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## 1. SCOPE

This document is a response to the consultation process set up by the Commission for Energy Regulation (CER), concerning ESBNG's 'Proposal to Limit New Wind Connections' [1]. This document addresses the issues raised in [1], and some of the issues discussed at the forum hosted by ESBNG on 17 December.

Garrad Hassan (GH) is responding to this consultation process, as a report produced by GH and its subcontractors [2] has been quoted by several parties involved in this discussion. GH is commenting on issues of interpretation of the report, and has also taken the opportunity to suggest possible routes forward on some issues.

GH is pleased to note that generally the references to the GH report have interpreted the sense correctly.

This document addresses only technical issues. GH considers that some issues raised by ESBNG are economic rather than technical issues (see Sections 5.2, 5.3). CER will no doubt wish to consider economic issues, but GH considers that resolution of these issues is not as time-critical, i.e. need not delay new connection agreements.

## 2. GRID CODE

The conclusions of the report included the following:

- Development and agreement of grid code conditions for wind generation should proceed rapidly.
- It was considered that wind turbine designs would be available which would meet the likely requirements, but that this needed to be kept under review to identify threats to the expected rate of installation of wind generation.

ESBNG state that they anticipate agreement of grid code conditions by mid 2004. ***GH agrees that production of this document is of prime importance.***

GH has not been involved in the group producing these grid code conditions, and so is not aware that a clear technical case has been established for delaying all new wind connection agreements until they are agreed.

GH considers that:

- if connection agreements require compliance with the conditions as eventually agreed (or, at the applicant's discretion, as proposed by ESBNG at the time of application);
- and updates on the progress of the grid code conditions are regularly published, particularly any issues that have been agreed;

then the risk of non-compliance is clearly placed on the applicants, and the applicants have sufficient information to allow them to assess that risk.

There would therefore be ***no need to delay connection applications for this particular reason.***

This would be reinforced by ESBNG's proposal that CER make clear that future wind generation will not be granted derogations from the grid code (though there will always be the possibility of a derogation for exceptional circumstances).

### 3. VALIDATION OF COMPLIANCE WITH GRID CODE

The GH report pointed this out as an issue which needed addressing. GH agrees with ESBNG that this is now an important issue.

We suggest that the principles of this issue can start to be addressed now, i.e. before the grid code conditions are agreed.

If the risk of failing to meet the compliance criteria is placed on the applicant, then as above there is no need to delay connection applications for this reason.

### 4. DYNAMIC ISSUES

The scope of work which resulted in the GH report specifically excluded consideration of dynamic issues. However it was recognised that this would become a critical issue, and is closely related to some issues to be covered in grid code conditions.

ESBNG state that the risk these issues pose to expansion of wind generation cannot be addressed until the grid code conditions are agreed and the dynamic characteristics of wind turbines are established. GH considers that ***sufficient information is available to start addressing these issues now***. It was not our intention that this work should be delayed until grid code conditions were agreed, especially if (as seems to be the case) these issues are now considered critical.

Some wind turbine manufacturers state that they can provide suitable models for the study of these issues, and test results purporting to validate them. ESBNG may not be convinced that these models are suitable. GH considers that if work is started on these issues now, and includes discussions of the results with wind turbine manufacturers, any failings should become apparent and the further work required by the wind turbine manufacturers will also become apparent. Wind turbine manufacturers will appreciate that a wind turbine design for which adequate models are available, and which does not produce unacceptable effects on the ESBNG system, will have a major competitive advantage.

It is not clear from the information available to us that particular dynamic issues have so far been identified which show that problems are likely. However, GH understands the precautionary approach taken by ESBNG in this case, as a prudent system operator.

GH suggests that an alternative to a moratorium on new connection agreements due to uncertainty over dynamic issues is an arrangement whereby new applicants accept the risk that more stringent technical requirements (i.e. grid code conditions) are defined and agreed in future, to solve dynamic problems so far unidentified. As these more stringent requirements could mean a change of wind turbine technology, or significant cost, this suggestion is likely to be acceptable only if a clear timetable exists for investigating these issues and reaching conclusions.

### 5. OTHER ISSUES

#### 5.1 Provision of reserve and frequency response functions

ESBNG state that the GH report concludes that wind generation is particularly unsuited to providing reserve and frequency response functions. It should be noted that this is for economic reasons, not for technical reasons, and may result in a financial disadvantage for wind generation.

## **5.2 Effect on conventional plant**

ESBNG refer to the GH report to point out that high levels of wind penetration will affect operation of conventional plant, and will also influence the future plant mix. GH considers that this is in essence an economic issue, and therefore is not a reason to delay offering network connections to wind generation.

## **5.3 Forecasting**

ESBNG state that more reliable wind forecasts are necessary. Again, GH considers this to be an economic issue. It is important for reducing total costs, but it is not a reason to delay the expansion of wind generation. Even with inaccurate forecasts, it will always be possible to operate the system, if arrangements for curtailment of wind generation are in place (see below). Ramp rate limits are particularly important here.

The same argument applies to ESBNG's concerns about the need for greater experience of the variability of wind at higher wind penetrations.

## **5.4 Curtailment of wind generation**

The GH report concluded that curtailment will be necessary when wind capacity reaches approximately 800 MW. This figure is close to the limit of approximately 775 MW currently under discussion. ESBNG state that the arrangements for curtailment are not in place.

In writing our report, we considered that suitable technical and contractual arrangements could be agreed relatively easily. If this issue can be addressed rapidly it should not become a limiting factor.

## **5.5 Operating data**

The GH report emphasised the need for detailed real-time operating data to be provided by wind farms to the system operator. ESBNG state that as one of the issues which is preventing further progress. GH considers that suitable requirements can rapidly be agreed (weeks rather than months), and be added to all new connection offers (perhaps with some exclusions for very small projects). Therefore this should not be seen as a limiting factor.

## **6. GENERAL**

Some of the above suggestions may result in applicants receiving connection offers that they cannot sign, for example because:

- the risk of failing to meet some of the grid code requirements is too high, with the wind turbine technology available to them;
- the risk of substantial curtailment (for example, to cope with the issues in Sections 5.2, 5.3, 5.4) is too high, or insufficiently quantified.

GH considers that this is still much better for all parties than no connection offer at all, because the applicant is then clear what has to be done to improve the situation.

[1] Letter 1 Dec 03, ESBNG (Kieran O'Brien) to Commissioner for Energy Regulation, with attachment '*Interim policy on wind connections*'

[2] *The Impacts of Increased Levels of Wind Penetration on the Electricity Systems of the Republic of Ireland and Northern Ireland, Final Report*, GH document 3096/GR/04 E, 11 February 03, available on [www.cer.ie](http://www.cer.ie)