9

OPPORTUNITIES FOR NEW GENERATION AND DEMAND

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9.1 HOW TO USE THIS INFORMATION

This chapter provides a commentary on the parts of the Grid most suited to the connection of new generation or demand. It draws on the results in the previous chapter, and in Appendices E and F. These results provide useful indications of trends and broad locational issues related to a specific set of forecast assumptions and tests.

There are a number of technical, commercial and timing issues relating to the connection of new generation to the transmission system that are specific to any individual proposal. The TSO will discuss potential generation proposals with developers in the strictest confidence. In addition, the TSO will analyse generation connections on a consultancy basis with the aim of identifying some of these issues before a developer proceeds to a formal request for connection to the transmission system.

A document titled the 'Process for Connection of a Power Station to ESB's Transmission System' can be found on www.eirgrid.com. This document sets out the method by which a formal offer of connection to the transmission system may be obtained by a generation scheme developer. This Forecast Statement is published solely for the purposes of Section 38 of the 1999 Act and is not intended to have any legal effect in relation to the negotiation of contractual terms for connections to the transmission system.

Direction CER/01/72 on Firm/Non Firm Access to the Transmission System, issued by the CER in June 2001[8], defines several dates relating to access to the Grid that the TSO must include in an offer of connection to a generator. These are summarised as follows:

- The Shallow Date is the date by which shallow connection works (those required to connect the generator to the Grid) are expected to be completed;
- The Deep Operational Date is the date by which shallow connection works and deep reinforcements works (those network additions required to allow the generator to output its full power) are expected to be completed;
- The Deemed Firm Date is the date on which the generator will have firm financial access to the Grid. This may be earlier than the Deep Operational Date, where significant reinforcements are required. The Direction should be referred to for details.

Deep reinforcements required for a generation connection can delay a generator's full access to the Grid. Section 9.2 provides indications concerning the likely need for reinforcement for connections at different parts of the Grid. A general comment on the impact on the generator's access is included.

8 In March 2003, the CER extended this direction until further notice.

9.2 OPPORTUNITIES FOR GENERATION

Opportunities are largely dependent on the size and location of generation plant. The connection of large-scale generation (above 100MW) has a much greater, and more immediate, impact on power flows than smaller units or typical demand increases. Large-scale generation here refers to station capacity, which may comprise a single unit or a number of smaller units. Due to their size and impact, connections of large-scale generation are more likely to require reinforcements to the Grid. Opportunities for smaller units (below 100MW) to connect, without the need for further reinforcements, are more prevalent.

In 2003 there is capacity for connecting small generation (50MW) at most of the 110kV stations considered. The Incremental Transfer Capabilities (ITCs) for Killonan and Knockraha indicates that there is opportunity for large-scale generation in the south-west.

By 2006 the ITC studies show significant additional capacity on the Grid. Table 9-1 below summarises the opportunities in 2006 for 220kV connected generation.

Table 9-1 Opportunities for 220kV Connected Generation in 2006

VERY HIGH (>400MW)	KNOCKRAHA (near Cork)
MEDIUM (100-250MW)	ARKLOW CASHLA (near Galway) FINGLAS (North Dublin) FLAGFORD (near Carrick-on-Shannon) KILLONAN (near Limerick) LOUTH MAYNOOTH (West of Dublin) SHANNONBRIDGE (Midlands)
LOW (0-100MW)	GREAT ISLAND (near Waterford)

The opportunities in Table 9-1 are derived from the results of the transfer studies. It is important to note, however, that the calculated short circuit levels at a number of 220kV stations in Dublin may limit opportunities for additional generation in that area. Where the addition of generation would cause short circuit levels to exceed the rating of a circuit breaker or other equipment, it would be essential to replace the equipment or take other measures to reduce the short circuit levels.

Although the number of stations considered in this analysis was limited, the results can be regarded as a guide to opportunities at other 220kV stations in the same area. For a given size of generator it is likely that connection in an area of higher opportunity will incur less reinforcement than connection of a similar generator in an area of a lower opportunity.

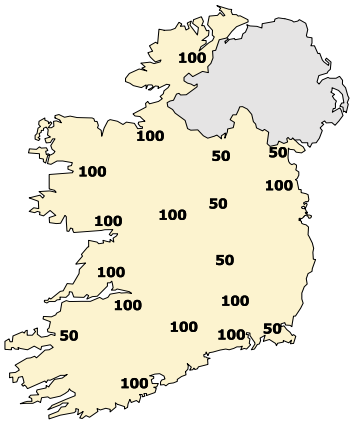
The results of the transfer studies show that the Grid is capable of accommodating significant additional transfers out of the Cork region. This indicates that there is a high opportunity for

generation to connect in the south-west near Cork. The addition of new efficient generation at other parts of the Grid is more limited. The main limitation is the capability of the Grid to transfer power to the south-west. Connections of large-scale generation in the low and medium opportunity areas are likely to require deep reinforcement work. This may impact on Deemed Firm Dates.

However, should new generation locate in Cork, the basis of the analysis would change and opportunities could open up in other areas. If the limitation on transfers to the south-west were eased significantly, then other areas, in particular, the north-west and north-east, could accommodate new generation without the need for additional reinforcement.

Connection of smaller generation stations, with a capacity in the order of 100MW or less, would usually be at 110kV. In most of the 110kV locations examined, 100MW of new generation can be connected. In all locations, 50MW of generation can be connected. Figure 9-1 below summarises the results of studies to determine the capacity of new generation that can be connected at selected 110kV stations. The actual amounts that can be accommodated at each location are presented in Table F-1 in Appendix F.

Figure 9-1 Capacity for New Generation in MW at 110kV Stations in 2006



The opportunities shown are relevant for generators connecting directly at the stations, where connected demand absorbs some of the output from the generator. This is not the case for generators looped into a 110kV line, and so opportunities for such developments are likely to be more limited. Additional generation embedded on the distribution system could limit opportunities further.

It must be stressed that the generation opportunities are not cumulative. Generation development in one area is likely to reduce opportunities in neighbouring areas. It should also be noted that closure of an existing generation station is likely to increase opportunities in that area.

9.2.1 Wind Generation

There is little experience of wind generation in Ireland and this experience is limited to that of relatively small installations. The TSO has particular concerns relating to the dynamic stability of large wind

farms, the ability of wind farms to provide voltage control capability to the Grid, the power quality performance of wind farms, and the ability of wind farms to remain connected during a disturbance on the transmission system. These dimensions may have an impact on the opportunities for the connection of wind farms.

The strength of the Grid, in terms of short circuit levels, is a significant consideration when connecting wind generation. Section 6.3 deals with forecast short circuit levels on the Grid. The level at a proposed wind farm location indicates the strength of the Grid to withstand switching at the wind farm without adversely affecting power quality for other users. A high short circuit level indicates a relatively strong Grid. Appendix G, which lists short circuit levels for Grid stations, will facilitate developers in assessing the strength of the Grid in relation to their development. Those using the table for this purpose should note that short circuit levels were calculated at maximum and minimum demand conditions. These values are not necessarily maximum and minumum short circuit levels, but are indicative of these nevertheless.

9.3 OPPORTUNITIES FOR NEW DEMAND

In 2003 there is limited capacity for demand growth above anticipated values outside Dublin and Cork.

By 2006 the capability of the 220kV network outside Dublin will have been developed significantly. This development occurs in discrete steps, with each new project providing additional capacity on the Grid. The results of the Incremental Transfer Capability studies show that there is capacity to accommodate increased demand at Dublin, Cork and Galway at 220kV level in 2006, following completion of the planned reinforcement projects.

Generation in Dublin will be approximately 20% higher than the demand in the same area. In general the connection of new demand in the Dublin area will reduce flows on the 220kV lines and cables out of Dublin, and thus free up capacity on the transmission system. This is, therefore, an opportunity for connection of substantial new demand at the 220kV stations in Dublin. It should be noted that the Incremental Transfer Capability analysis did not assess the capability of the radial 110kV network in Dublin.

The opportunities to support new demand, above the anticipated demand growth, on the 110kV system, are limited. Reinforcement of the 110kV network is planned to keep track with forecast demand growth. In general, 220kV reinforcement reduces 110kV line loadings and frees up capacity on the underlying 110kV network. For this reason there will be capacity for new demand at Trabeg in Cork[9] in 2006 without further reinforcement. Limerick, Ennis and Tralee, and to a lesser extent Mullingar and Portlaoise, can also accommodate additional demand.

By 2009 natural demand growth will have reduced the opportunities identified in 2006.

9 It is assumed that the Aghada-Raffeen 220kV circuit will be completed by 2006.

9.4 OPPORTUNITIES FOR INTERCONNECTION TRANSFERS

This section draws on the analysis undertaken to identify opportunities for transfers across the interconnection with Northern Ireland, described in Chapter 8.

9.4.1 Opportunities for Exports

The results illustrated in Chapter 8 indicate that the export transfer capability to Northern Ireland depends on where the new generation capacity is connected. In 2006, high export capabilities will exist from most locations. However, exports may be limited during maintenance of some critical circuits in the north-east.

The bottleneck between Dublin and Louth is likely to limit exports at peak demand periods in the long-term.

9.4.2 Opportunities for Imports

Opportunities are largely dependent on what generation in the Republic of Ireland has been displaced by (i.e., not dispatched because of) the import. The Grid will be capable of accommodating high imports that replace generation in Dublin or Moneypoint. These would have to be reduced during the maintenance of some key circuits in the north-east. There are limited opportunities for imports to replace generation in the south. This could change if new generation locates in the south.