# Ofgem - Electricity Distribution Price Control Review
# Initial consultation document

## Econnect response

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# 1 Purpose of this document

This document is Econnect's response to Ofgem's initial consultation document on the 5th Electricity Distribution Price Control Review (DPCR5), as invited in document Ref: 32/08 published on 28 March 2008, with a deadline for submission on 23 June 2008.

Econnect wishes to respond to questions in the "Environmental issues" section of the consultation document focusing in the following areas:

1) Long term development statement
2) Active network management
3) Connection process
4) Demand side management and energy efficiency

## 1.1 Confidentiality

Our response is not confidential and can be published by Ofgem as outlined in the consultation document.

# 2 Long Term Development Statements

## 2.1 Question 2.16: On-line LTDS

### 2.1.1 Ofgem question

*2.16. An online interactive LTDS would be one way of delivering better information on network availability which could also provide immediate indicative quotes for connection. Developments to the LTDS such as this would facilitate greater connection of DG. We invite views on how the LTDS could be made more useful for DG.*

### 2.1.2 Econnect response

Information about the transmission network has been published for many years in the form of seven-year statements. The information is comprehensive and enables generation site developers to assess the options for connecting their new development to the transmission network (132kV and above). With the development of renewable energy which connects at lower voltage levels than the transmission levels, the need for information on the distribution network arose and this lead to the publication of the Long Term Development Statements (LTDS) which cover the 33kV to 132kV network voltage levels.

There is currently a strong drive for "decentralised" generation of even smaller rated capacities which connects at voltage levels below 33kV (e.g. 20kV, 11kV, 6.6kV and Low Voltage). Distributed energy is widely seen as a necessary element in the energy production mix in order to tackle climate change issues and to meet European targets for renewable energy. The current distribution network has not been designed to accept large amounts of small scale distributed energy (e.g. plants rated between one kW to a few MW's). It is important that assessments of the connections for these new distributed energy plants are carried out as early as possible in the development process in order to identify connection barriers and to enable timely solutions to be designed. In order to facilitate such assessments easy access to data about the distribution

network below 33kV is required. The access to this data is currently very labour intensive and time consuming for both DNOs (Distribution Network Operators) and the party seeking the information.

An on-line interactive LTDS which delivers information about the distribution network (33kV to 132kV) and provides immediate indicative quotes for connections exists in the form of the "grid connection" web site (www.gridconnection.co.uk). This website provides a grid connection assessment service for generation plants in the range 2MW to 100MW. The LTDS are updated annually and these updates are reflected on the website on an annual basis.

From discussions with DNOs, the data published in the LTDS can already be out of date as the manual process of quality control and publication for the LTDS takes the DNO engineers a significant amount of effort and time. Some DNOs have the data stored in their internal system in an easily accessible electronic format and it seems that the whole process of the LTDS publication could be streamlined and made much more efficient for DNOs if it was delivered electronically from back office systems rather than in pdf/excel format.

This is unlikely to be practical for all DNOs and an incentive scheme would favour those that are able to provide the information via an on-line query system which obtains information directly from internal systems. This would then open the possibility to have more regular updates, which is particularly critical to identify where the network capacity has reduced due to connection of new generation plants (connection offers accepted, new plants connected). In addition, changes to the actual network could also be published on a monthly or quarterly basis so that changes to connection options can be evaluated. Using on-line delivery for the LTDS would also enable the easy publication of bulky information such as half hourly load data at Grid Supply Points (GSPs) and primary substations, which is essential for evaluating lower cost and more immediate constrained connection options and for active network management solutions for generation connection in a given part of the distribution network.

There is increasing pressure on DNOs and generation developers to assess the impact of connections to the distribution network onto the transmission network. The transmission network owners and the system operator are now are involved in assessing the impact of connections for smaller generation plants (down to 25kW in some cases). This is particularly critical in Scotland where distributed generation connections are assessed for their impact on the main Scottish transmission backbone (Inverness to Glasgow). The assessment of generation connections is now a truly end to end process, where regardless of the capacity of the generation plant, assessments on its impact on many or all voltage levels is required. To facilitate such assessments technical data about the whole electricity network is required, including a good level of information and integration between the transmission and distribution networks (between national grid and each DNO and between DNOs).

The volume of information increases many folds between the transmission network and the distribution network (33kV to 132kV), and again increases at least an order of magnitude for the 11kV networks. It is not practical to publish this information piecemeal and manually. An electronic system is essential to bring this information to those that need it (i.e. generation plant developers, consultants, planners etc.).

Econnect's business is focussed on generation connections in relation to network data but we are aware of the potential for a new paradigm of demand connections to be driven by the low carbon economy, e.g. increased loads and new connections for heat pumps (air and ground source); for electric vehicles; for electricity storage systems; and for electric space and water heating. These trends could drive much more complex and variable load flows making a "fit and forget" design philosophy even more difficult to maintain. To provide DNOs and users with the tools to assess the costs, risks and opportunities of different connection options and system uses, ever more integrated and complex data management and assessments tools will be needed.

Web technologies are an effective delivery medium, which can be made very secure and is available 24/7. Such data services could be developed by DNOs or outsourced to third parties. With the data available over the web, connection assessment services which take a holistic view of the electricity network and provide on-line quotes or budget estimates become feasible. This has been demonstrated by the "grid connection" web site, which could be used as a medium to publish integrated information about the whole electricity network as well as providing initial grid connection assessments. Such services would also address the significant industry skills shortage enabling the short supply of experienced electrical engineers across the industry to focus on detailed studies and the search for specific solutions for difficult connections.

# 3 Active Network Management

## 3.1 Question 2.19: RPZs

### 3.1.1 Ofgem question

*2.19. We recognise innovative connection arrangements can bring benefits to all customers, not just DG connections. Extension of the RPZ incentive to demand side initiatives would enable DNOs to develop more innovative ways of managing demand connections. Newly connecting industrial and commercial (I&C) customers would be possible participants in such arrangements given that they are already required to have half-hourly meters with real-time meter reads. It may also provide the flexibility to manage pockets of growth in DG rather than impose network wide solutions given uncertain development and penetration of DG across the country. We invite views on the possible extension of RPZ to include demand connections. We also invite views on whether RPZ should be extended more widely to include innovative ways of managing the network on an ongoing basis.*

### 3.1.2 Econnect response

Econnect carried out a research project on RPZs (Registered Power Zones) in association with the North East DNO CE Electric, aiming to find two sites in the NDEL (Northern) and YDEL (Yorkshire) areas which would qualify under the RPZ framework. A number of sites were identified and two were selected for in-depth study. The conclusions from the experience on this project were that it is very difficult to find a site that has the right mix of generation connection, network conditions and innovative techniques to trial. This has been confirmed by the very small number of RPZs being registered with Ofgem since the incentive was established.

There are a lot of research activities currently undertaken in the areas of active network management and demand side management. Both these areas are seen by the European Union (EU) and the UK (United Kingdom) government as essential to facilitate the reduction of carbon emissions through reduction in demand and meeting the demand with renewable energy sources. This means that electricity networks need to change quite substantially, both technically and commercially.

Active management of loads has the potential to facilitate more renewable energy onto the system and reduce the costs of operating with high penetrations of variable resources by modulating demand over time to better match the variability of the generation output. Such management requires technological solutions (communication and control systems) and commercialisation solutions (financial incentives to electricity users, new relationships between transmission operators, distribution operators and suppliers). Providing trials opportunities under the RPZ framework would help take these research activities into the realm of commercial reality. An

example of such an explorative project is Econnect's "Demand for Wind" research initiative (www.demandforwind.co.uk). Econnect believe that the RPZ incentive should be extended to encourage the trial of demand side initiatives so that such paradigms as Demand for Wind could be trials in earnest on DNO networks.

Adoption of new technologies in DNOs is very challenging as is pointed out elsewhere in this document. The IFI (Innovation Funding Incentive) scheme has been very successful in generating research and demonstration projects. The next challenge is to roll out the successful technologies on larger scale. IFI and RPZ schemes should be modified so that a sliding scale of support is available for say the first 100 installations in GB (Great Britain). An innovative first mover DNO could utilise all these 100 installations on their own networks. DNOs who were slow in adopting new technologies would lose out on support. Implementation of 100 installations of any new technology will play a major role in developing a truly commercial technology and lowering the costs due to economies of scale.

## 3.2 Question 2.22: DG as an alternative to reinforcements

### 3.2.1 Ofgem question

*2.22. Requirements to develop an economic and efficient network may imply consideration of non-network solutions before undertaking reinforcement. In addition, Engineering Technical Report (ETR) 130, which provides guidance on ER P2/627, suggests that such contracts with DG, or potentially a storage device, can be taken into account when considering compliance with ER P2/6. We understand that DNOs generally choose to undertake reinforcement rather than contract with DG or demand customers. Is there sufficient incentive for DNOs to consider non-network solutions before undertaking reinforcement? Are there any particular constraints on the development of demand side management and storage solutions?.*

### 3.2.2 Econnect response

1) Notification of potential

A barrier to DG (Distributed Generation) providing alternatives to reinforcements is the timescales involved in achieving development and planning for a DG solution. Therefore we would encourage DNOs to:

- give early notification (years ahead) of planned or potential reinforcements;
- state the potential/ requirements for DG to provide a solution or defer the reinforcement;
- state the value of the reinforcement deferral (e.g. £/year);
- indicate the area and extent of potential locations for DG.

E.g. a primary substation approaching thermal limits on its transformers or feeders would benefit from DG connected anywhere in the area served by that primary substation. A GIS (Geographical Information System) interface could be used to alert potential generators to this opportunity.

2) P2/6 and other drivers

Most reinforcement is delivered to meet CML (Customer Minutes Lost) and CI (Customer Interruptions) targets rather than P2/6 requirements and therefore the scope should be widened to highlight opportunities for DG to reduce the requirements for any reinforcement whether P2/6 or CML/CI driven.

3) Incentives on DNOs.

It appears to be much easier for DNOs to utilise conventional solutions rather than innovative solutions using active networks. This is because:

- DNOs have limited technical resources and therefore new solutions which require larger amounts of technical and management input are difficult to deliver.
- DNOs prefer a "fit and forget" solution compared to one which requires ongoing monitoring and management.
- DNOs appear to be motivated and orientated to replace Opex with Capex – which works against DG, DSM (Demand Side Management) or storage ANM (Active Network Management) solutions.

4) Support

Tapering support for e.g. the first 100 installations or implementations of new technologies would send a clear message that Ofgem wants to see roll out of these new solutions and not just one off demonstrations.

## 3.3 Question 2.23: Payments for DG as an alternative to reinforcements

### 3.3.1 Ofgem question

*2.23. It may be appropriate to be more explicit about the interpretation of the 'economic and efficient' test and the obligation to consider alternatives to standard reinforcement. It may also be appropriate to develop more clarity around how payments to generators or demand customers that defer reinforcement are treated for regulatory purposes given that they are not traditionally treated as network costs. We invite views on whether there is clarity on the current regulatory treatment of such costs and what alternative treatments might create a greater incentive on DNOs to consider contracting with generators before undertaking reinforcement.?.*

### 3.3.2 Econnect response

We suggest this question should be extended to include the situation where a new generator has two options for a connection. One involves an ANM solution and the other a pure reinforcement solution.

The same comments apply as in 3.2.2.(3) above i.e. DNOs are orientated and appear to be incentivised to use conventional reinforcement solutions and not to use active management solutions.

There is an additional challenge where an ANM solution to connect a generator results in a lower connection availability that a conventional solution (i.e. the generator will have a higher level of constraints). These constraint costs (opportunity costs for the generation) have to be weighed against a lower connection cost for the DG using the ANM solution.

The inevitable increased complexity of ANM solutions means that, under the current regime, DNOs will have a very strong preference for conventional solutions.

# 4 Connection Process

## 4.1 Question 2.10: Disproportionate Connection Practices

### 4.1.1 Ofgem question

*2.10. In addition, despite their statutory and licence obligations and financial incentives there are still suggestions that DNOs are being unhelpful with connections. Information received through the Distributed Energy Working Group (DEWG)20 suggests that, in some cases, DNOs' connection practices appear to be disproportionate relative to the size of the plant being connected. It was noted that it was difficult to gauge how widespread these views are, and the consultation invited parties to come forward with examples.*

### 4.1.2 Econnect response

There are undoubtedly different practices and approaches by different DNOs to generation connection applications. The different approaches include:

- Speed of response to connection applications (in spite of statutory requirements).
- Technical requirements and therefore costs and timescales for connection.
- Charges for making a connection offer.
- Preliminary studies required (and charges and timescales) before providing an offer.

Distribution connections costs are more obscure than transmission connection costs because of the PLUGS[1] / super shallow charging model used in transmission connections. Therefore in order not to discriminate against DG, there needs to be a greater level of transparency of connection and use of system charges.

We suggest that there must be rigorous reporting of generation connection enquiries and offers made which should include.

- Reporting of all generator connection information including connections made, offers accepted, offers made, studies undertaken, budgets provided and enquiries received.
- Reporting of both numbers of generators and MW capacity.
- Reporting of timescales for all activities from enquiry / application to response / offer.
- Reporting of connection charges received and offers made reported on per MW basis.

DNOs could be encouraged to use confidential third parties for connection enquiry processing to provide assurance of the impartiality of their reporting.

[1] Name of the National Grid transmission shallow connection charging methodology

## 4.2 Question 2.14: Consistent connection process

### 4.2.1 Ofgem question

*2.14. In addition, we also consider that the connections process should be more consistent on a national basis. At the moment, for example, the information required from a connectee when requesting an application varies. The connections process encompasses negotiating a connection agreement and the application of engineering recommendations for connecting to the distribution system. Notwithstanding the work progressed through the Competition in Connections review, we consider that a standard national process for connection should be developed by DNOs to facilitate further connection of DG. We are aware that a technical guide to the connection of generation to the distribution network25 was developed by the Distributed Generation Co-ordinating Group and the Technical Steering Group in February 2004 but has not been taken forward by the DNOs.*

### 4.2.2 Econnect response

Some DNOs will probably find reasons why connections to their network must be different to a standard. DNOs should be incentivised to conform to a voluntary national standard, as well as incentivised to provide timely proposals and quotations which are cost effective, contractually straight forward and standardised for ease of understanding so that generation enquiries turn into appropriate levels of connection. This is especially true for the increasingly smaller generation projects seeking connection where the revenues and values do not allow the developers to utilise the high levels of expertise that can be required to deal with some of the connection issues.

Additionally, a web portal could be one way of providing a standard application process across all DNOs as well as an audit trail of information flows and dates.

A web portal can also provide advice on connections as per the Technical Connections Guide. Such a web based service can be more easily kept up to date. It can also provide the advice in context where an on line connection assessments tool is provided, e.g. provide an explanation of fault level and potential solutions where fault level is an issue.

DNOs should be incentivised to make the connection process easy for generators, especially smaller generators, so that they can compete with larger generators who can more easily afford to employ the necessary expertise to overcome some of the technical, commercial, financial and project management barriers.

There is a potential that a new EU directive will require priority to be given to connection of renewable energy generation. A formal audited and simple process for connection which allows auditing of the process could be required to meet the directive.

In relation to developing appropriate standard formats, while DNOs are key stakeholders for the vehicle developed, the development should not be done by the DNOs but by an appropriately experienced independent organisation.

## 4.3 Question 2.25: Interface Distribution/Transmission networks

### 4.3.1 Ofgem question

*2.25. As the volume of DG connections continues to increase there are questions about how to manage the interface between the transmission and distribution systems most efficiently. The Transmission Arrangements for Distributed Generation (TADG) Group, established by Ofgem in July 2006, sought to bring together all interested stakeholders to consider the relationship between DG and transmission and consider appropriate enduring commercial and technical arrangements.*

### 4.3.2 Econnect response

The main issue for embedded generators (which are smaller than "Large") associated with the interaction between transmission and distribution access is the lack of consistent approach to interpretation of the current prevailing regulatory provisions.

For Large embedded generators, the CUSC (Connection and Use of System Code) has required a direct contractual relationship between Large embedded power stations and NGET (Transmission System Operator) since the implementation of the BELLA[2] arrangements as part of BETTA[3] in 2005. Section 6 of the CUSC now also requires DNOs to refer to NGET all applications for connection of generation to that DNO's distribution system, where they consider that embedded generation "may have a significant system effect".

Different DNOs take different interpretations of the test of "significant system effect": Certain DNOs consider it applies where a generation connection would reverse the flow of power at the connection point with the transmission system resulting in an exporting GSP (the calculation to determine whether generation were to provoke an exporting GSP), other DNOs apply different criteria.

In addition to this variation in interpretation of "significant system effect", there is a body of anecdotal evidence of NGET becoming increasingly intrusive in consideration of embedded generation connection applications. Econnect is aware of instances where NGET has requested to assess the impact of generation as small as 1MW. The BELLA arrangements provide a degree of expectation to developers as to the size of generation project that can be progressed without the involvement of NGET i.e. 10MW in North of Scotland, 30MW in South of Scotland and 100MW in England and Wales. Recent developments in which projects of all sizes are being referred for consideration by NGET without any clear frame of reference is undermining confidence in the current grid connection arrangements and threatens the development of competition in generation of electricity, a situation that does not sit well with the Authority's statutory objectives nor with the licence obligations of NGET and the DNOs.

Econnect notes the work of TADG (Transmission Arrangements for Distributed Generation) in considering mechanisms for management of exporting GSPs through various agency models. Econnect would urge Ofgem to incentivise licensees to finalise and implement the way forward (in the short term the establishment of a standard method of identifying system impact and determining exporting GSPs) before further loss of confidence in the embedded generation connection arrangement occurs.

# 5 Demand Side Management

## 5.1 Question 2.5: Zero carbon homes

### 5.1.1 Ofgem question

*2.5. In addition, the Government's proposal that all new homes in England should be "zero carbon" from 2016 is likely to increase the demand for and uptake of distributed energy (DE).16 The Department for Communities and Local Government (DCLG) has outlined a ten-year timetable for the transition however the definition of a zero carbon home is still being debated. It currently allows for measures that apply to entire developments and connections to local DE to count towards the*

[2] Bilateral Embedded Licence exemptable Large power system Agreement
[3] British Electricity Trading and Transmission Arrangements

*zero carbon homes standard. Final conclusions have not yet been reached on the extent to which zero carbon can be achieved using off-site generation, if at all. The final definition of zero carbon for homes will strongly influence future investment in DE.*

### 5.1.2 Econnect response

Variable renewable energy sources can provide large reductions in carbon used for water and space heating by substituting for fossil fuels whenever these variable renewable sources are available. E.g. solar water heating will reduce the requirements for electricity or gas for water heating especially during the summer, spring and autumn months.

Variable wind power from local and remote sources can also be used to substitute for fossil fuels using electricity as the transmission medium. This will become increasingly important in both new and existing homes as carbon fuels become more expensive due to fuel price increases and carbon taxes.

DNOs should be incentivised to find innovative methods of encouraging the use of variable sources, e.g. by developing appropriate distribution use of system tariffs. If they do not, there will be an increasing trend to private networks. Private networks are inevitably very local in nature and will only benefit those customers who are connected to them.

DNOs must play a role in meeting EU 2020 targets for renewable energy, widely expected to require the connection of 4GW of renewable generation each year. DNOs should be incentivised to increase the amount of renewable energy shipped through their networks. One way of encouraging this would be to incentivise DNOs to connect more and more renewable energy to their networks. Another would be to measure and publish the proportions of energy shipped in their networks in a similar way to which Licensed Electricity Suppliers are obliged to publish their fuel mix.

## 5.2 Question 2.50: Network Losses

### 5.2.1 Ofgem question

*2.50. Recognising the importance of this issue Ofgem has incentivised DNOs during DPCR3 and DPCR4 to reduce these losses. Since 2000 losses have fallen as a UK average from 6.1 per cent to 4.9 per cent on the distribution system37. As a result, many of the DNOs are earning significant incentive payments with total payments under the losses incentives being around £100m each year. The question for DPCR5 is to decide whether to continue to provide an incentive to reward overall loss reduction in the same way or whether the effect of the current method of incentive is largely exhausted and now is the time to tackle this issue in a radically different way. We also need to consider whether the environmental impact from losses is sufficiently reflected in the current incentive.*

### 5.2.2 Econnect response

Losses of electricity in the distribution networks are a part of the overall environmental impact of electricity generation, transmission, distribution and consumption. However, focussing on losses in isolation from the big picture could produce perverse outcomes.

For example, in order to rapidly access renewable energy resources, network losses may have to rise. If these losses come from low carbon sources (e.g. renewable energy) their environmental impact is far lower than losses from fossil fuel generation.

In another scenario, replacing gas fired heating systems with heat pumps will increase electricity demand and network losses but have a beneficial impact on national C02 emissions.

Furthermore, if renewable and/or low carbon electricity sources (e.g. Combined Heat and Power) are used to provide electric heating (directly or through heat pumps) and energy for electric vehicles, the overall carbon footprint will be reduced in spite of increased network losses. DNOs should not be penalised for supporting these necessary and inevitable changes.

A radically new approach to losses to take account of the overall carbon foot print of the electricity distribution networks (taking account of both generation and end use) is required.