out a programme of fitting SCADA to all generators greater than 200kW aiding greater depths of granulairty and giving control cycles closer to real time.
ANONYMOUS RESPONSE	In order to fully understand how load-flows affect the distribution system in real-time, it is important for NIE Networks to have greater visibility of the LV networks, as well as live data from the TSO. Market participants have a requirement to provide live SCADA signalling to the TSO. Any distribution connected customers could provide this same data to NIE Networks, allowing a more detailed picture to be built-up. Any “gaps” in the network visibility should be addressed by investing in the existing NIE Networks SCADA system.	Whilst there is currently limited real time visibility of generators less than 5MW NIE Networks are rolling out a programme of fitting SCADA to all generators greater than 200kW allowing for a more detailed picture to be built up. NIE Networks agrees that it is important to have greater visibility of the LV network. The associated investment may be on the NIE Networks’ SCADA system or alternative technology as deemed appropriate by NIE Networks. This requirement will become increasingly necessary as the volume of LV connected system service provider’s increase, particularly at domestic

		level.
ANONYMOUS RESPONSE	Yes, utilities will increasingly have to deal with very dynamic grid conditions. The need for faster decisions and real-time action requires visibility of assets across the entire business. With the increased amounts of data, it is important to have the correct software and tools to be able to analyse and process this data into useful information - and to be able to take the appropriate action or to predict and adapt to changing situations.	NIE Networks currently manages large volumes of data and derives benefit from it. They also have an understanding of numerous use cases for increased data, particularly on the Low Voltage network, including the necessary tools and software. These include but not limited to: • Improved forecasting of demand and generation on the distribution network • More efficient network investment decisions • Improved diagnostics of system events
SONI	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.	NIE Networks also welcomes the opportunity to engage with SONI to enhance current data exchange practices to ensure they are fit for purpose for the future management of the whole system and align with the principles outlined within KORRR. Within the CfE it was identified that there are three key areas where the provision of data is required to ensure the efficient development and operation of the system: Future data, Real Time data and Past data. Based on the responses to the CfE NIE Networks has included an additional key data area: Publically available data. The definition of this function has also been changed to reflect this. Previously this function was defined as “Provision of detailed data between the TSO and DSO to enable more efficient system development and operation”.

		NIE Networks now propose that this definition is changed to: "Provision of detailed data between the TSO, DSO and customer to enable more efficient system development and operation."
	Question 9B: Do you agree that to achieve this, increased levels of data need to be made available in the areas identified and be efficiently transferred between the TSO and the DSO?	
NI WATER & NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	NIE Networks fully appreciates that the storing and interrogation of data needs careful consideration including the internal skill sets required to manage this data. This will be a key part of the successful evolution from a DNO to a DSO. NIE Networks met with UKPN regarding the "Kent active system management" project. Whilst some valuable learning was garnered from this meeting a key part of the project focuses on the transfer of data via an ICCP between National Grid and UKPN. This data transfer via an ICCP link has already been achieved between NIE Networks and SONI and has been operational for some time.
ANONYMOUS RESPONDENT	The future roles of the TSO and DSO should be clearly defined with clear divisions of responsibility. The increased levels of data will only be useful to those with the tools and resources to actually process it effectively. For example, instead of transferring all the actual raw data from the DSO to TSO, it may be useful for automatic reports or processed information to be exchanged only.	As discussed above clear roles of the TSO and DSO are outlined within KORRR which both SONI and NIE Networks will need to adhere to. NIE Networks currently manage large volumes of data and derive benefit from it and therefore currently have tools and the expertise already in place to manage the increased data flow expected. However, like any organisation, as time changes so do business needs, NIE Networks will adapt to change where required.
ANONYMOUS RESPONSE	The collection and use of information is likely to benefit customer and the DSO via the increased efficient operation of the system. There should however be a limited circulation of the data and a pre-	

	defined methodology.	The aggregated data transfer as proposed within this consultation document represents an efficient data transfer mechanism as opposed to transferring all raw data.
	Question 9C: Are there any other areas that you believe the DSO should have visibility of?	
DEMAND RESPONSE AGGREGATORS OF IRELAND	"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 his market is too great to operate off quarterly meter readings while trying to implement a smart grid solution. 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.	Whilst the development of energy policy powers are outside the role of NIE Networks, it does not believe that there are currently any policy inhibitors or regulatory barriers which prevent the commencement of the DNO to DSO evolution. NIE Networks will continue to engage with the relevant parties to ensure that any future inhibitors, including the role of increased metering functionality, are identified and managed to help unlock customer benefits.
RICARDO	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.	NIE Networks agrees that they should have visibility across the voltage levels of their network, and whilst there is currently limited real time visibility of generators less than 5MW NIE Networks is rolling out a programme of ensuring SCADA is fitted to all generators greater than 200kW. In order to optimise the network in real time NIE Networks believes that their Network Management System (NMS) will require significant development. NIE Networks will therefore work with their NMS provider to ensure that it is developed appropriately.
ULSTER FARMERS UNION	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	NIE Networks agrees with the respondent regarding the need for sharing of forecasting between TSO and DSO. This has been proposed within the

	avoid any unnecessary curtailment.	consultation document.
	Question 10A: The provision of data and visibility of the network plays a significant factor in ensuring the efficient management and operation of the electricity network to help reduce network energy costs. Do you believe that greater metering functionality is required in Northern Ireland to provide the DSO with increased data? If so, please set out in detail.	
MULTIPLE RESPONDENTS	A comment made by several respondents stated that the cost of increased metering functionality should not be placed on customers, either directly or through system charges. The current scale of the market is too great to operate off quarterly meter readings while trying to implement a smart grid solution.	Future data gathering at customer sites, whether via greater metering functionality or from other devices will be crucial to managing a dynamic network. Whilst the development of energy policy powers are outside the role of NIE Networks, it does not believe that there are currently any policy inhibitors or regulatory barriers which prevent the commencement of the DNO to DSO evolution. NIE Networks will continue to engage with the relevant parties to ensure that any future inhibitors, including the role of greater metering functionality and associated cost recovery mechanisms, are identified and managed to help unlock customer benefits.
POWER ON	Metering is too simplistic and limited 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.	
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	
ANONYMOUS RESPONDENT	SONI have made a commitment to encourage domestic participation in the capacity and DS3 markets over the coming years. Online half-hourly metering is a current market requirement. NIE Networks needs to explore the possibility of upgrading all meters to online versions. The LoRaWAN protocol would allow a mesh-network of on-line meters to be established cost effectively.	

RICARDO	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.	
NI WATER	Greater meter functionality is a subset of the secure enabling ICT infrastructure that will be required to support an open and accessible market.	
ANONYMOUS RESPONSE	It would really depend on how the data is to be used. If the increased level of metering and visibility can assist NIE Networks in managing the distribution grid within real-time constraints then there may be value in greater metering. Perhaps in certain locations, increased metering may be more beneficial than in other locations. Similarly, if greater levels of metering allow NIE Networks to roll out new and innovative changing mechanisms, then there may be additional value in taking such action.	
ANDY FREW	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.	
	Question 10B: Do you believe customers should have increased access to network data? If so, please set out in detail.	

SONI	Under KORRR, certain customers will be significant grid users. 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.	NIE Networks also welcomes the opportunity to engage with SONI to enhance current data exchange practices to ensure they are fit for purpose for the future management of the whole system and align with the principles outlined within KORRR.
ANONYMOUS RESPONDENTS & POWER HOUSE GENERATION	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.	NIE Networks agrees that giving customers increased access to network data would be particularly beneficial for those applying for a new or amending a connection agreement. However, NIE Networks does not agree that providing such data will reduce its overheads. Based on feedback received from the CfE NIE Networks has included a fourth key data area considering the provision of data for public use. This will include: • Improved capacity maps for both demand and generation to improve customer investment decisions. • As described in the consultation document under the congestion management section NIE Networks are trialling innovation projects, some of which are seeking to develop market based solutions for network congestion. If successful, NIE Networks will be procuring solutions from industry to help manage network congestion, such as, but not limited to demand side response and energy storage services. In these scenarios, NIE Networks will be making the real time data for network congestion available to enable the market based solution to manage it.
ANONYMOUS RESPONDENT	Giving customers increased access to network data would be particularly beneficial for those wishing to build a business case for applying for a new or amend a connection agreement. Rather than paying over £6k, to be told that no capacity is available, customers could assess the network based on publicly available information. As well as assisting customers, this would also reduce the backlog in the connection application queue.	
RICARDO	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.	An excellent point made regarding the promotion of learning of DSO activities. NIE Networks will continue to engage with stakeholders throughout this process.
ORACLE	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.	
CHOICE HOUSING	Increased data would 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.	Providing data to electricity suppliers would be useful in reducing risk and achieving more accurate pricing, however, to complete such a task would require increased metering functionality and whilst the development of energy policy powers are outside the role of NIE Networks. NIE Networks will continue to engage with the relevant parties to ensure that any future inhibitors, including the role of greater metering functionality, are identified and managed to help unlock customer benefits
ULSTER FARMERS UNION	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	To enable customers to respond to market signals a tariff reform will be required. This tariff reform will require a separate consultation and will require significant engagement with the UR to ensure alignment with their forward work programme. It is likely that service providers will be required to provide the mandatory data as outlined within the Distribution Code.

	standards	
ANDY FREW	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.	While NIE Networks does not disagree with the comment and the idea being submitted, we believe that it relies more on Government Energy Policy and a decision on greater metering functionality. It is therefore beyond the scope of this consultation.
NI WATER	The vast majority of electricity customers are also water customers. Customer access to network data is an essential enabler for the democratisation of grid revenues.	Based on feedback received from the CfE NIE Networks has included a fourth key data area considering the provision of data for public use that will allow customers access to network data.
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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	To enable customers to respond to market signals a tariff reform will be required. This tariff reform will require a separate consultation and will require significant engagement with the UR to ensure alignment with their forward work programme. It is likely that service providers will be required to provide the mandatory data as outlined within the Distribution Code. Whilst NIE Networks recognises that there are variations of network operator model as presented by some respondents,

	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.	the model being proposed by NIE Networks is an extension of existing DNO processes and systems and does not require wholesale license and/or statutory regulation changes. For this reason the DNO to DSO evolution proposed by NIE Networks is considered as a low risk, least regrets approach. It should be noted however, that the adoption of the proposed evolution in the short to medium term does not preclude the transition to more radical models in the longer term if it is proved more efficient.
POWER ON	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.	NIE Networks agrees with the comments received, however, customers in Northern Ireland do not have access to increased metering functionality which allows customers to access their own data. The development of energy policy powers are outside the role of NIE Networks. NIE Networks will continue to engage with the relevant parties to ensure that any future inhibitors, including the role of greater metering functionality, are identified and managed to help unlock customer benefits.
IPOWER	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.	To deliver the requested information a future tariff reform will be required as part of the DNO/DSO which will provide the appropriate signals to help customers to manage their electrical load and play a vital part in the overall management of the grid. This tariff reform will require a separate consultation and will require significant engagement with the UR to ensure alignment

		with their forward work programme.
	Question 11: Should NIE Networks invest in technologies to enable generation constraints on the distribution network to be reduced?	
ULSTER FARMERS UNION	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.	As described in our consultation paper under, 'Congestion Management', NIE Networks are trialling innovation projects early in the RP6 period, some of which are seeking to develop alternatives to conventional reinforcement through smart network technology and/or market based solutions for network congestion. NIE Networks will continue to monitor progress on innovation projects across GB with the possibility of NIE Networks obtaining a fast follower approach on further successful projects. Further innovative thinking is going into how NIE Networks plans to manage the day-to-day operation of a future distribution system with high levels of generation and DERs connected. In order to ensure that customers continue to receive high levels of quality of supply, NIE Networks is looking to enhance its Network Management System. Ultimately, we also plan to extent the area of NMS control to the urban LV network and in doing so will be able to manage higher levels of micro generation and customer demand from Electric Vehicles and heating. NIE Networks will therefore work with its NMS provider to ensure that it is fit for purpose as NIE Networks evolves from a DNO to a DSO.
ULSTER UNIVERSITY	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	Initially, NIE Networks will be trialling the six innovation projects detailed in our RP6 Business Plan which are intended to bring lower cost alternative network reinforcement solutions to a 'business as usual' position.

	to that recently launched by UK Power Networks.	Both the consultancy work associated with the developing of the projects and the procurement of flexibility services will be put out to competitive tender by NIE Networks. In doing this, we will ensure that these projects are undertaken in a transparent manner. A brief overview of the projects can be viewed in our consultation paper. In the longer term, and following a successful outcome of our trials it is expected that NIE Networks will be able to test potential network reinforcement options against market based alternatives offered by customers.
SONI	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.	Following a successful outcome of our innovation trials, NIE Networks will be able to test potential network reinforcement solutions (whether conventional of smart) against market based alternatives offered by customers. In doing so it provides customers with the potential to 'stack' services, i.e. bid their capacity into different markets thus increasing customer opportunities. Distribution connected customers currently participating in the capacity and/or system services markets are constrained by the capacity of their local distribution network. This is presently being managed through a relatively static instruction set process. The planned development of NIE Networks' Network Management System will create the opportunity to offer more dynamic instruction sets to DERs thereby increasing their access to the network.
ANONYMOUS RESPONDENT	The current "worst-case scenario" approach, places unnecessary constraints on generation. The price benefits associated with reducing	NIE Networks disagrees that the current approach is a "worst case scenario" and that it places unnecessary constraints on

	generation constraints should easily outweigh the socialised cost of investing in these technologies.	generation. The current instruction sets are necessary to facilitate access to the distribution network for system services whilst ensuring that the safety, security and quality of supply are unaffected for all customers.
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	As described in the congestion management section of our consultation, NIE Networks are trialling innovation projects, some of which are seeking to develop market based solutions for network congestion. NIE Networks will continue to monitor progress on innovation projects across GB. NIE Networks is also working with industry and academia on a number of other innovation projects which are also looking at innovative solutions to maximising the efficient and economic operation of the grid network. Material procurement including the procurement of flexibility for these trials will be subject to a competitive tender. Finally NIE Networks is currently chairing a joint Connections Innovation Working Group with SONI. This group has been developed through a consultation process and will consider flexible type connections for generation within areas with transmission constraints. This group comprises of experts from industry, UR and DfE.
ORACLE	In order to provide safe, reliable, and cost effective service, NIE Networks must be able to limit generation on the distribution network. NIE Networks must also maintain history for audit/validation purposes.	As discussed above the Connections Innovation Working Group has been developed through a consultation process and will consider flexible type connections for generation. These types of connections will allow NIE Networks to limit, in real time, the amount of

		generation on the distribution network in order to manage network constraints.
POWER ON	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.	NIE Networks agrees that customer owned assets can play a part in providing support to the network. As described in our consultation paper under, 'Congestion Management', NIE Networks are trialling innovation projects early in the RP6 period, some of which are seeking to develop alternatives to conventional reinforcement through smart network technology and/or market based solutions for network congestion. NIE Networks will continue to monitor progress on innovation projects across GB. In the longer term, and following a successful outcome of our trials it is expected that NIE Networks will be able to test potential network reinforcement options against market based alternatives offered by customers in specific areas of need.
ANDY FREW	This should include the local diversion of power to the heating of hot water and rooms, or to batteries, in nearby properties.	Following a successful outcome of our RP6 trials and other innovative solutions that become available, it is expected that NIE Networks will be able to test potential network reinforcement options against market based alternatives offered by customers in specific areas of need. These alternative solutions may be in the form of water and space heating, and/or utilising batteries, but in a future world, it will be open to each potential provider to offer a service that will be tested against the market.
	Question 12: Do you believe the existing tariffs are fit for purpose, or do they need amendment to deliver benefit to all customer types?	

ANDY FREW	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.	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
ULSTER FARMERS UNION	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.	
CONSUMER COUNCIL	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. 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.	
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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.	
POWER ON	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 is much richer analysis available. Demand Side Response needs to be appreciated as having several dimensions which should be reflected in the new tariff structure for DUoS.	

RICARDO	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.	
SONI	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. 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.	
	Question 13: Do you believe the areas of potential change as outlined in section 3.5 are correct? Are there other areas of change that should be considered? If so, please set out the detail.	
RICARDO	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 transtion towards a low carbon	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this

	future.	consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
ANDY FREW	Yes. The local situation is unusual, with a massive wind energy resource available. To exploit this tariff need 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.	
CHOICE HOUSING IRELAND	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.	
SONI	SONI would welcome an opportunity to discuss the interaction between the signals sent by distribution and transmission tariffs.	
ULSTER	This balancing of demand and supply is normally done at a national level.	

FARMERS UNION	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 be 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.	
ORACLE	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).	
NEA	In brief, our key concerns are: 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.	
ANOMOYOUS RESPONSE	No	
ANONYMOUS RESPONSE AND POWER HOUSE GENERATION	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.	
	Question 14: Do you agree with the customer groups and definitions set out in this paper? If not, please set out in detail	
POWER ON	Respondent challenges the term Passive Consumer and suggests that social housing consumers may have	As per above, specific tariff arrangements will be captured within a tariff reform. This reform

	more complex tariff choices.	would have to be part of a separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
RICARDO	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?	As per the ENA Open Networks projects descriptions Active Participants can also be demand customers reducing operating costs. This would include domestic energy savings schemes.
SONI	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	NIE Networks recognises the need for the future DSO market and TSO market to work together effectively. Through NIE Networks' RP6 innovation projects they will be assessing the ability of customers participating in both markets and the potential conflicts and synergies that might exist. NIE Networks intends to accommodate SONI's request for further information in a follow up meeting and will provide further opportunities for engagement throughout the evolution. Regarding the statement around Passive Consumers "...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)." NIE Networks acknowledges that if participating in the energy market or capacity market then another

	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.	key relationship will exist between the TSO and the aggregator/supplier.
ANDY FREW	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.	NIE Networks acknowledges that customers will move between customer groups as they purchase low carbon technologies and become more energy conscious.
CHOICE HOUSING IRELAND	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	It is important in these more complex housing arrangements to ensure NIE Networks clearly identify the customer type related to the specific site. In this instance NIE Networks would view the site as an active participant albeit that the individual occupier may be passive. NIE Networks appreciates that customers will move between categories during the lifetime of the connection.

	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 Networks 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 Networks and social housing bodies in this area to consider these opportunities in more detail, and ensure that any proposals facilitate innovation appropriately.	
NI WATER	Broadly speaking yes, though the Active Participant customer category should include provision for contracts for services with TSOs and DSOs through community energy schemes.	The proposed "Active Participant" group has been developed by the ENA's Open Networks Project. As stated in the main consultation document NIE Networks intends to keep the proposed customer groups as is but will keep this under review.
	Question 15: Please detail which customer group(s) you either identify	

	with or represent.	
	NIE Networks' response not required to this question.	
	Question 16: What are your views on benefits of the DSO evolution across these consumer groups and how this can be maximised? Please set out in detail.	
SONI	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.	Through the DSO evolution NIE Networks are seeking to ensure that distributed energy resources are managed in a coordinated way delivering whole system benefits as per the DSO definition. Similarly this evolution seeks to eliminate unintended consequences which are already prevalent between the market and network, for example through the delivery of system services on the distribution network. When implementing specific functions within this DSO plan, where appropriate NIE Networks will be performing the relevant CBAs and business plans to ensure that the initiative is beneficial for all customers on the network.
ANONYMOUS RESPONSE	It is important that those customers in the Passive Consumer group are protected from being left behind in this transition. Consumers and consumer groups should be consulted so that they are fully aware of this transition and its implications to them.	NIE Networks agrees that the passive consumer group must be adequately protected against being left behind in this evolution. Within the consultation NIE Networks is proposing a charging reform to ensure that, amongst other things, passive consumers are protected against any unintended consequences of this evolution. Furthermore, this evolution, including the provision of services to the TSO will place downward pressure on costs for all customers' not just active customers. NIE Networks has facilitated engagement with various stakeholders throughout this process and will continue to facilitate engagement as this

		evolution progresses.
IPOWER	System service providers and active partciptants should be able to secure additional MEC and have more favoruable instruction sets	With c1.7GW of renewable generation connected and a further c0.1GW committed to connect to the NIE Networks' transmission and distribution system, there is limited unused capacity for future generation to connect in the absence of network investment. As Northern Ireland is already close to Government targets for energy consumption from renewable sources, it is now becoming more difficult to justify further proactive network investment for renewable generation in the absence of policy direction. Consequently, NIE Networks are currently chairing a joint Connections Innovation Working Group with SONI. This group has been developed through a consultation process and will consider flexible type connections for generation within areas with transmission constraints. This group comprises of experts from industry, UR and DfE. As part of the DSO workshop held at the Crowne Plaza on 14th September 2018 we discussed the potential of introducing a flexible connections option to all applicants based on timed or active network management. In general this was well received by attendees whilst appreciating that this may not suit all customers. It is important to note that a potential flexible connections offer will require the customer to be flexible within the terms of the offer. With reference to more favourable instruction sets, within the consultation document NIE Networks has included a market facilitator function which seeks to provide more dynamic instruction

		sets potentially facilitating greater access to the network for the provision of systems services. In general whilst the evolution from a DNO to a DSO will result in greater access to the distribution network it will not result in unfettered access to the network and may not result in greater MECs.
CHOICE HOUSING IRELAND	We believe that proposed changes could have a significant positive or negative impact on social housing providers. 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 Networks 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	Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme. During RP6 NIE Networks will be implementing several innovation projects. Some of these projects will be seeking market based solutions from customers offering services to the network (e.g. Demand Side Response) which may be of relevance to Housing Associations or similar bodies.

	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 billpayer and the customer as in some instances such as social housing, the billpayer 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.	
	Question 17: Do you believe that there are any policy inhibitors that may prevent or restrict NIE Networks evolving to a DSO? If so, please set out in detail.	
SONI	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.	Comments relating to Question 5 have addressed the "potential for an actual or perceived conflict of interest between some of the DSO functions proposed". NIE Networks agrees that the evolution from a DNO to a DSO must align with existing markets and the transmission system operation to deliver whole system optimisation as per the DSO definition. NIE Networks will continue to engage with key stakeholders to ensure that this is delivered.
ULSTER FARMERS UNION & NORTHERN IRELAND RENEWABLES INDUSTRY	A fundamental review of the policy and legislation underpinning energy in Northern Ireland is required	Whilst the development of energy policy and review of the Utility Regulator roles and powers are outside the remit of NIE Networks, it does not believe that there are currently any policy

GROUP		inhibitors or regulatory barriers which prevent the commencement of the DNO to DSO evolution. However, taking respondent's comments on board NIE Networks does acknowledge a number of inhibitors that may become prevalent over the medium term which require consideration, for example: • The current tariff structure may not be fit for purpose as the growth of LCTs increases. • The price control mechanism will have to evolve to ensure the DSO evolution progresses in a manner that is symmetrical to customers and investors. • As data becomes increasingly more beneficial, it may be necessary for a policy decision on the role out of more advanced metering functionality to provide the DSO with network data to help unlock customer benefits. NIE Networks will continue to engage with the relevant parties to ensure that any future inhibitors are identified and managed to help unlock customer benefits.
ULSTER FARMERS UNION	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. The UFU recommends a review of duties and obligations of bodies such as the Utility Regulator, to enable more flexible policy making.	
RICARDO	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.	
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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	Competition in connections has been recently introduced bringing competition in transmission and distribution. NIE Networks accepts that the interface between SONI and NIE Networks will become more critical during the DNO/DSO evolution and NIE Networks is committed to making it better for

	hampering EV charge-point delivery. There are likely to be other issues that cannot be progressed under existing legislation. 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 mis-communication 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	customers. A review of the UR powers is outside of the remit of NIE Networks and this consultation.
ULSTER UNIVERSITY	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	As per previous comment, whilst the development of energy policy and review of the Utility Regulator role and powers are outside the remit of NIE Networks, it does not believe that there are currently any policy inhibitors or regulatory barriers which prevent the commencement of the DNO to DSO evolution. NIE Networks acknowledges that the price control mechanism will have to evolve to ensure the DSO evolution progresses in a manner that is symmetrical to customers and investors.

	implemented by, New York, California, Rhode Island	
	Question 18: Do you have any other suggestions on how NIE Networks could give customers greater access to the distribution network? If so, please set out in detail.	
ANDY FREW	Provision of heat metering and billing service in addition to electricity metering would make a broader range of micro generation technologies available over a broad geographic area. Initially implementing advanced load controls and promoting micro generation in limited areas would be likely to be more economic, as the controls and communications would be more intensively used.	Whilst the provision of heat metering and billing services are outside of the remit of NIE Networks'. NIE Networks will continue to engage with the relevant parties to help ensure that a joint up approach is taken to the decarbonisation of the energy sector.
ANONYMOUS RESPONSE	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.	The RP6 innovation projects will be trialling market based solutions to congestion management issues on the network. This will include Demand Side Response and Facilitation of Energy Storage Services. If successful, these projects will allow NIE Networks to issue Requests for Tenders (RfQs) for services on congested parts of their network. Individual customers or indeed aggregators/suppliers comprised of many smaller customers may wish to tender for these services. It is therefore up to the customers to decide whether they respond to such tenders independently or as part of a large aggregated group.
POWER HOUSE GENERATION	The DSO should accommodate connections with Non-Firm Access	**<u>Flexible Connections</u>** With c1.7GW of renewable generation connected and a further c0.1GW committed to connect to the NIE Networks' transmission and distribution system, there is limited unused capacity for future generation to connect in the absence of
NORTHERN IRELAND RENEWABLES INDUSTRY GROUP	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 to consider smart solutions that can maximise the use of existing and new assets. As mentioned in all NIRIG responses to recent NIE Network 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 requirements 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.	network investment. As Northern Ireland is already close to Government targets for energy consumption from renewable sources, it is now becoming more difficult to justify further proactive network investment for renewable generation. Consequently, NIE Networks are currently chairing a joint Connections Innovation Working Group with SONI. This group has been developed through a consultation process and will consider flexible type connections for generation within areas with transmission constraints. This group comprises of experts from industry, UR and DfE. As part of the DSO workshop held at the Crowne Plaza on 14th September 2018 we discussed the potential of introducing a flexible connections option to all applicants based on timed or active network management. In general this was well received by attendees whilst appreciating that this may not suit all customers. It is important to note that a potential flexible connections offer will require the customer to be flexible within the terms of the offer. **Smart Incremental Investment** NIE Networks acknowledges and agrees with the need for continued conventional network reinforcement. NIE Networks intends to deliver whole system optimisation through using smart solutions in conjunction with conventional reinforcement. This investment strategy is known as "smart incremental". NIE Networks would however point out that the Transmission system planning, capacity and capability investment is a function

		of SONI. <u>Reactive Power Requirements</u> The reactive power requirements in the current distribution code were approved by the Utility Regulator following agreement at the Distribution Code Review Panel (DCRP) and public consultation. Non exhaustive justification for these reactive power ranges are shown below: • There is an acute need for transmission system reactive power support from 33kV connected generation in Northern Ireland. • Due to the volume of Distributed Generation heavily embedded on the distribution network in Northern Ireland, there is a need for reactive power support on the distribution network to manage voltage, particularly in Emergency Voltage Control. • The European Code, Requirement for Generators allows the DSO to specify wider ranges than what NIE Networks currently require.
	Question 19: Do you believe greater access to the distribution network will bring other customer benefits? If so, please set out in detail	
ULSTER FARMERS UNION	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	NIE Networks agrees that SSG can play a key role in energy security of supply provided it complies with the relevant RoCoF standards, SCADA standards and future D-Code requirements. An example of how customers can benefit the network will be trialled through the RP6 innovation projects, for example the Demand Side Response and Facilitation of Energy 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.	Services projects. If successful, these projects will allow NIE Networks to issue a Request for Tenders (RfQs) for services on congested parts of their network. Existing customers, fulfilling the technical specification will be eligible to tender for such services.
NI WATER	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.	NIE Networks agrees with the respondent. In order to appropriately manage the day-to-day operation of the distribution system with high levels of DERs connected to it whilst continuing to deliver the same quality service to customers, NIE Networks believes that enhancements to their existing system and processes are required.
ORACLE	The DSO should support distribution locational marginal pricing (D-LMP) at the customer level in order to provide location specific value-based participation	D-LMP could be considered as part of a tariff reform. A Tariff reform as part of the DNO/DSO evolution is needed but would have to be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation. In the development of this consultation, NIE Networks will engage with the UR to ensure alignment with their forward work programme.
SONI	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	NIE Networks will continue to engage with SONI to ensure that considerations and proposals are considered on a whole system basis. With reference to the specific comments raised by SONI NIE Networks would make the following points: NIE Networks disagree that the initial focus of the CfE document is solely in terms of embedded

	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. 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.	generation. Significant emphasis in the CfE and this consultation document has been on a wide range of customers and issues, for example: • The impact of Low Carbon Technologies (Electric Vehicles, Heat Pumps, etc.). • Facilitating access to markets for all customers. • Providing opportunities for Demand Side Response for local network issues. • Charging reform to protect passive consumers from unintended consequences of this evolution. NIE Networks agrees that a low cost approach should always be considered first. The principle of selecting the Least Cost Technically Acceptable (LCTA) has been embedded within NIE Networks for many years. With the potential to now use smart and market based solutions NIE Networks has been clear that a smart incremental investment strategy is the preferred option, which represents a lower cost solution to the customer base when compared to a conventional investment strategy. A smart incremental investment strategy is based on the principle that where appropriate smart solutions or market based solutions should be used to defer conventional reinforcement. By deferring high cost conventional reinforcement a significant financial benefit for the general customer base can be achieved. This financial benefit is based on the well understood economic concept of the “time value of money”. The deferral of

		conventional reinforcement also has other significant benefits, for example it reduces the risk of "stranded assets" if the load growth doesn't materialise. Consequently, by deferring conventional reinforcement there are significant long term benefits to all customers.
	Question 20: Do you believe there is any downside for customers in receiving greater access to the distribution network? If so, please set out in detail.	
ANDY FREW	There would need to be protections and assistance in place for vulnerable consumers	NIE Networks agrees with the respondents. NIE Networks fully appreciates the need to ensure that all customers benefit from this evolution and not just those customers with the technical and financial capability to purchase low carbon technologies and participate in various markets. In acknowledgment of this NIE Networks is proposing a charging reform to ensure that there are no unintended consequences of this evolution and the associated decarbonisation of the energy sector on passive customers including vulnerable customers. Furthermore, by delivering whole system optimisation through for example, providing additional services to the TSO and using smart and market based solutions in conjunction with conventional reinforcement, NIE Networks believes that this evolution will help place downward pressure on electricity costs for all customers including those passive and vulnerable customers. NIE Networks will continue to engage with stakeholders to help ensure that any potential barriers to customer benefits are identified and removed and to help avoid confusion associated
ANONYMOUS RESPONSE	Will greater access to the distribution network mean greater access for all? Or greater access for the first movers? Most consumers will be largely unaware of this work and there could be a downside if those customers ultimately miss out on this greater access.	
CHOICE HOUSING	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.	
POWER ON	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.	with this evolution.
RICARDO	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.	
NORTHERN IRELAND WATER	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	The evolution from a DNO to a DSO will necessitate an exponential increase in the IT and data requirements of the business. NIE Networks agrees with respondents that as the IT and data requirements increase so does the cyber security risk. To mitigate this NIE Networks has comprehensive plans for Cyber Security and Data Protection strengthening measures. The implementation of these measures will also greatly enhance NIE Networks position for compliance with NIS[3] and Data Protection Regulations. NIE Networks will continue to ensure that cyber security and data management considerations are of paramount importance in the development of solutions within
ORACLE	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	

[3] Networks and Information Systems

RICARDO	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.	the business
SONI	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.	NIE Networks agrees that through the decentralisation of the electricity sector the management of the system is becoming increasingly difficult and more complex. As part of the evolution from a DNO to a DSO, NIE Networks are seeking to ensure that distributed energy resources are managed in a coordinated way delivering whole system benefits. Similarly this evolution seeks to eliminate unintended consequences which are already prevalent between the market and network, for example through the delivery of system services on the distribution network. NIE Networks will continue to engage with SONI to ensure that considerations and proposals are considered on a whole system basis.

	General Comments	
ANDY FREW	Being able to distribute large amounts of intermittent and lower cost wind energy can be a massive economic benefit for important sectors. 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.	Whilst the delivery of energy policy, required to influence the uptake of particular types of energy sources, are outside of the remit of NIE Networks', NIE Networks will continue to engage with the relevant parties to help ensure that a joint up approach is taken to the decarbonisation of the energy sector.
ANONYMOUS & POWERHOUSE GENERATION	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.	Decisions associated with compensation regarding DS3 system services are outside of the remit of NIE Networks. NIE Networks would however state that the evolution to more dynamic instruction sets is being driven by customers, evidenced by the response to the CfE where 85% of respondents agreed that NIE Networks should develop more dynamic instruction sets. It should also be noted that more dynamic instruction sets will help provide greater access to the distribution system for the delivery of services.
ULSTER FARMERS UNION	The UFU are 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 be supplied locally, the	The DNO/DSO evolution will help facilitate the matching of demand and generation at a local level. Specifically, the deployment of market based solutions such as DSR will be trialled during RP6, incentivising customers to flex their usage to ensure the network is not constrained.

	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	
NEA	In brief, NEA's 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.	NIE Networks are adopting a least regrets approach to the evolution from a DNO to a DSO. This means that NIE Networks will be evolving their current systems and processes as opposed to investing in wholesale changes. Whilst adopting a least regrets approach will minimise the funding requirement, additional funding will still be required to enable progress and NIE Networks will explore with the UR the best approach to minimise additional costs for the general customer base NIE Networks fully appreciates the need to ensure that all customers benefit from this evolution and not just those customers with the technical and financial capability to purchase low carbon technologies and participate in various markets. In acknowledgment of this NIE Networks is proposing a charging reform to ensure that there are no unintended consequences of this evolution and the associated decarbonisation of the energy sector on passive customers including vulnerable customers. Furthermore, by delivering whole system optimisation through for example, using existing NIE Network assets to provide additional services to the TSO and using smart and market based solutions in conjunction with conventional reinforcement, NIE Networks believes that this

		evolution will help place downward pressure on electricity costs for all customers including those passive and vulnerable customers.
CCNI	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. 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. 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	NIE Networks fully appreciates the need to ensure that all customers benefit from this evolution and not just those customers with the technical and financial capability to purchase low carbon technologies and participate in various markets. In acknowledgment of this NIE Networks is proposing a charging reform to ensure that there are no unintended consequences of this evolution and the associated decarbonisation of the energy sector on passive customers including vulnerable customers. Furthermore, by delivering whole system optimisation through for example, providing additional services to the TSO and using smart and market based solutions in conjunction with conventional reinforcement, NIE Networks believes that this evolution will help place downward pressure on electricity costs for all customers including those passive and vulnerable customers. The respondent raised the point that there are potentially important social policy issues to be considered and that they are for the Northern Ireland government to decide. It is not NIE Networks' remit to determine who the approving authority should be. NIE Networks will continue to engage with all relevant stakeholders to ensure that these plans are fully disseminated and understood. With specific reference to tariff

	the appropriate policy making body for Northern Ireland to decide	reform, this will be part of a separate consultation. The valid points being raised by respondents will be considered in this separate consultation.