EUROPEAN NETWORK OF
TRANSMISSION SYSTEM OPERATORS
FOR ELECTRICITY

DEMAND CONNECTION CODE

CALL FOR STAKEHOLDER INPUT

FEEDBACK DOCUMENT

1 GUIDANCE

This feedback document is used in the „DCC - Call for Stakeholder Input" as published on 5 April 2012 on the ENTSO-E website. It lists all questions raised in this Call and allows to provide answers in a structured format. Please use only this feedback document to formulate your responses which facilitates handling of responses by ENTSO-E and understanding by other stakeholders afterwards.

You are welcome to send additional information that supports your responses. In that case, please clearly refer in the foreseen text boxes to the supporting document where relevant. Please also provide the key message or data which is relevant in the foreseen text box in this feedback document.

Based on your background and your possible interaction with the Demand Connection Code, you are welcome to only respond to those questions you consider to be of relevance to you. In case a joint response is given on behalf of several organizations, please indicate this clearly in Section 2 (Respondent Coordinates).

In order for your responses to be taken into consideration in the further development of the Demand Connection Code, you are requested to send the completed form to consultations@entsoe.eu by **9 May 2012**. All responses will be published shortly afterwards.

On behalf of ENTSO-E, we wish to thank you for your contribution.

2 RESPONDENT COORDINATES

Organization name(s)	**RenewableUK**
How would you describe your type of organization(s)?[1]	Association representing the wind wave and tidal power sector in the UK.
Respondent name	Guy Nicholson
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E-mail address	Guy.nicholson@renewableUK.com
Phone number	
Other contributors ***(optional)***	Some of the 650 member companies of RenewableUK
Response submission date	9 May 2012

[1] Please try to be as specific as possible, e.g. Association, DSO, Industrial Customer, Research Institute, Regulator, …

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3 QUESTIONS

Section 1.2.2 – Options to increase RES penetration in the System

1.1. What is your view of the high level analysis presented in Table 2?

The assessment and the analysis are both inadequate.

Firstly the challenge of non-synchronous infeed to a synchronous area/system is not just about renewables but may also come from HVDC links. I.e. in future Ireland could, from time to time, be 100% supplied by energy from HVDC links with no internal generation, renewable or otherwise.

The analysis fails to analyse the changes, assess the challenges, and present the alternatives to each challenge and then synthesise potential solutions.

The whole document and Table 2 do not mention the probable most effective solution – using synchronous compensators and Table 2 does not discuss increased interconnection (AC or DC) as options.

The document does not reference, discuss or analyse any of the current experience with DSR in Europe or globally.

1.2. What is your view of the conclusion that the "Benefits from demand side response (DSR) are clear and that DSR has the potential not only to be relatively inexpensive, but also supports the EU goals to integrate RES and to empower customers to participate in the energy market"?

There are benefits of DSR, but there are risks and costs. There is no consideration whatsoever of the risks associated with the DSR measures proposed.

We fully support development of many and diverse DSR products and services.

These DSR services have value for the system operator (e.g. for frequency management and transmission constraints), for the DSO (e.g. for local network constraints), and for the supplier (e.g. to balance their energy supply/ demand). Consumers should be empowered to trade these services (e.g. through their supplier) with different parties at different times to maximise the value and the benefits of the DSR investments.

If this DCC is implemented it puts the power system at risk of unforeseen failure modes, and will prevent innovation in products and services to solve the challenges ahead, which will vary from place to place and time to time in the EU.

Section 2.2 – Level of Detail

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2.2.1. What is your view on ENTSO-E's interpretation of the level of detail required in the NC DCC?

Mandating DSR measures at this stage and in this detail is totally inappropriate.

Section 3 – Requirements of NC DCC in Light of future Challenges

3.1. Can equitable treatment be assured if the NC DCC includes only high-level requirements, with national legislative required to set specific requirements in each country? If so, how could equality in burden sharing be achieved in synchronous areas and across Europe?

We do not agree that there should be any "requirements". DSR must be developed through ancillary services contracts and via aggregators for smaller users.	

3.2. In your opinion, is there any other new topic that should be included in the NC DCC?

	Yes
Yes the roles of TSOs in promoting ancillary services and fostering innovation, demonstrations, development and deployments to enable both TSOs and others to assess the optimal products, services, standards, equipment and configurations.	

Section 3.1 – Demand Side Response delivering Reserve Services

Questions based on the different available options put forth in section 7.1.1 in Appendix 1

3.1.1. What is your view of the analysis presented on the challenge ahead associated with reduced availability of reserve services from synchronous generators at time of high RES production?

The analysis ignores the procurement of services from existing and new players. This is still a vast untapped area. E.g. • Fossil fuel generators could operate as synchronous compensators to provide: inertia, reactive power, voltage control, fault current infeed improving power system stability. If existing generators can provide these services, they gain income which also encourages them to be available during times of peak demand and low renewables generation to provide backup power. Alternatively such services can be provided by new flexible plant or by dedicated synchronous compensators contracted by the SO. • Standby diesel generators are present in supermarkets, banks, hospitals, water facilities, etc in the hundreds of GW across the EU. This resource can be called on thorugh ancillary services contracts to support power system security.

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3.1.2. Is there any class of users that should be excluded from providing these reserve services?

Services should be contracted to the lowest bidder.

3.1.3. What would be the technical and economical limits to the development of DSR for industrial customers, commercial premises and Closed Distribution Network operators?

Under a contractual approach to ancillary services any "limits" will become apparent.

3.1.4. In Appendix 1, options for the provision of mitigating the shortfall of reserves are given, are there any comparable alternative options other than the ones provided in Appendix 1?

	Yes
	No

We do not accept the statement on wind forecasting errors and the reserve calculations which ensue. RenewableUK has raised these concerns several times with National Grid (e.g. ref below) but have never received a response or explanation.

- RenewableUK consultation response to National Grid on SO Incentives from April 2011 - dated 22nd December 2010
- RenewableUK consultation response to National Grid's operating in 2020 consultation - dated 16th September 2011.

3.1.5. What would be the typical cost to equip one appliance (e.g. a washing machine or a heat pump controller) under each of the 3 alternatives?

3.1.6. What form and level of incentive do you believe is required to encourage consumers not to switch the reserve off under option 1 and 2?

3.1.7. Considering the cost and consequences of the alternatives, do you support use of DSR for this purpose?

We do not agree with the proposal to mandate DSR.

3.1.8. Which of the 3 DSR alternatives (1, 2 or 3) would be your preferred option to achieve the greatest societal benefit and for what reason?

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3.1.9. If the services proposed here are provided, what further uses of these technical capabilities (see Appendix 1) would be most beneficial and why?

…

Section 3.2 – Demand Side Response delivering System Frequency Control

Questions based on the different options outlined in Appendix 2:

Regarding the DSR application related to temperature controlled demand to deliver a smarter, robust and a more user friendly LFDD-capability to avoid frequency collapse and hence contain the impact of rare events with large system frequency excursions:

3.2.1. Do you agree with the conclusion to apply this service universally using European Standards proposed as a result of the initial CBA based on Irish data?

	No
It is irresponsible to specify such requirements without any consideration of the risks and without deploying and verifying the services on an increasing scale over a period of time. It is economically inefficient to specify the requirement ahead of such real world experience as the optimum configurations are unknown.	

3.2.2. ENTSO-E believes this service can be introduced for new appliances (and temperature controllers) without any detectable difference to the primary purpose of the service of the appliance. Can you share any specific knowledge or experience and associated data you may have on this topic?

	Yes
	No

Regarding the use of the temperature controlled demand beyond LFDD-capability for frequency response, following assumptions are taken:

- Primary performance of the temperature controlled function is not effected (operating within the same temperature tolerances);
- Conditions of near total absence of synchronous generators during windy / sunny conditions;
- Moderate demand for synchronous areas with extreme real-time RES penetration (initially expected in Ireland and GB)

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Three DSR alternatives have been identified (with a fourth alternative being 'do nothing'):

- Alternative 1: Voluntary service capability – mandatory usage
- Alternative 2: Voluntary service capability – voluntary use

- Alternative 3: Capability as standard, with mandatory delivery

3.2.3. If this further DSR for temperature controlled demand is introduced should this be arranged by each nation rather than at European level and if so should there be a requirement for **harmonising** within a synchronous area in order to provide burden sharing?

	Yes
	No
…	

3.2.4. Are the **types of demand** suggested in Appendix 2 the most appropriate to provide this service giving continuous response to system frequency deviation away from the target frequency (50.0Hz)?

	Yes
	No
…	

3.2.5. Please provide comments on the **specific data** used in the initial CBA presented.

…

3.2.6. The initial CBA indicates that alternative 1 may be able to provide the required services quicker than alternatives 2 and 3 (due to higher uptake). Do you have any comments about this **conclusion** and the underpinning **assumptions**, including
- 20% uptake for voluntary service capability;
- Increased unit cost for lower volume and supplying more than one option;
- The costs identified.

…

Section 3.3 – Reactive Power Exchange Capabilities

Questions on general reactive capability based on the Appendix 3:

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3.3.1. General questions

a. Do you agree that increasing displacement of synchronous generation is a significant new challenge?

	Yes

Yes. It is not just renewables that will displace synchronous generation but also increasing AC and HVDC interconnection. At times synchronous generation will be displaced in both complete synchronous areas and at other times in large parts of synchronous areas.

There are several challenges (not just one "challenge") that result. These include: reduced inertia, reduced short circuit current / fault levels, and impacts on stability of remaining synchronous machines malfunction of Line Commutated Converters used in traditional HVDC converters and control instability of voltage source converters used in wind turbines and PV installations.

Each of these challenges can be solved without DSR, e.g. by the use of sufficient synchronous compensators. The most cost effective solutions will become apparent over time and DSR may be able to play some role in those solutions.

b. Do you agree that a review of existing requirements is needed, to take into account the new challenges mentioned above in Section 1.2 and 1.3?

	Yes
	No

Yes there could be a requirement on all new large synchronous plant to be capable of operating as a synchronous compensator. Such operation would be contracted as ancillary service(s).

c. Do you agree with the conclusion from the initial CBAs (Ireland & GB) that the societal benefits are greater for reactive management to occur closer to the reactive demand? In either case please provide the rational with supporting evidence where available on the aspects of the conclusion of the CBA that you agree or do not agree with.

	Yes
	No

Reactive power does not "travel well" so correcting imbalances close to source will be more economically efficient. Requiring generators in remote areas, e.g. wind generation (offshore and at remote locations onshore) to provide a reactive capability is not economically efficient. Therefore, a requirement on all generators to provide high levels of reactive capability should be reviewed, especially as generation is not always on line to deliver such services – and therefore there will be double investment to provide the reactive capability from other sources when the generation is off line. Therefore there will be more cost effective solutions than requiring reactive power from generation.

3.3.2. Question specifically relevant for DSO connections

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a. Do you agree that the development of cables and embedded generation introduce further challenges regarding reactive power control, including risk of high voltage during minimum demand?

	No
There is no analysis, reference or documentation to support the statement "*High voltage situations are now increasing due to...*" Without any evidence being presented we cannot accept this assertion.	

b. Is it reasonable to ask DSOs to avoid adding to the problem of high voltage on the transmission system during minimum demand by avoiding injecting reactive power at these times?

	Yes
	No
…	

3.3.3. What is your view on the most appropriate way forward, including but not limited to the following options:

- Do nothing. Leave the TSO to sort out reactive balancing. The CBA of the transmission located reactive capability option in the CBA is relevant here.
- General limit on power factor at transmission to distribution interface, e.g. better than 0.90 or 0.95, with the value set in each country by each TSO subject to public consultation and NRA decision or an equivalent process as provided by the applicable legal framework, such as the definition of a limit in MVAr.
- As in the previous point except the power factor limit set on a local (or zone basis) by the TSO following CBA & consultation / NRA decision.
- Total separation between distribution and transmission reactive flows (i.e. 0 MVAr at the interface).
- The DSO at network exit points treated in the same way as generation is treated in network entry points with the DSO expected to regulate voltage continuously. Should this be limited to slow time scales of minutes (e.g. achieved by means including transformer tapping) or extended to fast acting reactive power support for disturbed conditions?
- Establishment of full reactive markets (e.g. in zones) encompassing DSO contributions as exist in some countries with respect to generation today?

Establishment of reactive power markets is the most appropriate way forward.

Section 3.4 – Voltage Withstand Capabilities

3.4.1. Do you agree with the analysis concerning the need of voltage withstand capabilities?

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	No
No because no analysis or evidence is presented or referenced.	

3.4.2. What are the technical limitations to voltage withstand capabilities in your Demand Units in option iii?

…

3.4.3. What are the technical limitations to voltage withstand capabilities in your Demand Facility or Distribution Network in option iv?

…

3.4.4. What would be the costs induced by such requirements in option ii, iii and iv?

…

3.4.5. Which alternative would you prefer? In case of option ii, iii or iv, shall the requirements be defined for all Demand Units/ Demand Facilities/ Distribution Networks or with specific voltage connection levels only?

…

Section 3.5 – Frequency Withstand Capabilities

3.5.1. Do you agree that certainty is required in the performance of elements in the electrical power system to ensure stable frequency operation and to minimise the cost of procuring frequency response?

	No
No because no analysis or evidence is presented or referenced.	

3.5.2. Which option (i or ii) would you prefer and for which reason?

…

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3.5.3. Please provide cost information to establish frequency withstand capability over the full range from 47.5 Hz to 51.5 Hz for Distribution Networks and Demand Facilities and explain which typical apparatus are needed.

…

3.5.4. Please provide cost information to establish frequency withstand capability over a limited range from 49 Hz to 51 Hz for Distribution Networks and Demand Facilities and explain which typical apparatus are needed.

…

3.5.5. Which frequency-sensitive installations do you have in your Distribution Networks or Demand Facility?

…

3.5.6. Please provide cost information to reinforce frequency-sensitive installations with frequency withstand capability over the full range from 47.5 Hz to 51.5 Hz.

…

3.5.7. Please provide cost information to reinforce frequency-sensitive installations with frequency withstand capability over a limited range from 49 Hz to 51 Hz.

…

4 ANY OTHER BUSINESS

Are there any other items or suggestions you wish to raise on the topic of the Demand Connection Code?

We have very serious concerns with the scope of the proposals in this document based as they are on virtually no analysis or experience with the proposed measures, for example:

- The DCC states „*existing national connection requirements ...have been analysed*" yet no such analysis is shown or referenced.
- No risk assessments for the proposed measures are considered.
- The document does not take account of existing European practices e.g. STOR contracts in GB or the extensive deployment of underground cables in the Netherlands.
- The CBA does not follow the EU Guidelines for conducting a cost benefit analysis of Smart Grid Projects.

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