2

DEMAND

2 DEMAND

This chapter deals with forecasts of the total peak demand that will be transported on the transmission network, and of demand at individual transmission-connected stations.

2.1 BASIS OF TOTAL PEAK DEMAND FORECASTS

The *Generation Adequacy Report 2003-2009* (GAR), published by the TSO in November 2002, contains forecasts of future energy and peak demand for the seven-year period to 2009. These forecasts form the basis of the total peak demand projections used in this Forecast Statement.

The GAR forecasts are based on projections of economic activity, and an historical relationship between this activity and demand for electricity. Economic forecasts produced by the Economic and Social Research Institute (ESRI) have been used as inputs in the demand forecasting process. The most recent ESRI Medium Term Review (published September 2001) contains forecasts of economic variables up to 2015 and a Quarterly Economic Commentary (published summer 2002) contains shorter term ESRI forecasts for 2002 and 2003. These reports show that Ireland's economic growth dipped in 2002, following the global downturn, and predict a general recovery to steadier growth rates up to 2009. This central forecast represents the ESRI's best estimate of the prospects for the economy and is the basis for the demand forecasts used here.

Since the publication of the previous Forecast Statement, the TSO has developed a new long-term energy forecasting methodology. The new methodology is based on a linear regression model that forecasts domestic and non-domestic energy separately, using Personal Consumption of Goods and Services (PCGS) and Gross Domestic Product (GDP) indices. Verification tests using an historical data set indicate that this model is more robust, reliable and accurate than the previous technique of solely utilising the relationship between energy and GDP. Further details on overall demand projections can be found in a document titled "A New Methodology For Forecasting Long Term Electricity Demand For The Republic Of Ireland", which is available on the EirGrid website under the Policy section.

The demand forecasts produced by this methodology represent the total amount of electricity consumed by all customers, including customers with on-site generation who supply some, or all, of their own requirements.

Electrical losses are incurred in the transportation of energy over the transmission and distribution network. An estimate of these losses is added to the electricity demand forecasts to determine the total level of generation required.

2.2 FORECASTS OF TRANSMISSION PEAKS

Power is transported on the Grid from generation stations to the distribution system and grid-connected demand customers. Demand that is met by embedded generation[3] is not transported on the Grid. In determining forecast transmission peak flows, an estimate of the demand met by

[3] Generation connected to the distribution system or at a customer's site.

embedded generation is deducted from the total peak electricity requirement.

In adjusting the total peak electricity demand to take account of embedded generation, the TSO estimates the output, at the time of peak, from these installations. All generators have a probability of being out of service, and so their projected total capacity is partially reduced to determine this estimate of output. In the case of wind generation, however, the variability of the output is such that it cannot be relied on to reduce transmission flows. It is, therefore, not included in the peak reduction calculation.

Forecasts of combined heat and power schemes (CHP) and generation from renewable sources are listed in Appendix D. Because the size and location of future embedded generation is uncertain, its estimated contribution is assumed to reduce the forecast demand at all stations by an equal percentage. While this assumption may lead to a small underestimation of demand at many stations, it avoids large prediction errors.

Table 2-1 presents the forecasts of peak transmission demand for the seven years 2003 to 2009. The peak demand in column (A) is the median forecast of total peak demand as presented in page 47 of the *Generation Adequacy Report 2003-2009*. The peak transmission demand is calculated by subtracting the estimated embedded generation at peak figure in column (B) from the total peak (A). The figures represent the annual peaks that are forecast to occur in the winter e.g., the 2003 forecast of 4209MW is projected to occur in winter 2003/4.

Table 2-1 Total Demand Forecast, MW

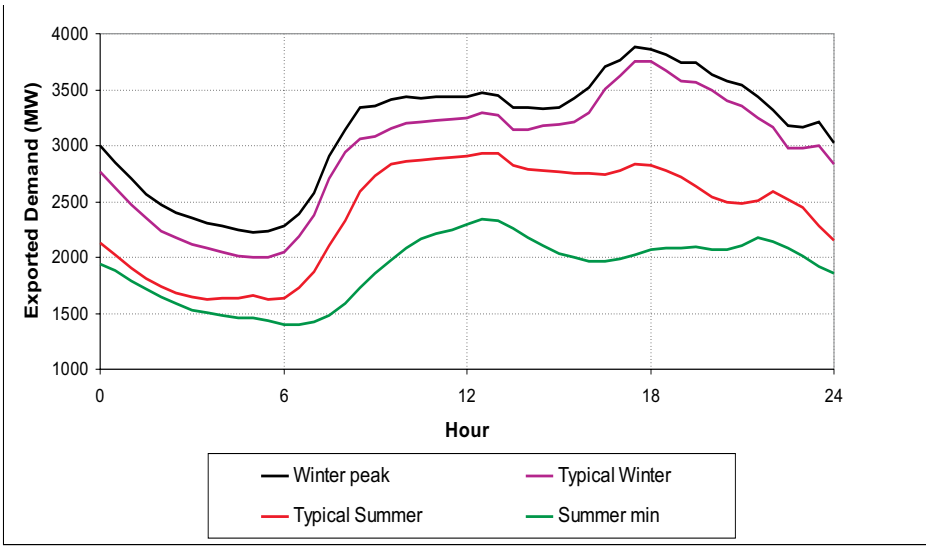
Year	Peak Demand (A)	Embedded Generation (excluding wind) at peak (B)	Peak Transmission Demand (=A-B)
2003	4350	141	**4209**
2004	4494	144	**4350**
2005	4641	153	**4488**
2006	4795	163	**4632**
2007	4960	172	**4788**
2008	5130	189	**4941**
2009	5302	206	**5096**

The peak transmission demand recorded for winter 2002/3 was 4415MW in gross terms (i.e., including generation station consumption). This translates to approximately 4240MW in exported terms (i.e., as in Table 2-1). It is important to note that this peak was higher than anticipated. The TSO will continue to monitor demand growth and may amend forecasts if changing conditions justify such action.

2.3 DEMAND PROFILES

Electricity usage follows some generally accepted patterns. For example, annual peak demand occurs during winter weekday evenings, while minimum usage occurs during summer weekend night-time hours. The annual minimum is referred to as the summer night valley (SNV) in this Forecast Statement. Peak demand during summer months occurs much earlier in the day than it does in the winter period. Figure 2-1 shows the demand profile for the day on which the peak occurred in 2001, as well as profiles for typical summer and winter weekdays and for the minimum demand day. The profiles, ranging from 1500MW to 4200MW, indicate that the power system deals with a wide variation in demand throughout the year. Many factors have an impact on this electricity usage pattern throughout the year, including weather, competition from other fuels, and customer demand management.

Figure 2-1 Daily Demand Shapes for Year 2001



2.4 COMPARISON WITH PREVIOUS DEMAND FORECAST

2.4.1 Internet Data Centres

The demand projections presented in *Forecast Statement 2001/02-2007/08* included a number of Internet Data Centres (IDCs) which, at that time, were expected to add substantially to the overall peak system demand. However, to date, large-scale IDCs have not materialised because of the general downturn in this sector and it is now assumed that demand in this sector will be much lower than previously forecast. Furthermore, the contribution from IDCs to the economy is now included in the ESRI's GDP forecast and, as such, is included in the electricity demand predictions for this Forecast Statement.

2.4.2 Demand Side Management

Demand Side Management (DSM) is the term used to describe the modification of normal demand patterns, usually through the use of financial incentives. ESB's Winter Demand Reduction Incentive tariff (WDRI) is a DSM scheme that encourages industrial users to reduce their demand at the time of winter peak. *Forecast Statement 2001/2-2007/8* included a projection of a continuing peak reduction of 200MW, resulting from ESB's WDRI scheme or an equivalent tariff offered by independent suppliers. However, it is now evident that fewer industrial users are partaking in the DSM scheme. The peak reduction assumed in the GAR and in this Forecast Statement is 90MW.

2.5 FORECAST DEMAND AT TRANSMISSION INTERFACE STATIONS

Transmission interface stations are the point of connection between the transmission system and the distribution system, or directly connected customers. These are mostly 110kV stations. In Dublin, where the Distribution System Operator (DSO) operates the 110kV network, the interface is at 220kV stations.

Table C-1, in Appendix C, lists the forecast demand at each interface station at time of system peak demand for summer 2003, winter 2003/4, summer 2006, winter 2006/7, summer 2009, and winter 2009/10. New to *Forecast Statement 2003-2009* the forecast demands at time of minimum demand for summer 2003, summer 2006 and summer 2009 are also listed.

The figures for demand customers who are directly connected to the transmission system are the current best estimates of their requirements. The other demand figures are calculated by allocating the forecast of system demand, net of the directly connected demand customers' figures, to the interface stations in proportion to their historical demand levels. Account is taken of transfers between stations as agreed with the DSO. The figures do not include transmission losses. However, demand at stations that interface with the distribution system are inclusive of distribution losses.

Although demand-side management schemes may reduce some industries' demands over winter peak hours, their normal demand levels are shown in Table C-1 and are used in the power flow diagrams in Appendix J, as they are more indicative of general power flows.

2.6 NEW TRANSMISSION INTERFACE STATIONS

Table 2-2 lists the future interface stations that the DSO plans to connect to the transmission network. These are included in the appropriate network models in this statement, according to their expected connection date. Details of the connections are given in Table B-4 in Appendix B.

Table 2-2 Planned 110kV Transmission Interface Stations

Station	Code	Nearest Main Town or Load	County
Athy	ATY	Athy	Kildare
Ballybeg	BEG	Wicklow	Wicklow
Ballycummin	BCM	Raheen	Limerick
Banoge	BOG	Gorey	Wexford
Great Connell	GCO	Newbridge	Kildare
Killoteran	KTN	Waterford Industrial Estate	Waterford
Kilmurry	KMY	Waterford Port	Kilkenny
Tipperary	TIP	Tipperary	Tipperary

The Athy, Ballycummin, and Kilmurry stations are additions to the list in Table B-8 in Appendix B of the *Forecast Statement 2001/2-2007/8 Supplement*.

Table 2-3 lists the planned 110kV distribution stations that are shown in the schematics and maps in Appendix A. These stations are not considered part of the transmission network. However, they are included in the relevant network models used for the Forecast Statement.

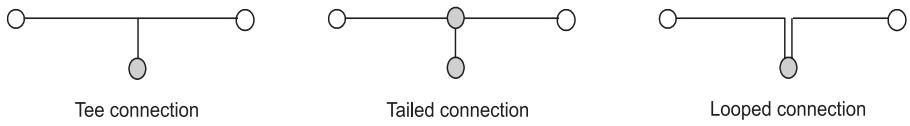
Table 2-3 Planned 110kV Distribution Stations

Station	Code	Nearest Main Town or Load	County
Balbriggan	BAL	Balbriggan	Dublin
Camus	CAM	Screebe	Galway
Glenlara	GLE	Newmarket	Cork
Hartnett's Cross	HTX	Macroom	Cork
Nenagh	NEN	Nenagh	Tipperary
Tonroe	TON	Ballaghadreen	Mayo

In addition to the connection of these new stations, changes to the connection method for a number of existing distribution stations is expected.

Three existing stations that are currently connected to the Grid via a tee (i.e., an unswitched connection to an existing line between two other stations) are expected to be looped within the period. These are Barrymore and Castleview in Cork, and Cloon[4] in Galway. Figure 2-2 illustrates the different connection methods.

Figure 2-2 Different Connection Methods



A second connection is expected to three existing distribution stations that are currently tail-fed i.e., connected to the Grid by a single circuit. These connections are from Marina to Liberty Street in Cork, from Lanesboro to Richmond in Roscommon, and from the planned Gorman station to Meath Hill in Louth.

4 Since the data freeze date, the Cashla-Lanesboro 110kV line has been looped into Cloon station.