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119/10		Hammersmith, 16.11.2010

RESPONSE TO PROJECT TRANSMIT: A CALL FOR EVIDENCE

This letter gives Statkraft UK's response to Ofgem's Call for evidence for project 'Transmit'. In the UK, Statkraft is a major player in offshore wind and we see the grid charging regime and connection arrangements as crucial elements for the realisation of our projects. Statkraft owns through Scira 50% of the 315MW Sheringham Shoal offshore wind farm. Statkraft is also part of the Forewind consortium, which won the third round license to develop offshore wind projects on Dogger Bank. Statkraft also is an onshore wind player and is currently involved in 8 onshore wind farm projects.

We have divided our response in 4 chapters:

1. Offshore wind and grid connection - Why charging for grid connection should not be a barrier for the deployment of offshore wind in the UK

2. Cancellation securities - Required changes to the cancellation security regime

3. Interconnection and offshore wind - Required changes to the charging regime to facilitate co-development of European interconnection and offshore wind-farms

4. Co-ordinated networks and TNUoS charging - Required changes to charging regime to facilitate co-ordinated development of an offshore grid network and to reflect the increased scale of the offshore grid needed for round 3

1 OFFSHORE WIND AND GRID CONNECTION

Why charging for grid connection should not be a barrier for the deployment of offshore wind in the UK

The existing charging framework for grid infrastructure in the UK has been developed to meet, and has successfully delivered, the requirements over the last 10-20 years. This has been based on incremental additional investment in the network to connect new generation as it is added to the generation portfolio. The key driver of this framework has

been to ensure the consumer is protected against unnecessary expenditure on the network to facilitate these incremental changes.

This has led to a number of key principles for the charging framework, which include:

- The charging framework has been established to encourage the addition of generation near to the centres of demand, to minimise the requirement for power transmission, leading to less infrastructure requirement and reduced losses.

- A new user of the transmission network who, by signing a connection agreement with National Grid, triggers additional infrastructure requirements for the transmission network, must fully secure that work to ensure that the consumer will not bear the cost of any work which is not actually needed (so-called “stranded” assets).

These principles have been appropriate for the past 20 years, and have led to the current situation where the UK has a secure, robust, cost-effective and diverse electricity generation portfolio. However, the UK now faces a unique set of circumstances and requirements for the next 15-20 years which will require significant modifications to the charging regime to ensure the correct incentives are in place to maintain a secure, robust, cost-effective and diverse generation portfolio over the coming years.

1.1 Key challenges

- UK has a number of ageing electricity generation assets which are expected to cease generation over the coming 10-15 years, including the majority of its existing nuclear power facilities, and a number of older fossil-fuel generation assets which fall under LCPD and IED legislation.

- Hence the UK will require the construction of a large volume of new electricity generation in order to maintain security of supply and a robust generation industry.

- A number of the expected new generation sources (new nuclear power, onshore wind, offshore wind) are locationally constrained, either due to the nature of the fuel source, or due to the limited number of locations where they can be deployed. This is resulting in a significant shift of energy generation location towards coastal and more northern locations. Other options, such as new coal-fired generation with carbon-capture technology, or new CCGT technology, are either not technologically mature or present other risks to the UK security of supply due to the dependence on external fuel sources.

- This shift in location means that the UK transmission network will require a fundamental overhaul in a very short time frame in order to allow transmission from the new generation areas to the centres of demand. The work by the Electricity Networks Strategy Group in 2009 estimated that the expenditure required on the UK transmission network up to 2020 would be £4.7billion (compare this with National Grid’s current asset base for its transmission network assets of around £7billion).

It should also be noted that the shift towards these new forms of electricity generation (nuclear, offshore wind and onshore wind) is being driven by UK governmental policy, to both address the issue of security of supply for the UK market, and due to UK governmental targets for carbon intensity reduction (specifically European Union 2020 targets but also 2050 targets). UK also has an ambitious target for increased consumption of renewables to 2020.

The mechanisms by which the government is looking to drive this shift is through consumer support mechanisms, such as the Renewables Obligation and potentially introducing a carbon pricing mechanism. Furthermore, it is important to note that it is in the consumer's interest that such a shift takes place. Ofgem's recent Project Discovery work showed that the best way to ensure a robust generation market and minimise cost increases to consumer bills was for the UK market to either undergo a Green Transition or a Green Stimulus.

1.2 Project Discovery results and conclusions

4 future generation models were assessed:

Slow Growth – Impacts of current credit crisis continues, leading to low levels of investment. New generation is dominated by CCGTs, UK 2020 targets not met, 12.9GW (36.3TWh/year) of wind generation by 2020

Dash for Energy – Global economies bounce back strongly, security of supply dominant agenda issue, significant CCGT generation increase, UK 2020 targets not met, 14.2GW (40.0TWh/year) of wind generation by 2020

Green Stimulus - Impacts of current credit crisis continues, leading to restricted levels of investment. New generation is dominated by renewables, UK 2020 targets are met, 27.2GW (77.7TWh/year) of wind generation by 2020

Green Transition - Global economies bounce back strongly, environmental concerns dominant agenda issue, new generation is dominated by renewables, UK 2020 targets are met, 28.5GW (81.5TWh/year) of wind generation by 2020

	Green Transition	Green Stimulus
Key supply risk:	Generation variability	Generation variability
CO2 impact:	Down 33% by 2020	Down 46% by 2020
Impact on bills:	Up by 23% by 2020	Up 13% by 2020
Invt required:	£194bn	£190bn

	Dash for Energy	Slow Growth
Key supply risk:	Gas import dependency	Deferred investment
CO2 impact:	Down 14% by 2020	Down 19% by 2020
Impact on bills:	Up 52% by 2016	Up 19% by 2020
Invt required:	£110bn	£95bn

Stress test	Period	Today	Green Transition	Green Stimulus	Dash for Energy	Slow Growth
Re-direction of LNG supplies	1-in-20 severe winter	🟢	🟡	🟡	🔴	🔴
Russia-Ukraine dispute	1-in-20 severe winter	🟢	🟡	🟡	🔴	🔴
Bacton outage	1-in-20 peak day	🟡	🟢	🟡	🟡	🟡
No wind output	1-in-20 peak day	🟢	🟡	🟡	🟡	🟡
Electricity interconnectors fully exporting	1-in-20 peak day	🟢	🔴	🔴	🔴	🔴

Observations from Project Discovery:

- A “Dash for Energy” will lead to consumer bills increasing by over 50% by 2016.
- A “Slow Growth” will protect consumer bills up to 2020 (increase of 19%) but results in the least robust electricity market.
- The “Green Transition” and “Green Stimulus” models give an increase in consumer bills to 2020 of 13-23%.
- The “Green Transition” and “Green Stimulus” models give the most robust market to future stress, with the “Green Transition” preferable on this test.
- Whereas all the models require significant capital investment of greater than £95billion, both the “Green Transition” and “Green Stimulus” models require significant additional investment of at least £190billion.

Conclusions from Project Discovery:

- From a customer bills and energy security standpoint, it is in the interests of the UK consumers to see regulation and the grid charging regime facilitate a “Green Stimulus” or “Green Transition” model of future generation.
- From a UK governmental targets standpoint, it is in the interests of the UK government to see regulation and the grid charging regime facilitate a “Green Stimulus” or “Green Transition” model of future generation.
- Both of these “Green” models require significant additional capital expenditure, which must be found in challenging market circumstances. It is therefore imperative for the grid connection charging regime to remove wherever possible the barriers and hurdles to making this investment materialise, in the interests of the UK consumer and the UK government.

1.3 Funding challenges for new generation types

As observed within the Project Discovery work, the new generation types expected over the next 10-20 years have a different investment model to the generation which has been incrementally added to the portfolio in the past 15-20 years. Over the past period, the majority of new generation has been CCGT technology, which has a relatively low up front capital expenditure (CAPEX) cost (circa £0.4m per MW installed) but high operational (OPEX) cost due to the cost of fuel. The new generation, in particular new nuclear and offshore wind, have very high up-front development and capital expenditure costs but, in the case of offshore wind, lower operational costs due to the lack of a “fuel cost”. This results in a significantly different investment model for these projects. Since it is in the UK interest for the projects to be built, it is appropriate to design a charging regime which caters for that investment model in order to ensure investments are made. Such projects require:

- Wherever possible a reduction in up-front cost demands during the development phase of the project (particularly in terms of requirements to post cancellation securities).
- Due to the high capital cost, such projects require more clarity and stability in terms of the revenue stream once operational (support levels, electricity prices etc.) Such projects cannot take the same level of risk on future pricing as can be taken by CCGT projects.
- Wherever possible, reduction in the capital cost of the future projects, in order to allow the potential investment to be stretched as far as possible to realise as much new generation as possible.

1.4 Conclusions

In conclusion, we would argue that it is no longer appropriate to load all costs and risks of additional grid connection infrastructure onto the generation project developers:

- The changes to the grid infrastructure over the next 10-20 years will not be incremental change triggered by single projects, but wholesale change required for the UK to transition to a “Green” generation model.
- As Ofgem’s Project Discovery has demonstrated, it is in the interests of UK government and UK consumers to see such a transition take place, and therefore UK government and consumers are incentivised to share in the risks of such a transition to ensure it takes place.
- If the grid charging regime prevents the delivery of new generation at locationally constrained locations, then it will be to the detriment of UK government and UK consumers.
- The construction of new offshore wind generation is already a capital-intensive undertaking, which cannot bear the additional burden of securing the restructuring of the UK transmission network.
- Changes to the grid charging regime should be seen as an opportunity to remove the barriers and hurdles to the deployment of offshore wind (be they in terms of project risks or capital expenditure) to facilitate this shift.

Subsequent sections of this response will address the requirements from offshore wind developers from a grid charging regime to facilitate deployment of offshore wind in the UK, in the following areas:

- Required changes to the cancellation security charging regime
- Required changes to the charging regime to facilitate co-development of European interconnection and offshore wind-farms
- Required changes to the charging regime to facilitate co-ordinated development of an offshore grid network and to reflect the increased scale of the offshore grid needed for round 3

2 CANCELLATION SECURITIES

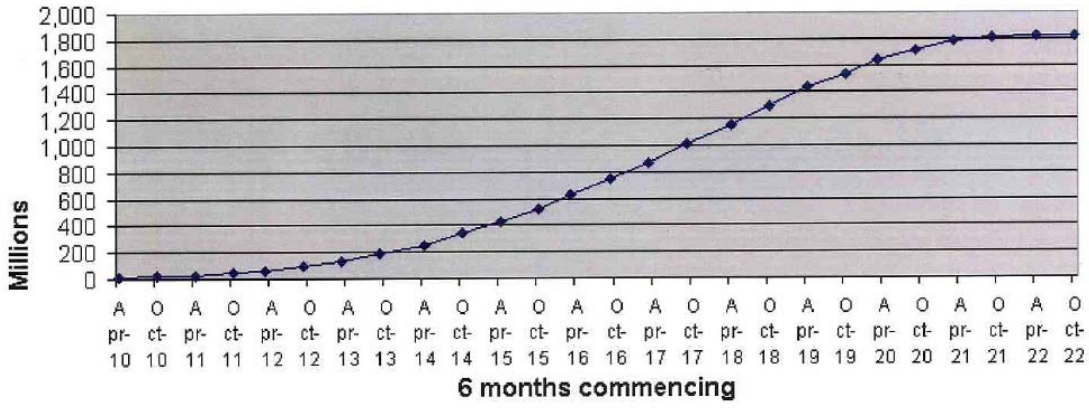
Required changes to the cancellation security regime

As a principle, Ofgem and the UK government should ensure that the Transmission System owners can **invest in strategic grid development ahead of requirement without onerous security requirements on Generators** which are likely to delay or halt developments. Given the current strategic need for large scale offshore wind, the risk of

complete non-delivery is small. Furthermore, it is this strategic need for offshore wind which has created a perceived termination risk, rather than purely Generator development aspirations. The Crown Estate have pre-selected sites and allocated suitable bidders to them.

The commitment from Generators is clearly demonstrated by the significant development costs already being incurred at risk. Requiring Generators to also secure all grid works is unreasonable, especially prior to Financial Investment Decision (FID). Given the costs of providing security, it also diverts capital away from the priority task of offshore wind farm development.

The size of cancellation security provision required has already been found to be a block to the acceptance by developers of connection agreements for offshore wind. By way of example, the Forewind consortium put in an application in November 2009 for 12800MW of grid connection capacity for the Dogger Bank zone, in 1000MW project sizes, for the period from 2016 to 2023. Figure 1 shows the "S" curve for the required cancellation provision for the onshore reinforcement works only.



Date	Amount of cancellation security	Per parent company
Mar 2010 (initial sum)	**£12.4m**	**£3.1m**
Oct 2012 (consent application for first 3000MW)	**~£100m**	**£25m**
Oct 2013 (approaching consent for first 3000MW)	**~£200m**	**£50m**
Oct 2014 (approaching Financial Investment Decision for first 3000MW	**~£350m**	**£88m**
October 2016 (approaching Financial Investment Decision for final projects)	**~£750m**	**£188m**

These levels of cancellation securities, especially ahead of making a Financial Investment Decision, are not acceptable to developers, as they dwarf the development capital invested to bring the projects through to consent.

We accept the need for some security requirements to act as a balance and avoid non-viable schemes coming forward. However, given the strategic background to these developments, it would be appropriate to **cap Generator's security at a reasonable level**. In this manner we welcome the introduction, on an interim basis, of the "hybrid" Interim Generic User Commitment Methodology (IGUCM) for offshore wind, but would welcome a further debate on the structure of this methodology for offshore wind and the appropriate level of capping, both prior to and post financial investment decision. Two major issues occur with utilising the IGUCM method for offshore wind:

- The trigger for switching from the capped commitment level to the "multiple of TNUoS" level is the achieving by the TSO of all the required consents. This should also be linked to the development timeline of the generation project, to ensure there is no misalignment of commitment level. We would wish to see a link between the two projects so that the TSO is not permitted to start capital expenditure on the "local" reinforcement works required for the connection before the project has decided to reach FID, and hence there is no need to step up to a "multiple of TNUoS" level until the generation project has reached the Financial Investment Decision (FID).

- Basing the calculation on a multiple of TNUoS may not be appropriate for offshore wind projects, and should be reviewed.

Should such a change to introduce a cap on cancellation security not be implemented, we believe the following changes are required to the cancellation security charging regime as a minimum. These can be broken down into two categories: securities required prior to project Financial Investment Decision (FID), and securities required post-FID.

2.1 Pre-financial Investment Decision requirements

Overall we believe that, if developers are required to secure the development of reinforcement work to the transmission network, the process should be **proportionate, aligned with the generation asset development, and transparent.**

Proportionate
Recent changes to the cancellation charging regime, on an interim basis, removed the requirement on developers to post cancellation securities for "wider" reinforcements to the transmission network, and placed a requirement on developers to only post cancellation securities for the "local" works triggered. This interim modification must be a feature of the enduring charging regime as a minimum. As argued above, it is unreasonable to ask developers, who are bringing forward projects that meet UK governmental targets and lead to protection of consumer bills, to also guarantee the required wholesale changes to the UK transmission network. It is therefore wholly appropriate that developers should not be faced with guarantees for the "wider" works.

In addition, careful attention should be placed on defining exactly what constitutes "local" works versus "wider" works. It is important that works are not inadvertently or deliberately

inappropriately classed as “local” or “enabling” works, with the risk that projects will not be able to bear such requirements and do not come forward, or that projects are given connection dates later than could otherwise be accommodated under the new “Connect and Manage” process.

Aligned

It is absolutely crucial that the development process of transmission network reinforcements and the generation asset are aligned to ensure that the risk profiles match and that the generation project is not required to place capital expenditure securities ahead of reaching its own investment decision. Developers would therefore accept posting cancellation securities for project management, consenting activities, engineering design work, procurement etc for the “local” works prior to wind-farm project FID, but there should be a link between the two projects so that the TSO is not permitted to start capital expenditure on the “local” reinforcement works required for the connection before the project has decided to reach FID. In this way, the developer can be given the comfort that the cancellation securities it is posting prior to its own FID will not leave it open to paying for expensive equipment that is not required. This is entirely reasonable and should be a feature of any future charging regime.

Transparent

In the current regime, the TSO makes a demand every 6 months for the posting of cancellation securities to cover the coming 6 months of activities. At present, the securities are broken down by reinforcement activity. However, each reinforcement activity can be a very significant cost expenditure, and the developer has no visibility of which activities are taking place, how the reinforcement project is progressing, and why any changes to the secured amount have occurred. As a minimum, the TSO should be obligated at each 6-monthly period to provide the following for each reinforcement activity which it is requesting the developer to secure:

- A revised FSL curve for the secured amount out to the connection date
- The FSL curve costs broken down by reinforcement activity out to the connection date
- The costs of each reinforcement activity out to the connection date broken down into the following sub-areas:
    - Project management expenditure
    - Consenting activities
    - Engineering design and pre-FEED
    - Procurement Activities
    - Capital expenditure
- For each reinforcement activity, a project programme chart versus plan to show how each activity is progressing

In this way, the developer, who is in effect paying for the work through cancellation securities, will have clear visibility of the progress of the activities and can be assured that they are not being asked to post securities that are not required.

2.2 Post-Financial Investment Decision requirements

Post financial investment decision, the developer is already committed to the project, and therefore ongoing FSLs should be calculated as a function of risk of cancellation, which is very low for the developer. Again, these should be capped at a reasonable level. A mechanism could be developed whereby project certainty is calculated as a P50/P90 style probability, and the developer secures in proportion to this (i.e. if the project is 90% certain to be completed, developer secures 10% of reinforcement costs to that point).

3 INTERCONNECTION AND OFFSHORE WIND

Required changes to the charging regime to facilitate co-development of European interconnection and offshore wind-farms

To date, interconnectors have broadly been considered in isolation. In terms of charging methodology, the EU 3rd package does not permit TNUoS charging, which should improve the business fundamentals of interconnection. To further subsidise interconnector schemes by offshore wind generators facilitating far offshore connection points and the consumer ultimately paying for them - which is one interpretation of the general direction regulation is currently heading - does not seem fair.

Putting who pays to one side and ignoring regulatory and commercial barriers for a moment, there is a strong case for far offshore wind generators to be integrated into interconnector schemes. This case applies to both a Zone limited offshore network or a fully co-coordinated network approach as currently being promoted by NGET. In addition to the isolated advantages of point to point interconnectors and offshore wind, our in-house analysis shows an integrated approach can:

- reduce capital costs by a 10 figure sum without impacting on the market trading capability of the interconnector, equivalent to about a 7% reduction in the direct cost of energy from the integrated wind farms
- by using the same high speed controllable and flexible transmission assets for both intermittent wind power and interconnectors, the NETSO could consider such connections as firm sources of generation rather than simply intermittent wind
- promote the case for interconnection and offshore wind generation on a European level, leading to higher deployment of renewable energy, lower bills for the consumer [Project Discovery analysis], less volatile wholesale markets and reduced requirements for expensive standby generation
- release AC grid capacity and connection points that might otherwise be used for point to point interconnectors
- significantly improve [double] the utilisation of 'OFTO' assets above the circa 35% average that is typically expected from 100% rated radial connections.

Despite the advantages of integrating offshore wind generation with interconnectors, the prevailing uncertainties and the isolated path interconnector regulation has to date taken means the most likely prospect is for point-to-point interconnectors competing for grid capacity and bypassing and an offshore transmission network and far offshore wind generation. Integrating wind generation into interconnectors has been excluded from the scope of previous Ofgem consultations.

Each offshore wind farm of a nominal 1GW capacity will require in the order of £3bn to construct. Developers and investors require certainty. Areas where uncertainty exists in relation to an integrated approach include:

- where does an interconnector end and an OFTO start?
- noting integrated solution advantages are based on reducing the amount of radial connections, what certainty is there that the interconnector will be built (Britned took 10 years to develop)?
- an interpretation of current regulation is that part of the output of such an integrated wind farm would not qualify for ROC support. Consideration of power flows and how the wholesale market is likely to react to several tens of GW of wind power being injected when the wind blows indicates current regulation may have some very serious, undesirable and unintended consequences. Long term certainty on this point would be a necessity.

4 CO-ORDINATED NETWORKS AND TNUOS CHARGING

Required changes to charging regime to facilitate co-ordinated development of an offshore grid network and to reflect the increased scale of the offshore grid needed for Round 3

A level of coordination between offshore wind projects looks to be both desirable and probably inevitable. The question is more about the degree and timing of coordination and how it impacts on a greater objective - a rapid decarbonisation of energy supply.
During 2010 NGET has been championing the development of what has been labelled an "integrated network". This concept is an aspirational optimised and efficient network of what could theoretically be achieved. The integrated network idea attempts to pull together a number of deliverables including:

- reduced overall transmission asset base by the strategic sizing and building of assets i.e. designing and building offshore assets in a way that would not be done if the trigger project were the only project being considered
- recognise development consenting considerations and the desirability of OFTO assets to share the same onshore corridor where possible and only be built upon the once, perhaps well in advance of financial commitments to projects that may ultimately use that corridor

- creating an offshore network that would see sharing of offshore assets between multiple generators, interconnectors and consumers
- deliver consumer benefits by providing North-South corridors and/or relieving the need for onshore grid reinforcement and the associated challenging consents
- sending power further south towards major demand centres rather than cheapest OFTO connection points

The current connections and TNUoS charging regime for offshore wind has been based on some principles that are no longer appropriate in application on Round 3 projects. Changes are necessary to avoid that the aim of significantly decarbonising energy supply at the lowest reasonable cost to the consumer is missed. For the near-shore radial connections of Round 1 and Round 2 projects, the case was made that the only beneficiary of each AC OFTO connection was the specific wind farm to which it was connected and as such the respective developers should provide various guarantees and pay for the whole OFTO asset.

NGET's vision of a fully coordinated offshore network would see many direct and indirect users or beneficiaries of the assets. If a developer in the future does have spare financial capacity in excess of the demands of the large scale offshore wind farm, it would be inappropriate for that developer to guarantee things that others benefit from. As an added complexity, in Round 1 and Round 2, transmission stranding risks could be managed by not committing to actual OFTO construction until there is a high degree of confidence that the project will go ahead. For Round 3, starting to build a transmission asset at 200% rated capacity of project 1 and expect project 2 in the early stages of development to fund or guarantee huge construction costs is unrealistic.

The charging principles must also take into account the scale of the offshore grid for UK Round 3 of offshore wind with the large distances involved, the size of projects and the huge capital expenditure required by the developers. The construction of Round 3 will require in the order of £90billion for 30,000MW of offshore wind generation. Ofgem estimates that the OFTO market will be around £15billion or in the order of 15% of the total capital expenditure. If this additional cost is to be borne by the offshore developers it could limit their ability to deliver offshore wind capacity. This is a cost that ultimately has to be passed on to consumers. If this is to be paid initially by the developers it will require a higher support level than if these costs were socialised by network users or charged to the consumers directly.

Any revised grid securities and TNUoS charging regime must ensure a balanced the risk-reward profile for offshore wind farm developers. Round 1 and Round 2 approaches cannot be replicated into Round 3 with targets being hit.

Yours sincerely,
for Statkraft UK Ltd

Bjoern Drangsholt