

**IWEA response to the consultation on the Application of Clause 5.4 of EirGrid's Connection  
Charging Methodology Statement in a Harmonics Context**

**25 July 2014**

**Introduction**

IWEA welcomes the opportunity to respond to the consultation on the Application of Clause 5.4 of EirGrid's Connection Charging Methodology Statement in a harmonics context. The issue of harmonics has come to the fore in recent times and is having an impact on the connection timelines for generators. It is in the interest of all involved to come to a solution which reflects the significance of the issue and can be most efficiently managed in a fair and transparent manner. In our response we set out some concerns relating to the consultation, along with some commentary on the different options proposed. It is worth setting out that in general the connection charging methodology is designed to ensure that the transmission charges:

- are transparent and cost-reflective;
- are fair to all users of the transmission network;
- promote socioeconomic growth;
- are related to the use of the network and ;
- support efficient use of electricity;
- support operation of and long term investment in the transmission network;

**Customer preferred connection method (CPCM)**

The consultation is focussed on projects where the cable connection is the customer preferred connection method. IWEA would like to point out that in most instances a cable connection is not the customer preferred method as IPPs do not prefer to pay more for undergrounding transmission connections. The challenges of building overhead lines are well established and are constantly becoming more acute. The areas where wind has been directed by local councils are in many cases the same areas where it can be challenging to build overhead lines. These connections usually arise in cases where there is no option to build an OHL and underground becomes a last resort.

There are also situations which arise where a developer and EirGrid are both aware that an overhead connection will have significant and possibly insurmountable planning or wayleaving challenges. IPPs can find themselves in a position where they need to wait for EirGrid to deem a cable connection the LCC connection method. Due to time constraints on projects such as the time allowable to construct determined by the planning permission or the availability of REFIT waiting may not be feasible.

An example of the recently commissioned Donegal 110kV line shows that going through the process can take a significant amount of time. The original planning application for this project was

submitted in 1998. As a result of the lengthy timelines involved in EirGrid pursuing OHL as default preferred option even in areas where it is unlikely to be feasible, IPPs often find themselves forced down the route of requesting UGC in order to shorten this process and to assure connection in a reasonable timeframe.

## **Renewable Energy Policy**

It is important to recognise that national policy outlines a target of 40% electricity from renewables by 2020. The proposed costs associated with harmonics mitigation could be prohibitive for projects impacted. In an effort to avoid the costs associated with undergrounding and harmonics mitigation measures, significant time delays will be introduced in showing that the cable option is the LCC, which would add risk to achieving the 2020 targets.

The benefit of undergrounding cables in terms of public acceptance of network build-out should also be noted. This is likely to increase the chances of delivering the 2020 targets..

## **Harmonics – quantifying the problem**

In trying to quantify the harmonics problem there are a number of questions which need to be addressed:

- Are the planning standards being used appropriate?
- Is the modelling being carried out correct? Any modelling is only as good as the underlying input assumptions. Are the assumptions correct and realistic?
- What is the experience of EirGrid of projected harmonics modelled for connections versus actual levels which materialise in reality?
- What is the impact of demand on harmonics and how is this assessed? Does EirGrid have historical harmonics data to show how load has changed background harmonic levels?

A key point with harmonic analysis is that it is not an exact science and should be treated as a risk assessment. Harmonic analysis therefore cannot be treated like load flow calculations for modelling the system and definitely not in a charging context.

The main concern in relation to the charging methodologies proposed is that assets required to mitigate harmonics are not always easily attributable to individual connections, as has been outlined in the consultation paper. It is therefore wholly inappropriate that individual connections should be held to account for any system assets required if it cannot be determined in a clear and transparent manner whether or not that connection has driven the requirement. The paper also notes that there is an existing level of harmonic distortion on the system which comes from many sources, including: demand customers using arc furnaces, DC motor controllers, saturated ferromagnetic transformers etc. and existing generators. Any methodology that penalises newly connecting generators for pre-existing levels of harmonics is not appropriate. There is no discussion in the paper in relation to charging demand customers.

Due to the complexity of the issue, including identifying the main cause of the harmonics and the most efficient mitigation measures, IWEA is of the view that **Option 4 Recover the cost of harmonics mitigation via TUoS tariffs** is the only appropriate charging regime. By ensuring that the cost is

recovered through the TUoS tariffs, the most efficient solutions are likely to be found where the required equipment will be placed in the most appropriate locations rather than having project specific solutions. It will also ensure that system wide modelling is carried out and is likely to result in more accurate modelling of the system. Where the requirements are assessed on a project by project basis it is likely that more conservative assumptions will be used. It is worth noting that harmonic limits at transmission level exist to manage the harmonics downstream where load customers are generally connected. Harmonic levels can increase as long as MV and LV limits are maintained. Charging generators for very high cost solutions at transmission levels is possibly not a prudent approach if low cost MV solutions to manage harmonics could be implemented where actually required instead.

EirGrid have identified the key objectives in the consultation paper as being:

1. Cost recovery
2. Protecting the interests of the TUoS customer
3. Policy is clear and transparent; and
4. Does not unduly discriminate

IWEA agrees with objectives 1, 3 and 4, however we believe that objective 2 is not appropriate given that demand is partially responsible for problem. We suggest that, at a minimum, this be rephrased to “does not unduly burden TUOS Customer”.

### **Comments on Options Proposed**

#### **Option 1: Charge customers for the actual solution implemented**

Clause 5.4 of the EirGrid connection charging methodology statement provides that the Applicant must pay for additional system assets required as a result of the CPCM. EirGrid make it clear that it is not always possible to clearly prove cause and effect in relation to an individual Applicant. Therefore in many cases this charge if applied would be challenged as not being compliant with the approved charging principles.

EirGrid have outlined a number of difficulties with this solution in the consultation paper including the following:

- It would be very difficult to assign causation to individual connections and therefore apportion the appropriate share of any optimised solution on an individual basis.
- The demand customers, who EirGrid accept are more likely to cause harmonics, would be paying nothing towards harmonics mitigation under this option. This policy is therefore clearly discriminatory.
- This option would likely require additional power quality studies to estimate causation and associated charges on a per connection basis. This would introduce significant additional complexity to the application of connection charging policy.
- The methodology and the data sets for studying harmonics for members of a group would have to be consistent, which would be difficult given the staggered nature of underground cable requests. This approach could impose undue inflexibility and further delays for customers’ connection offers.

- The risk of one or more parties in a subgroup falling away could create significant risk and financial uncertainty for connecting parties.
- This option would need to allow for rebates to generators if future connections make use of the assets. Developing and administering a mechanism for calculating rebates will add significant further complexity.
- This option would be difficult to implement in a fair and consistent manner and may create unnecessary connection delays.

IWEA is opposed to this option because

- It cannot be applied in fair and transparent manner
- It will lead to inefficient implementation of mitigation measures
- It does not lead to demand customers, who are fundamentally part of the problem, contributing to solution.
- An “actual solution” can only be designed when an “actual problem” has been identified. Current harmonic analysis cannot determine an appropriate solution to a problem which may not actually exist when real time measurements are taken post energisation. This would leave massive uncertainty for connecting parties at connection agreement signing stage. An unknown capital cost would need to be accepted by any connecting party. This uncertainty would not be acceptable to wind energy projects.

### **Option 2: Charge customers on a Least Cost basis**

This option has similar issues to option 1. The only advantage appears to be that EirGrid could optimise the mitigation solutions over the wider network, which may reduce the costs to a certain extent, and may result in a more predictable than charging for the actual solution implemented, particularly where only one customer was involved. Again, IWEA is of the view that this option would be difficult to implement in a fair and consistent manner and may create unnecessary connection delays. This also does not allow for demand contributing to the solution.

### **Option 3: Apply a “harmonics levy”**

IWEA does not believe this approach is appropriate as this places the entire burden on a limited set of generators who are not the sole contributors to the problem, and in some cases on generators who do not contribute to the problem at all.

- The demand customers, who EirGrid accept are more likely to cause harmonics, would be paying nothing towards harmonics mitigation under this option. This would appear to be discriminatory.
- It is not consistent with existing approved charging principles.
- There is an accepted high probability of inaccuracy in charging.

In addition EirGrid accept that there would be a high probability that forecasts of costs could differ significantly from actual costs incurred. The idea of imposing a narrow time window of 1 month every 1-2 years to apply for a modification to cable would be much too restrictive on projects,

particularly in the context of complex sub-group interactions and looming REFIT timelines. This is not a workable proposal.

#### **Option 4: Recover the cost of harmonics mitigation via TUoS tariffs**

The consultation paper notes that Demand Customers are also injecting harmonics into the system. All options presented in the paper are considered against 4 main policy objectives, including “Protecting the interests of the TUoS Customer, and “Does not unduly discriminate”. It is worth noting that Generators are also TUoS customers and a charging methodology that favours demand customers (who it is accepted are likely causing harmonics) vs certain generation customers could be considered discriminatory. A TUoS charge would facilitate cost recovery, would be relatively clear and transparent and would not unduly discriminate. In relation to providing incentives to generators to select connection methods that might mitigate these effects, it needs to be clearly understood that there is significant additional cost to cable connections vs OHL and Generators are not switching to UC to save costs. As such there is already a cost incentive to build overhead line where this is possible.

In practical terms wind generators with long cable connections will have harmonic limits which must be met at the connection point. In these cases filters may be installed by connecting parties if required. Any filter will be of benefit to the network as well as the connecting party. In these instances there may not be any cost to harmonic mitigation to be recovered by TUoS tariffs. Indeed there may never be significant costs associated with harmonics to be incurred on the entire network.

#### **Conclusion**

In conclusion, IWEA believes that the most appropriate solution is **Option 4 - Recover the cost of harmonics mitigation via TUoS tariffs** for the following reasons:

- Only the required solutions are developed
- There is an incentive on EirGrid to minimise the TUoS cost and therefore optimise the modelling assumptions and the solutions required.
- This is the most equitable of all solutions as it does not discriminate between different types of connections (e.g. generators and demand)
- It removes the complexity of associating solutions with individual projects
- It reduces the requirement for complex modelling under each connection application
- It is the option which will best facilitate the renewable energy targets by enabling projects to progress without the risk of significant additional cost being imposed.
- Option 4 is most in line with the established principals of connection charging.