



Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

WIND GENERATOR CONNECTION POLICY

**DIRECTION
BY
THE COMMISSION FOR ENERGY REGULATION**

9th July 2004

CER/04/245

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INTRODUCTION

1. On 22 March 2004 ESB National Grid (ESBNG) wrote to the Commission for Energy Regulation under the heading “Wind Generator Connection Offers”. A copy of this letter is attached in **Appendix A**.
2. This letter followed on from a series of earlier correspondence and public debate arising from a request by ESBNG of 1 December 2003 for agreement to a moratorium on issuing to wind generators connection offers to the transmission or distribution systems pending resolution of certain matters. This request had been agreed to by the Commission under Section 34 (4) of the Electricity Regulation Act, 1999.
3. The letter of 22 March summarised progress to date on dealing with certain matters which, it had earlier been agreed, needed to be urgently addressed in order to facilitate the connection of wind generation. The letter also proposed that ESBNG, as a prudent system operator, should only resume processing connection applications for wind generation after four specified criteria were met. By necessary implication, the moratorium would continue pending these criteria being met. The Commission has therefore treated the letter of 22 March as, among other things, a request for Commission agreement to a further extension of the moratorium under Section 34 (4) of the 1999 Act until the Commission decides on the specified criteria.
4. On the 11th May 2004 the Commission published its Draft Direction Wind Generator Connection Policy. The Commission received 12 submissions from interested parties. These submissions have been examined and taken into account in drawing up this direction.
5. The present document contains the Commission’s direction on these specific criteria and constitutes a direction by the Commission for Energy Regulation to ESBNG under Section 34 (1) of the 1999 Act.

BACKGROUND

6. The background circumstances which gave rise to the moratorium on wind connections has been set out in various documents available on the Commission website and at the public forum hosted by ESBNG on 17 December 2003.
7. In brief, while the level of wind generation actually connected to the system remains quite modest, there has been a rapid escalation in new connection offers issued and accepted in recent times, particularly the latter half of 2003. This has brought to a head serious concerns about the impact of such a scale of wind penetration on the future safety, stability and security of our electricity system. These concerns had been anticipated, to varying degrees, in some

quarters prior to last December. In particular, the potentially destabilising consequences of large scale wind penetration in a relatively small and isolated electrical network, had been highlighted.

8. The table below is taken from the ESBNG's paper "Interim Policy on Wind Connections" which accompanied their letter to the Commission of 1 December 2003 and illustrates the orders of magnitude involved.

Wind Connections (MW) in Republic of Ireland (Situation on 21st November 2003)

	Transmission (MW)	Distribution (MW)	Total (MW)	Cumulative Total (MW)
Connected	39	127	166	166
Signed Agreements	305	228	534	700
Live Offers	32	43	75	775
Applications in Process	144	279	422	1197
Applications being checked	83	15	98	1295

Wind Connections (MW) in Republic of Ireland (Situation on 8th July 2004)

	Transmission (MW)	Distribution (MW)	Total (MW)	Cumulative Total (MW)
Connected	39	190	229	229
Signed Agreements	379	215	594	823
Live Offers	0	39	39	862
Applications in Process	596	773	1369	2231
Applications being checked	125	146	271	2502

9. This ESBNG letter of 1 December (refer **Appendix B**) also set out in some detail ESBNG's concerns and proposed certain interim policy measures. One of these was a request for Commission agreement to

an immediate moratorium on all TSO and DSO wind connection offers until 31 December 2003.

10. The Commission agreed to this request as well as to the subsequent request for an extension of the moratorium to 31 March 2004. These agreements were given under Section 34(4) of the 1999 Act and were accompanied by conditions relating to industry consultation and achieving progress on a number of related policy issues leading to the submission of longer term policy proposals from ESBNG.¹ These included:
 - Work on revising the grid and distribution codes to take account of the special characteristics of wind generation in consultation with the industry be accelerated so that a new “Wind Grid Code” (a term used here for convenience) be drawn up and circulated to the industry by 9 April with a view to consultation and Commission approval shortly thereafter;
 - A survey of accepted connection offers to be conducted to ascertain the likely realistic scale of take up of offers;
 - Issues regarding the constraining of wind farms be examined;
 - The transmission and distribution network connection offer processes be aligned;
 - A programme for the modelling of wind generation plant and its impact on the system be produced;
 - A wind steering group be established and chaired by the Commission to oversee progress on these various issues.

The Scale of Offers and Applications

11. In relation to the survey of connection offers, the Commission engaged an independent consultant to review all accepted and live offers for wind developers not yet connected to the system. The purpose of the survey was to get a realistic judgment of the scale and timing of future wind farm connections. The survey concluded that of the 787 MW of contracted or offered capacity 661MW would be likely to connect to the system by mid 2006 (190 MW already connected). This indicated the scale of likely wind penetration is 125MW less than that anticipated by the TSO in the given timescale. On the face of it, therefore, this would appear to ease the scale of the problem, albeit only marginally.
12. On the other hand, since the introduction of the moratorium the volume of generation in the connection offer process or being checked by the operators has risen dramatically, which is probably not very

¹ Link to Commission’s letter of 23rd December 2003 <http://www.cer.ie/cerdocs/cer03310.pdf>

surprising. The Commission understands it is now of the order of 1640MW.

13. Another factor to consider here is that the Commission has received a number of individual dispute referrals from intending wind generators arguing that they should have received offers from the TSO or DSO as applicable under the normal process application rules prior to the introduction of the moratorium.
14. Lastly, before turning to the details, it is worth noting in passing that concerns associated with increased wind penetration relative to system size is not unique to Ireland.

RELEVANT CONSIDERATIONS

15. In arriving at this draft direction the Commission has been guided by the following criteria and considerations:
 - The Commission's express statutory functions and duties under the 1999 Act.
 - In addition to these duties the Commission has a duty to uphold EU obligations on the State such as those set out in the Renewable Energy Sources Directive 2001/77/EC as well as stated Government policy in the field of promoting renewable energy.
 - The arguments and evidence produced by ESBNG on the threats posed to system stability and security by a continuation of the wind connection policy prevailing before the moratorium.
 - The views of third parties as expressed in the public forum and consultation, including the proceedings of the Wind Steering Group chaired by the Commission. This group met on four occasions to review progress on these issues. The minutes of these meetings can be found on the Commission's website (www.cer.ie).
 - The Commission's own independent technical advice.
16. Ultimately the Commission's direction entails a judgement and, to some extent, a reconciliation between competing public objectives. In making this judgement the Commission has followed the general principle for the purpose of this direction that any obligations or restrictions on wind generators seeking connections to either the transmission or the distribution system should be *necessitated* by the need to protect system stability and reliability. Such measures should also be *proportionate* to the potential threat to system safety, stability and security posed by a continuation of the projected increase in wind connections, which triggered the moratorium in the first place.
17. Wider policy considerations, such as the economic impact on conventional generation of increased wind penetration have been

ignored for the purpose of this direction. In the longer run this has to be a concern. The present direction, however, focuses exclusively on system safety and reliability with wind generator connection.

ESBNG'S PROPOSED FOUR CRITERIA FOR FUTURE WIND CONNECTIONS

18. The four criteria proposed by ESBNG as pre-conditions for lifting the moratorium are set out below, followed in each case by a Commission commentary.

Criterion 1

“The assessment of all applications, both distribution and transmission, should include assessment of the impact of that connection on system dynamic performance and security. Consequently, applications should only be deemed to be complete, and processing by the DSO or TSO as appropriate should only commence, when appropriate dynamic models have been received by the TSO”.

19. The Commission considers this criterion to be reasonable and necessary. With the prospect of considerably increased wind penetration of our system in the coming years, it will become ever more important that the TSO is in a position to assess reliably the impact of new wind farm connections on the dynamic performance and security of the system. It therefore needs suitable and accurate dynamic models of wind farms, including the wind generator and any associated controls and reactive compensation equipment, in the same way as such models are required for conventional plant. That suitable modeling information accompanies connection applications is in fact a current TSO connection requirement, though not a DSO requirement. The Commission does not consider that extending the requirement to the DSO should impose an unreasonable requirement on applicants.
20. The Commission therefore approves this criterion subject to the following qualifications:
- (i) Only generic type data is required for wind farms falling below the 5MW *de minimis* threshold proposed for the wind grid code section of the Distribution Code;
 - (ii) The modeling information shall be provided by connecting generators greater than 5MW (as shall be defined in the Distribution Code) in PSS/E computer coded format provided that the equipment manufacturer or supplier or software vendor supports such latter models. For the avoidance of doubt, an applicant who provides satisfactory modeling data and who engages meaningfully with ESBNG on the validation of the model will be deemed to have met this criterion;

- (iii) This criterion shall apply to all future applications for connection and to existing applications awaiting receipt of a connection offer. These latter applicants shall be allowed a period of 20 business days to supply the dynamic model during which period they shall retain their place in the queue. Should applicants fail to submit a dynamic model within this period then their application will no longer be deemed complete until such time as the model is provided. As a result their position in the queue may be affected;²
 - (iv) all parties who have a 'live' or signed connection offer shall provide the dynamic model no later than 120 business days prior to their advised date of commencement of commissioning;
 - (v) Lastly, all wind generation plant connected and fully commissioned on the date of this direction shall provide actual generator data upon reasonable request by TSO or DSO.
22. ESBNG shall define the model requirements and what shall be deemed 'an appropriate model' in conjunction with the industry, subject to approval by the Commission. The modeling requirements shall be detailed in the Planning Code Appendix of the Grid Code and the appropriate corresponding section of the Distribution Code within two months of the date of this Direction. For the avoidance of doubt a connection application received in the interim and accompanied by a suitable model shall not be held up pending finalisation of the details of the model requirements. These requirements and a register of suitable models shall be made available by ESBNG.

Criterion 2

“Offers for the connection of wind generation to the distribution or transmission system should issue only when the TSO has completed its studies on the overall impact of wind generation on the dynamic performance and security of the system. As previously indicated to the Wind Steering Group, this is likely to take approximately six months from suitable dynamic models becoming available”.

22. The Commission interprets this proposed criterion to the effect that the moratorium should continue until ESBNG's studies on the likely overall system impact of wind generation is complete. This is stated to be approximately six months from “suitable” dynamic models “becoming available.” This could give rise to the moratorium continuing for an indefinite period. The Commission has difficulties with this proposed criterion. It would appear to be more than is necessary or proportionate to deal with the underlying problem particularly in the light of the new Wind Grid Code that is emerging and the prospective availability of constraining of wind generators for system safety and reliability purposes.

² For the avoidance of doubt this requirement applies to all parties in the connection application process including those who have received acknowledgement that their application has been received and/or is complete.

23. This is not to call into question the need for these studies to be carried out in their own right. The Commission accepts that overall dynamic system studies will have to be carried out by ESBNG and that these are important. Indeed such studies are an important and ongoing activity of ESBNG in fulfilling their TSO obligations and identifying network changes necessary to meet customers' needs.
24. Issues associated with the overall system dynamic performance and security are associated with the amalgamation of all of the connected generation. It is the purpose of the proposed Wind Grid Code to place requirements on wind plant such that wind generators do not, in aggregate, present a threat to overall system dynamic performance or security. On this basis it would be unreasonable to argue that further connections offers need to be curtailed until detailed overall studies are completed. That said, the Commission notes that on their own the Codes do not guarantee the reliability or security of the system and complementary measures may need to be implemented by either system operator to ensure this.
25. In conclusion, the Commission does not propose to accept the continuation of the moratorium implied by Criterion 2. However such studies should be carried out.

Criterion 3

“Future offers of connection to the distribution or transmission system will be made on the basis that the output of the wind farm may be constrained for system reasons. As stated by ESBNG at the Wind Steering Group meeting on 12th March, it is increasingly likely that such constraints will have to be implemented. Therefore it is essential that the corresponding commercial rules are developed and issued by the CER as soon as possible”.

26. The Commission considers the principle in this criterion – i.e. that in future wind farms connected to either system will be subject to constraining off for technical reasons – to be reasonable and necessary. Moreover, having this technical facility will help maximize the amount of renewable wind capacity that can be accommodated on the system. As wind penetration increases, so also will the importance of the TSO having the facility to constrain off wind farms for strictly technical reasons. Examples of such reasons would include:
 - to ensure safety in the operation of the electricity system;
 - to manage the potential loss of plant in the event of a major system fault;
 - to create some head room to allow the dispatch of conventional generation for frequency response purposes;
 - to allow some wind farms themselves to provide that same frequency response service.
27. The prospect of wind farms becoming subject to constraining off has been anticipated in some quarters as a possibility, or even a likelihood for some while.

28. The Commission appreciates that the prospect of being constrained off has the potential to make investment in wind generation a more risky commercial enterprise than at present. To some extent this is an unavoidable fact of life, reflecting the growth in wind farm industry in the first place. The degree of risk facing investors will depend on the circumstances (e.g. location) of individual projects as well as on the commercial and technical rules for constraining.
29. These latter rules will obviously be very important to the industry and will have to be developed in consultation with all stakeholders. The Commission expects that such rules will be:
 - transparent, auditable and, in so far as it is possible to do so, enable constraint requirements to be predictable;
 - equitable to all parties involved.
30. This issue of the rules for constraining of wind generators as more and more wind is brought on to the system is dealt with in more detail at paragraphs 49 and 50 below.
31. It has been put to the Commission in some submissions on the draft Direction that the Commission was going beyond ESBNG's request in applying this criterion to "present and future offers" whereas the ESBNG proposal in this regard spoke of "future offers of connection..." While this is true in a narrow sense, it has to borne in mind that the requirement to have the technical capability to be constrained by the TSO is set out in the Grid Code and is proposed in the Distribution Code (and was also proposed in the Wind Grid Code consultation). These Codes will apply to all offers – new and existing. Present offers shall have to comply with the relevant transmission Grid Code or Distribution Code requirements as applicable, subject to a derogation under Section GC.8 or DGC11 as appropriate. There is also the point that the volume of potential capacity covered by existing offers – some 833MW – is very significant. If this capacity were not subject to Criterion 3 this would curtail ESBNG's ability to exercise reasonable control of system reliability and, by extension, the system's ability to absorb more wind connections. Therefore, the Commission considers that the inclusion of this in future offers to be reasonable and it is on this basis that the Commission accepts that Criterion 3 shall apply to present and future offers.

Criterion 4

"Before any offers issue, the new Grid Code and Distribution Code requirements for wind are approved by the CER."

32. The Commission accepts this criterion and has issued a separate direction under Section 33(2) of the 1999 Act approving the new transmission Wind Grid Code. The Commission anticipates issuing

very shortly the Distribution Code for a short consultation upon receipt of the proposed text from the DSO.

33. The new transmission Grid Code and Distribution Code will apply in full to *all* connection offers, including those signed and “live,” as well as new offers to be issued in the event of the moratorium being lifted. This is because of (i) the vital role which the new Code will play in resolving the technical issues in question as well as (ii) the general principle that the nature of the transmission and distribution Codes, as a necessarily evolving set of rules to which generators should be expected to comply in the overall interest of the industry, providing revisions to the Codes are not arbitrary. The Commission addressed this issue in the Wind Farm Transmission Grid Code Provisions Direction (CER/04/237). In this regard the Commission notes that the Grid Code and Distribution Code apply to all plant connected to the system although requests for derogations may be made under Sections GC.8 and DGC11 respectively. Such requests will be considered on their individual objective merit, and may be accommodated on an exceptional basis. There will be no question of derogations becoming the norm or acting to undermine the very basis of the new wind generator connection policy.
34. On this basis, the Commission takes Criterion 4 as given and approved.

CONSTRAINING OF WIND GENERATION

35. The ESBNG letter of 22 March highlighted the need for Commission to develop the necessary rules around the commercial impact of constraining off wind generators as soon as possible.
36. The issue of constraining of wind generators as more and more such generation comes on to the system was raised at the Wind Steering Group, but it was not dealt with in any detail. Some industry representatives argued that it was irrelevant to the introduction of the moratorium. Whatever about this argument, the issue is relevant to *lifting* the moratorium. This is borne out, for example, by the Commission’s position on Criterion 2 (refer paragraph 22 above). It would be simply unrealistic to ignore the constraining off issue. The Commission feels that many in the industry would acknowledge this.
37. The Commission considers that there are four broad issues to consider at this stage:
 - the likely scale of constraining off of wind generators;
 - should there be financial compensation?
 - the technical rules for constraining; and
 - the case for sharing the burden within the wind industry.

THE LIKELY SCALE OF CONSTRAINING

38. The likely scale of constraints imposed on wind generation will be determined by two main factors, namely:
- (i) the total capacity of wind connected to the network, which will tend to influence the need for a general constraint on wind generation at certain times of day, e.g. summer minimum demand; and
 - (ii) the location and extent of clustering of individual wind farms, which will tend to determine the extent of any local network needs for constraint and emergency situations resulting in contingencies outside of current Security and Planning Standards, e.g. storms, where local constraints may need to be applied.
39. The Commission expects ESBNG to estimate the likely incidence of such constraints on the basis of the overall growth in wind generation connections, and on the basis of local network issues. ESBNG and/or ESB Networks shall provide developers with information to allow them to investigate the likely extent/impact of constraining.

SHOULD THERE BE FINANCIAL COMPENSATION TO WIND GENERATORS?

40. Under the current market, conventional generation plant is centrally dispatchable by the TSO. This plant receives a form of compensation in so much as it is kept whole in terms of its tradable quantity (MW to sell) or INC bid (i.e. a payment) as appropriate by the TSO when it is constrained up or down by the TSO solely because of congestion or constraints on the transmission system. Expenditure on Constraints Payments in 2004 is budgeted at €21 million.
41. Wind generation, by contrast, is not dispatchable under the existing market and does not bid into the market. It is not constrained up or down and therefore there is no question of either form of compensation arising.
42. The draft Direction issued by the Commission on the 11th May 2004 drew, in part at least, on the new market arrangements (MAE) then being implemented, pursuant to S.I. 304 of 2003, and the philosophy underlying the MAE. One important tenet of the MAE is that there would be an ending to the regime of paying financial compensation to (conventional) generators – often located in an unfavourable area of the system – who are constrained down or off because of system constraints. Since then, the Commission has decided to put the implementation of MAE on hold for 3-4 months and to consider possible changes to MAE market design, notably regarding locational marginal pricing and the associated introduction of financial transmission rights. The present Direction, therefore, makes no presumption on the outcome of this particular debate nor does it rely on general MAE principles.

43. In considering the question of compensation the Commission wishes to emphasise that there are, broadly speaking, two main reasons why constraining of wind generators might come about:
- (a) constraining may arise due to the inherent risks and characteristics associated with wind generation itself (for example intermittency, variability of as a result of the total volume of wind nationally or locally
 - (b) constraining may arise due to wider system reasons beyond those purely created by the nature of wind generation plant (e.g. transmission constraints).

Constraining under (a) can be seen as more purely “technical” in the sense invoked by ESBNG since the debate on the moratorium began last December. The Commission does not see that there is a convincing case for granting financial compensation in these cases – i.e. where the constraining arises from system reliability issues which are caused by the inherent, unique characteristics of wind generation. This would be inefficient and unfair to other users of the transmission system. On the other hand, the Commission accepts that the question of financial compensation for constraining under (b) warrants further debate and analysis, going beyond the scope of the wind moratorium debate and extending to future developments on MAE, before a conclusive position can be determined.

The Commission concludes, therefore, that there should be no financial compensation for wind generators when they are constrained off for strictly technical reasons and where this arises essentially due to the unique characteristics of wind. The question of possible compensation for wind generators for wider system reasons raises separate issues and cannot be resolved in this Direction. The Commission appreciates that it will be important to develop rules for distinguishing between these two categories of constraints and envisages this being included in the stakeholder consultation process referred to at paragraphs 29 and 50 of this Direction.

44. It has been put to the Commission that failure to grant financial compensation to constrained off wind generators would amount to a breach of the **EU Renewables Directive 2001/71/EC**. The Commission does not accept this argument.
45. The Directive does require the State to promote an increase in the contribution of renewable energy sources to electricity production and to take steps to achieve an indicative target share of renewables in total electricity production by 2010 of 13.2%. The Commission would note, in passing, that no evidence has been produced to date to suggest that the achievement of this target has been put in jeopardy by the recent moratorium on wind connection offers. Neither is the present direction likely to do so. A further point to bear in mind in this debate is that the EU target, as well as the Irish Government’s own target, covers *all* forms of renewable generation and not just wind generation.

46. It is true that Article 7 of the Directive does require that TSOs and DSOs “guarantee the transmission and distribution of electricity produced from renewable energy sources.” However, this obligation is “without prejudice to the maintenance of the reliability and safety of the grid.” TSOs *may* also provide for priority access to renewable generators and when dispatching stations, *shall* give priority to such generation “in so far as the operation of the national electricity system permits.”
47. These provisions make it clear that there is a duty on the State (including Regulators and TSOs) to ensure that the grid access and station dispatch rules give priority to renewables and guarantee them access subject to system reliability, safety and feasibility considerations. They do not, in the Commission’s view, go so far as to require financial compensation for being constrained off for technical reasons.
48. That said, the network businesses will continue to build the network to accommodate generation to deliver its output and where appropriate to relieve constraints. However, as noted in paragraph 38 there will be issues around local and national limits that may require plant to be constrained for safety and reliability reasons.

TECHNICAL RULES AND CASE FOR BURDEN SHARING

49. The detailed rules of how constraining of wind generators will be managed raise important issues, both of efficiency and equity. These will clearly have to be discussed with the industry before any final decision is taken by the Commission. Examples of the kinds of questions to be dealt with include
 - which units should be constrained and what criteria should apply?
 - should the financial burden be borne only by those units constrained or should it be spread across all wind generators? It has also been argued by wind participants that those who situate in a particularly beneficial location should not carry the cost for those who don’t.
 - how to ensure that the technical rules do not create a perverse incentive not to comply fully with the new Wind Grid Code?
 - how to ensure that the rules are fair and as transparent as possible?

This does not purport to be an exhaustive list.

50. ESBNG has brought technical proposals to the Commission and these are being put out for consultation with the industry in tandem with this direction. The Commission will be convening a group to discuss these issues with the industry. The final policy decisions in this area will, of course, be the responsibility of the Commission.

TRANSMISSION AND DISTRIBUTION CONNECTION OFFER PROCESSES

51. One of the tasks to be addressed, as set down in the Commission's letter of the 23rd December 2003 was the alignment of the transmission and distribution connection offer processes. The purpose of this was to eliminate the possibility of a generator seeking to exploit differences between the processes in order to gain an unfair advantage.
52. The proposed changes to the transmission and distribution connection offer processes were put out to consultation on the 25th and 23rd March 2004 respectively.³ The Commission received a number of submissions and has considered these in coming to its draft direction the main elements of which are:
- a single queuing process for applications;
 - application fees
 - capacity, decommissioning and reinstatement bonds;
 - validity period for connection offers and agreements;
 - application completeness
 - payment schedule.

The Commission will be issuing a final direction very shortly on the alignment of the two connection offer processes and the planned queuing of connection applications.

ADMINISTRATION AND RESOURCE ISSUES

53. The Commission accepts that a major backlog of connection applications has built up as a result of the moratorium and that the lifting of the moratorium and the requirement to conduct the system modeling will have an impact on resource requirements within ESBNG. Consequently the Commission indicated in its draft Direction of 11th May 2004 that the Commission was prepared to look favorably on the provision of funds for such a project. The Commission has recently received an indication from ESBNG of the likely scale of additional financial resources that it expects will be required in the short term and is awaiting a formal proposal.
54. There may also be a case for reviewing some aspects of the conventional approach to preparing connection offers on an individual basis, at least in some cases depending on local circumstances. The idea here is to get a proper balance between pragmatism and fairness with a view to speeding up the clearing of the applications backlog.

³ Link to Commission's consultation on the transmission and distribution connection offer processes <http://www.cer.ie/CERDocs/cer04126.pdf>

The Commission is in consultation with both system operators on this issue.

Decision

The Commission hereby decides that the wind moratorium shall end and directs ESB National Grid, as transmission system operator, and ESB Networks, as distribution system operator to recommence the processing and issuing of connection offers on the following basis:

With regard to ESB National Grid's four criteria from its letter of the 22 March 2004: -

Criterion 1: The Commission approves this criterion subject to the qualifications cited in paragraph 20.

Criterion 2: the requirement to undertake system studies prior to issuing any further connection offers shall not apply. ESBNG shall continue to undertake and complete the studies on the overall impact of wind generation on the dynamic performance and operation of the system cited under Criterion 2, but the issuing of connection offers to applicants for connection of either system shall not be held up on this account. ESB National Grid shall publish a timetable, the scope and expected outputs for these studies. Any matters arising from this analysis for consideration shall be published.

Criterion 3: The Commission approves this criterion.

Criterion 4: The Commission approves this criterion. The transmission Grid Code for Wind has been approved at this point and the Distribution Code shall issue shortly.

The technical rules for constraining wind generation referred to in paragraph 50 shall be developed by ESB National Grid in consultation with the industry and subject to approval by the Commission. The Commission will convene a special forum to consider these proposals. ESB National Grid shall develop and publish a timetable to devise the technical rules.

This decision shall take final effect when the Commission approves the Distribution Code under Criterion 4. The Distribution Code Review Panel has very recently received a modification to the text of the proposed new Code. This has resulted in a delay and the Commission is awaiting receipt of the final text for consultation from the Panel. The Commission considers that approval should issue within 3 weeks of receipt of this text.

Tom Reeves
Commissioner
9th July 2004

APPENDIX A

22nd March, 2004.

Mr. T. Reeves,
Commissioner for Energy Regulation,
Plaza House,
Belfgard Road,
Tallaght,
Dublin, 24.

Wind Generator Connection Offers

Dear Tom,

You will be aware of the complex technical issues associated with accommodating large amounts of wind power on a small and weakly interconnected power system such as ours. ESB National Grid (ESBNG) has been drawing the attention of industry, policy makers and regulators to these problems for more than four years now and we are pleased to report that considerable progress has been made over the past two months. We apologise for any inconvenience caused by the fact that this letter is being sent to you one working day later than originally requested; however important developments continued to occur right up to now; for example, three Wind Turbine Generator (WTG) models were received today.

In your letter of 23rd December last, in which you extended the moratorium on issuing new connection offers for wind generation, you listed a number of issues that needed to be urgently addressed to facilitate the connection of renewable generation.

Current Status

The following is our considered view on the present position with regard to the issues with which ESBNG is directly involved:

▪ Grid Code for Wind and interaction with the Distribution Code

You will recall that ESBNG initiated this important piece of work in mid-2003 and the *Wind Grid Code Consultation Group* first met in October 2003. Following the Forum in December, we agreed an accelerated programme to deliver the Wind Grid Code several months ahead of its original target delivery date of September 2004. Since then, considerable progress has been made by, and consensus broadly reached within, the *Wind Grid Code Consultation Group*. The last meeting of this Group will take place on 1st April. Agreement has in effect also been reached with the Distribution System Operator (DSO) on the amendments required to the Distribution Code to align it, where appropriate, with the new *Wind Grid Code*. We will present the *Wind Grid Code* to the *Grid Code Review Panel* on 6th April next and the new *Wind Grid Code* will issue to CER for approval by 9th April. We can confirm therefore that we will have met the advanced delivery date, as agreed in January 2004.

- Constraining of wind generation (for technical reasons)

At our Forum in December 2003, wind industry representatives raised the issue of constraining off wind power at certain times. ESBNG had been aware of this issue for some time and had included it as part of the Wind Grid Code development programme. ESBNG clarified to the *Wind Steering Group* the issues surrounding the constraining of wind generation on 12th March. In essence, constraining of wind for technical reasons will become a feature as wind penetration levels increase. Although the new *Wind Grid Code* will afford the Transmission System Operator (TSO) the ability to curtail the output of wind generators, the necessary rules around the commercial impact have yet to be developed. It is essential that these rules are developed by the CER as soon as possible.

- Reconciliation of differences between DSO and TSO connection processes

ESBNG wrote to CER on 1st March with its proposals concerning the alignment of the TSO and DSO connection offer processes. These proposals were developed following extensive consultations with the DSO. As outlined in 1. below, it is our view that it would be imprudent for the TSO or DSO to process wind farm applications without the TSO having first received the appropriate, suitable dynamic model. Hence it will be necessary that such models accompany DSO applications.

- Impact of wind generators on system dynamic performance and modelling of WTGs

ESBNG wrote to wind farm developers seeking updated information with regard to the technical details of their wind farm proposals, and asked each manufacturer whose products have been cited in connection applications for models suitable for use in the PSS/E power system simulation software. Through subsequent contacts with manufacturers and developers, and overseas visits by ESBNG to a number of the major manufacturers, it has become clear that the manufacturers are in the process of having PSS/E models for many of their products developed. The model development is in most cases being undertaken by third party contractors on behalf of the manufacturers. A number of manufacturers are concerned about the protection of confidential information incorporated in the models and ESBNG has entered into non-disclosure agreements where required.

There are a number of models already available. However, many of these do not represent the features that will be incorporated in the WTGs to ensure compliance with the Grid Code, or are in other ways not representative of the WTGs to be installed in Ireland. ESBNG is continuing its dialogue with the manufacturers in order to ensure that the most appropriate models become available at the earliest possible date, and to ascertain how the models can be validated.

A number of WTG models have been provided to ESBNG in recent weeks, three of which were only received today. These are being evaluated for suitability and validity. Manufacturers expect to make further models available in the coming weeks.

We have engaged the services of Professor Mark O'Malley, Director of the Electricity Research Centre at University College Dublin, to independently assess

the current status of such modelling efforts. Professor O'Malley represents Ireland on the International Energy Agency Annex 21 on Dynamic Models of Wind Farms for Power System Studies. Professor O'Malley has reviewed the results of ESBNG's initiatives to date in the light of his international experience, and has provided a preliminary report (dated 21st March 2004 – please see attached).

Further Considerations

Under the present circumstances, it is our view that as a prudent system operator, ESBNG (and the DSO) should only resume processing connection applications for wind generation if the following criteria are met:

1. The assessment of all applications, both distribution and transmission, should include assessment of the impact of that connection on system dynamic performance and security. Consequently, applications should only be deemed to be complete, and processing by the DSO or TSO as appropriate should only commence, when appropriate dynamic models have been received by the TSO.
2. Offers for the connection of wind generation to the distribution or transmission system should issue only when the TSO has completed its studies on the overall impact of wind generation on the dynamic performance and security of the system. As previously indicated to the *Wind Steering Group*, this is likely to take approximately six months from suitable dynamic models becoming available.
3. Future offers of connection to the distribution or transmission system will be made on the basis that the output of the wind farm may be constrained for system reasons. As stated by ESBNG at the *Wind Steering Group* meeting on 12th March, it is increasingly likely that such constraints will have to be implemented. Therefore it is essential that the corresponding commercial rules are developed and issued by the CER as soon as possible.
4. Before any offers issue, the new Grid Code and Distribution Code requirements for wind are approved by the CER.

In the event that the CER adopts the above approach, the following important implications arise:

- Wind farm applications for distribution or transmission connections are complex and potentially interact with one another. Accordingly, they cannot be processed within the standard 70 business-day time period.
- Major new resources are required to:
 - process the large volume of non-wind generator applications (currently amounting to over 1200MW)
 - perform the global dynamic analysis studies for the accepted wind offers
 - process the approximately 1000MW of wind generator connection applications
 - process the modifications to existing connection agreements.
- The specialised skills and experience required are in great demand internationally, and are very difficult to acquire in the short-term. Significant resources have already been diverted to the Market Establishment Programme, at the request of the CER. We have already brought to your attention the difficulty of recruiting such expertise from ESB. Please see attached correspondence.

- In the absence of any direction to the contrary, the status quo in terms of wind being priority dispatch will remain, and the distribution and transmission connection offer processes will not take account of the issues raised in ESBNG's recent report on the "*Impact of Wind Power Generation in Ireland on the Operation of Conventional Plant and the Economic Implications*". The commercial and economic implications of this should be clearly understood. Wind farm projects will proceed on the basis of current policy, which means that conventional generating plant will be constrained down as required and wind plant will have priority. This arrangement will be implicit in any new, signed connection agreements, unless the TSO and DSO are otherwise advised.

In summary, with the co-operation of all wind industry participants, considerable progress has been made since last December in developing proposals for the *Grid Code for Wind* and in reconciling a range of issues between the DSO and TSO. However, there are still issues outstanding with regard to dynamic modelling and the impact of wind generation on system dynamic performance and security, and with regard to the constraining of wind.

The above sets out the current position as we perceive it. We look forward to continuing co-operation with the wind generation industry, the CER and other interested parties in addressing these issues.

Yours sincerely,

K.J. O'Brien,
Managing Director,
ESB NATIONAL GRID

APPENDIX B



**NATIONAL
GRID**

Kieran O'Brien
Managing Director

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Bord Soláthair an Leictreachais
Sráid MacLiam Íochtair, Baile Átha Cliath 2, Éire

Your ref:

Our ref:

1st December, 2003

Mr. T. Reeves,
Commissioner for Energy Regulation,
Plaza House,
Belgard Road,
Tallaght,
Dublin, 24.

Wind Generation System Security Issues

Dear Tom,

I refer to our recent discussion concerning the above.

In accordance with Section 34.4 of Electricity Regulation Act 1999, I am attaching for your attention an information paper setting out my serious concern at the recent rapid increase in the amount of wind generation proposed for connection to the power system at both transmission & distribution voltages.

As Transmission System Operator we have on several occasions over the past number of years, advised against the connection of more than 400-500MW of such generation prior to 2005/6 when it might reasonably be expected that the technical problems associated with large scale wind generation might be resolved.

The amount of wind generation either currently connected to the system or holding signed connection agreements has now reached approximately 700MW. With this level of committed wind connections, the initial target in the Green Paper on Sustainable Energy will be achieved and Ireland will have made significant progress towards meeting its Kyoto targets. We propose that no further wind generation is connected to the system until the technical issues outlined in the attached document have been resolved.

We suggest that the CER implement this policy as follows:-

1. Immediately direct both the TSO and DSO to cease issuing offers on wind connections between now and year end.



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2. CER to review the proposed policy and consult with the industry between now and year end.
3. Assuming CER agreement with the policy proposals, issue no further offers to wind connections until the technical issues have been resolved.
4. For the approximately 530MW of generation with connection agreements and due to connect to the system over the next 2/3 years, issue authorisation strictly only on the basis of such plant complying with revised interim technical provisions to be proposed by the TSO and approved by the CER.
5. CER to consult with Ofgem with a view to co-ordinating a policy on wind generation for the whole island.

The amount of wind generation likely to be connected under this policy is already much higher than originally proposed by the TSO and reflects the reality of the current position. This amount of wind generation does however pose an increased risk to the security and stability of the power system which the TSO feels exceeds the level normally likely to be accepted by a prudent system operator.

Yours sincerely,

K.J. O'Brien,
Managing Director,
ESB NATIONAL GRID

C.C.

Mr. B. Tuohy, Secretary General,
Dept. Communications, Marine & Natural Resources

Mr. J. Shiels, Executive Director, Networks, ESB.