Electricity Security of Supply Report 2014

Submitted to the European Commission

Pursuant to

Directive 2009/72/EC and Directive 2005/89/EC

Executive Summary

The Commission for Energy Regulation (the CER) is required to produce and submit a report to the European Commission every two years on the details of its monitoring arrangements with respect to security of supply of electricity. This is the fifth such report. The legal requirement to complete this report is contained in Statutory Instrument (SI) 60 of 2005[1]. SI 60 of 2005 transposed Directive 2003/54/EC[2] and Directive 2005/89/EC[3] into Irish law. In addition, under Directive 2009/72/EC the CER is obliged to monitor security of supply as per Article 4 of that Directive.

The monitoring of security of electricity supply is a key legal obligation and priority for the CER. The CER has formal monitoring and reporting arrangements in place with EirGrid as Transmission System Operator to examine the security of supply position in the short, medium and long term.
The main components of this monitoring report are:

- fuel and other power sources
- the balance between supply and demand
- the adequacy of electricity network

In addition to EirGrid, there are a number of other stakeholders involved in the security of supply framework including the European Commission and the Department of Communications, Energy and Natural Resources and of course market participants and customers.

A noticeable feature of the generation portfolio in Ireland is the significant reliance on imported fossil fuels. In 2013, 63.9% of electricity generation came from imported fuels - of which 48% was natural gas, 16% was coal and 0.2% was oil distillate. In contrast to previous years however, the reliance on imported fossil fuels has fallen. Electricity generation from gas has fallen significantly from 55% in 2011 to 48% in 2013. The reduced use of these fuels highlights significant changes that have occurred as a result of increased wind connections.

Based on EirGrid's assessment of electricity supply and demand, an increase in generation capacity is expected in the coming years, peaking in 2017, falling off thereafter[4]. This reflects the actual and planned connections of new plant in recent years.

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[1] http://www.irishstatutebook.ie/2005/en/si/0060.html

[2] This has since been repealed

[3] Official Journal of the European Union, 18th January 2006

[4] http://www.eirgrid.com/media/Generation%20Capacity%20Statement%202014.pdf

The Corrib Gas Field is expected to provide up to 58% of total peak-day Irish demand in its first full year of operation. It has an estimated lifespan of 15-20 years.

In 2012 a new 500 MW interconnector was connected to the Irish system. The East-West Interconnector has resulted in a significant increase in the security of supply of electricity while additionally has broadened the electricity market for Irish consumers and generators.

The CER also monitors EirGrid and ESBN Networks' investments to deliver sufficient network capacity to ensure that generators can service demand.

The Irish government has adopted a target of generating 40% of all electricity consumed from Renewable Energy Sources (RES) by 2020. A large portion of this renewable electricity will come from wind power. Other RES will also play a part in meeting this target, such as hydro and biomass.

Taking into account the electricity demand forecast and other RES, it is estimated that between 3200 and 3700 MW of wind power needs to be installed by 2020 to meet the 40% target in Ireland. Waste-to-Energy projects with a total capacity of 81MW are also connected or due to connect over the next few years.

The successful rollout of an upgraded electricity network is a key requirement to achieving the ambitious targets for renewable generation and maintaining a secure system. To this end, EirGrid performed a study into the future needs of the high voltage electricity grid. This in-depth study named Grid25, suggests that the biggest challenge facing EirGrid is the development of the high voltage transmission grid. EirGrid estimates that the cost of implementing Grid25 will be in the region of €3.2 billion[5]. A number of projects have already been completed under this programme and project status updates are periodically communicated to the CER. The continuing rollout of these projects is of critical importance to the successful integration of renewables onto the system.

To promote security of electricity supplies there is a framework in place under which the system is operated. The rules governing the physical operation of the electricity system are set out in the Grid Code. EirGrid, run and monitor a number of performance incentives particularly related to reducing peak demand and Powersave[6] events. For the past ten years, EirGrid operated a Demand-Side Management scheme (DMS) called the Winter Peak Demand Reduction Scheme (WPDRS), which rewarded participating customers for reducing their electricity

[5] http://www.eirgrid.com/media/Stage%201%20Report.pdf. Please note that Eirgrid is currently in the process of updating Grid25 and expects to publish a report in due course.

[6] The objective of the Powersave scheme is to encourage large and medium sized customers to reduce their electricity demand on days when total system demand is close to available supply.

demand at peak winter hours. However, the Winter Peak Demand Reduction Scheme has been phased out in 2013. This is due to sufficient capacity levels on the system during the period that renders the incentive unnecessary. More peak demand reduction is expected when called from new Demand Side Units (DSU).

The transmission and distribution system operators are also required to report annually on their performance against agreed targets to the CER. A number of performance incentives regarding network delivery and revenue incentives are also operated by the CER. The current set of performance incentives are scheduled to be in place until 2015. EirGrid also has a set of Operating Security Standards, which set out the criteria to which the TSO aims to operate the system to at all times.

There are a number of additional initiatives in place to safeguard security of electricity supplies. EirGrid has ancillary services contracts in place with a number of generators. These ancillary services include operational reserve, reactive power and black start capabilities. The rates for ancillary services require regulatory approval. There is also a requirement on generators to hold additional fuel stocks on their sites. Gas fired generation for instance, must be capable of running on an alternative fuel. The number of days that generators must hold stocks for depends on the type of plant. For example, base-load gas generation must hold five days back up fuel in storage on site, whereas peakers are only required to hold three days' worth of fuel.

Interconnection will continue to play an important role in future security of supply in Ireland. The East-West Interconnector has connected the transmission systems of Ireland and Great Britain, and can transmit 500 MW in either direction. Along with the existing Moyle Interconnector that connects the transmission systems of Northern Ireland and Great Britain, this has significantly enhanced the overall interconnection between the Island of Ireland and Great Britain. The second major North-South interconnector, connecting Northern Ireland and Ireland, will lead to a more secure, stable, and efficient all-island system.

Conclusion

The CER is confident that the current monitoring arrangements are sufficient to identify credible threats to Ireland's electricity security of supply, and that no such threats are likely. The CER is also satisfied that the market framework in place is appropriate to encourage new investment where and when necessary and thereby enhance security of supply. Given the vital importance of Ireland's security of supply the CER will continue to assess the appropriateness of the current framework and identify where any improvements can be made.

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1.0 Legislative Basis

The Commission for Energy Regulation (the CER) is required to produce and submit a report to the European Commission every two years on the details of its monitoring arrangements with respect to security of supply of electricity. This is the fifth such report. The legal requirement to complete this report is contained in Statutory Instrument (SI) 60 of 2005[7]. SI 60 of 2005 transposed Directive 2003/54/EC[8] and Directive 2005/89/EC[9] into Irish law. In addition under Directive 2009/72/EC the CER is obliged to monitor security of supply as per Article 4 of that Directive.

Directive 2009/72/EC

Article 4 of Directive 2009/72/EC states that Member States shall ensure the monitoring of security of supply issues[10]. Such monitoring shall, in particular, cover the balance of supply and demand on the national market; the level of expected demand and additional capacity being planned or under construction; and the adequacy of the network. This report is published every two years and forwarded to the European Commission.

Directive 2005/89/EC

Directive 2005/89/EC establishes measures aimed to further safeguard security of supply and to ensure the proper functioning of the internal market for electricity.
This directive contains the following requirements:

- Article 7 (2) details the reporting requirements regarding:
    1) operational network security
    2) the projected balance of supply and demand for the next five-year period
    3) the prospects for security of electricity supply for the period between five and 15 years from the date of the report
    4) the investment intentions, for the next five or more calendar years, of transmission system operators and those of any other party of which they are aware, as regards the provision of cross-border interconnection capacity[11]

[7] http://www.irishstatutebook.ie/2005/en/si/0060.html

[8] This has since been repealed

[9] Official Journal of the European Union, 18th January 2006

[10] In the case of Ireland the Member State has delegated this task to CER as the Regulatory Authority.

[11] It should be noted that the principles of congestion management for Article 7(d) were contained in Regulation 1228/2003/EC which has since been repealed

In relation to part (d) of Article 7, the arrangements need to take account of:

a) existing and planned transmission lines

b) expected patterns of generation, supply, cross-border exchanges and consumption, allowing for demand management measures

c) regional, national and European sustainable development objectives, including those projects forming part of the Axes for priority projects set out in Annex I to Decision 1229/2003/EC

- Article 7(2) states that this report should be prepared in close cooperation with the TSO and that, if appropriate, the TSO should consult with neighbouring TSOs.

Structure of this Report

The purpose of this report is to present the findings and outcomes arising from the monitoring required under Section 11 of SI 60 of 2005 and Article 4 of Directive 2009/72/EC. These reporting requirements include:

- Operational network security
- The projected balance of supply and demand for the next five years
- The prospects for electricity security of supply for the period between five and 15 years from the date of the report and
- The investment intentions, for the next five or more calendar years, of transmission system operators and those of any other party of which they are aware, as regards the provision of cross-border interconnection capacity

The report is structured around the key reporting requirements in the applicable legislation. The remainder of the report is set out as follows:

Section 1: Security of Supply Framework

This section sets out the high level security of supply reporting framework used by the CER. It also sets out some security of supply initiatives currently in place.

Section 2: Balance between Supply and Demand

This section takes a forward-looking view of the prospects for electricity supply and demand for the next five years. The section also contains details of the peak demand reduction initiatives both in place and planned, and developments in relation to smart metering and their roll out.

Section 3: Future Generation Investment

This section examines the prospects for future investment in generation in Ireland. Part of the section details the overall framework for new connections. The section also examines current investment plans and the market mechanisms that are in place to incentivise the construction of any additional generation in future.

Section 4: Transmission Networks

This section contains an overview of Ireland's transmission system. The section also contains information on the transmission system investment program over the next number of years. In particular, reference is made to the Grid25 programme which aims to ensure modernisation of the Grid will be capable of facilitating renewables.

Section 5: Operational Network Security

This section examines the operational security of the network and details the incentives and requirements placed on the TSO when operating the system. In

particular, reference is made to the technical programmes put in place by EirGrid as TSO to facilitate the integration of non-synchronous wind generation (DS3 Programme) onto the system.

Section 6: Interconnection and Regional Market Integration

This section contains a description of current interconnector development plans in Ireland and any market changes that will be required to accommodate increased interconnection, including changes to Intra-Day trading. Plans for future regional market integration and regulatory treatment of interconnectors are also summarised.

2.0 Security of Supply Framework

Security of electricity supply is of paramount importance in building and sustaining the long term economic health of the country. For this reason the ongoing monitoring of security of supply is of great importance. Given this importance it is critical that a joined up approach is taken by all involved parties – from the TSO, the CER, the relevant Government Department, market participants and customers.

2.1 Key Stakeholders

2.1.1 The European Commission

The European Commission has been working with the Member States to create an internal electricity market in Europe. A key objective for the successful operation of the internal market is "*the guarantee of a high level of security of electricity supply*[12]*."* Securing European energy supplies is therefore high on the EU's agenda. One of the key roles of the European Commission in security of supply is the pan-European legislation it promotes to further market integration across the European Union.

As part of the further integration of a single European electricity market, the European Commission published in November 2010 a communication titled "Energy 2020: A Strategy for competitive, sustainable and secure energy"[13]. This document outlines the approach to be taken EU-wide to reach renewable targets of 20% and a 20% improvement in energy efficiency. In particular it makes reference to the continuing development of secure and competitive sources of energy to come from low-carbon sources.

Additionally, the European Commission produced a further communication in December 2011, titled "Energy Roadmap 2050[14]", outlining the longer-term goals of reaching a "secure, competitive and decarbonised" energy system by 2050[15]. The EU is committed to reducing greenhouse gas emissions to 80 to 95% below 1990 levels by 2050 in the context of necessary reductions by developed countries as a group. A key requirement for future energy is the focus on energy efficiency and switching to renewable energy sources.

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[12] Introduction to Directive 2005/89/EC.

[13] http://ec.europa.eu/energy/publications/doc/2011_energy2020_en.pdf

[14] http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm

In November 2012, the European Commission set up an Electricity Coordination Group. The Electricity Coordination Group's tasks are:

- to serve as a platform for the exchange of information and coordination of electricity policy measures having a cross-border impact and for the exchange of experiences, best practices and expertise and also to assist the Commission in designing its policy initiatives

- to facilitate the exchange of information and cooperation regarding security of supply in electricity, including generation adequacy and cross-border grid stability

2.1.2 Department of Communications, Energy and Natural Resources

The Department of Communications, Energy and Natural Resources (DCENR) has an overarching policy formation role, as prescribed in the Electricity Regulation Act 1999, in relation to promoting the continuity, security and quality of supplies of electricity. Furthermore, certain specific actions, which may be taken by the CER with respect to measures to protect the security of supply, require the consent of the Minister of that Department. The Department published a White Paper on "Delivering a Sustainable Energy Future for Ireland" in 2007. Major changes have occurred in Ireland and the world since the last energy White Paper in 2007. Many of these changes have affected the way we use energy and the amount we use.

DCENR recently published a Green Paper on future energy policy. This Green Paper aims to stimulate a discussion among citizens, policymakers, businesses and stakeholders on a vision for Irish energy policy. The Green Paper sets out six priority areas to assist in framing the discussion. This paper discusses what needs to be addressed in the forthcoming White Paper on Energy Policy in Ireland.

2.1.3 The Commission for Energy Regulation (CER)

The CER's primary economic responsibilities in energy are to regulate the Irish electricity and natural gas sectors. This covers electricity generation, electricity and gas networks, and electricity and gas supply activities. As part of its role, the CER jointly regulates the all-island wholesale Single Electricity Market (SEM) with its counterpart in Northern Ireland, the Utility Regulator. The SEM is governed by a decision-making body known as the SEM Committee, consisting of the CER, the Utility Regulator and an independent member. The remit of the CER was recently expanded to include a function to become the independent economic regulator for the public water services sector.

Its primary functions are granted under the Electricity Regulation Act 1999 and the Gas (Interim) Regulation Act 2002, as amended. In carrying out its duties under the Electricity Regulation Act 1999, the CER must have regard to the need to promote the continuity, security and quality of the supply of electricity. The overall aim of the

CER's economic role is to protect the interests of energy customers, maintain security of supply, and to promote competition in the generation and supply of electricity; and the supply of natural gas.

2.1.4 EirGrid - Transmission System Operator

EirGrid holds licences as independent electricity Transmission System Operator (TSO) and Market Operator (MO) in the wholesale trading system in Ireland. It is also the owner of the System Operator Northern Ireland (SONI), the licensed TSO and market operator in Northern Ireland. The Single Electricity Market Operator (SEMO) is part of the EirGrid Group, and operates the Single Electricity Market on the island of Ireland. The TSO, under section 28(4) of SI No 60 of 2005, has a specific duty to report and advise the CER if it is of the view that security of supply is threatened or likely to be threatened. In the preparation of this report the CER has consulted with EirGrid and all operational information contained in this report is sourced from EirGrid.

2.1.5 Market Participants and Customers

Market participants and customers play an active role in ensuring security of electricity supplies in Ireland. Participants provide the required generation to meet demand. Many of the required demand side measures and ancillary services are facilitated and operated by market participants. ESB Networks also plays a key role in ensuring security and continuity of supplies to customers.

2.2 Security of Supply Monitoring

The CER has established formal monitoring and reporting arrangements with EirGrid. These are categorised in terms of short-term, medium-term, long-term and 'Other' reporting activities. Figure 2-1 below sets out ongoing reporting and monitoring activities.

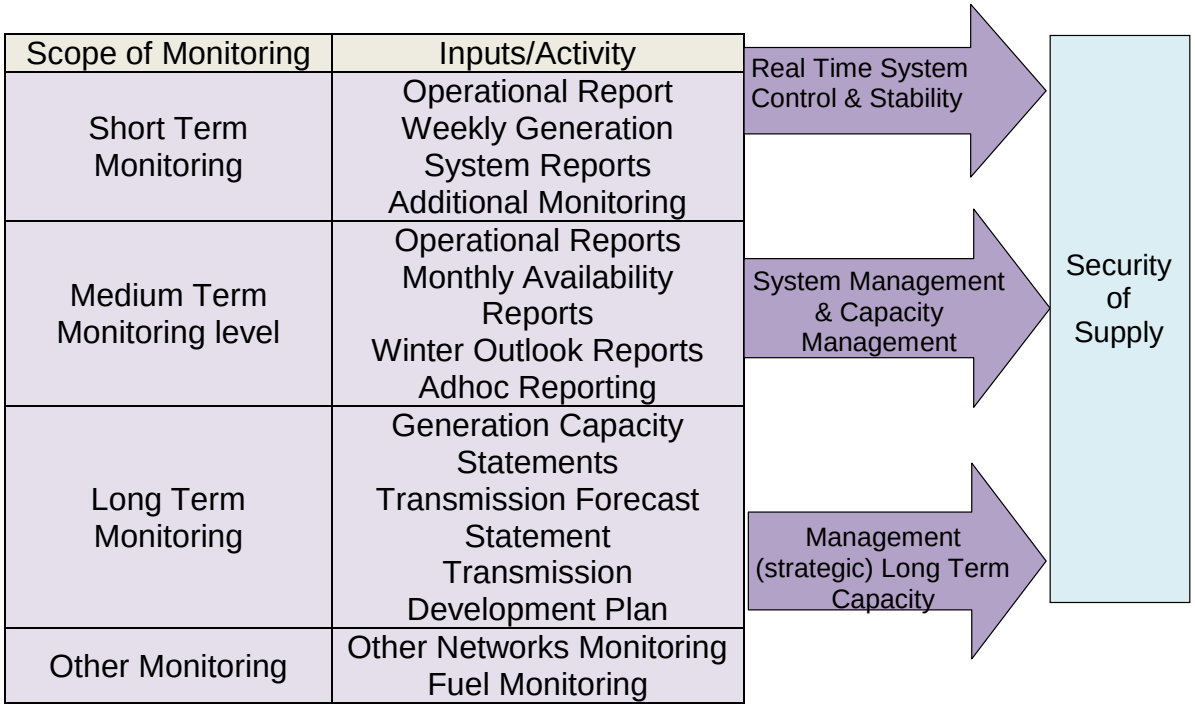

Figure 2-1 Security of Supply Monitoring Framework

The primary outputs of these monitoring activities are a number of reports produced by EirGrid, ESBN and other market participants. Many of the EirGrid reports are referred to later in this report and include the Generation Capacity Statement, Winter Outlook Reports and the Transmission Forecast Statement. These reports feed into the security of supply monitoring activities of the CER (and other stakeholders) and are available on the EirGrid website[16]. In addition, the published reports are important for existing and potential market participants in assessing the viability of existing and new projects.

2.3 Security of Supply Initiatives

Ensuring security of electricity supply is an important part of the CER's activities. In 2011, 55% of electricity generated in Ireland was produced from natural gas. In 2013, due to a corresponding increase in wind generation this fell to 48%. This highlights the impact that continuing wind connections can have on the system and the ability to reduce reliance on a single fuel source.

The East-West Interconnector has connected the transmission systems of Ireland and Great Britain, and can transmit 500 MW in either direction. Along with the existing Moyle Interconnector that connects the transmission systems of Northern Ireland and Great Britain, this has significantly enhanced the overall interconnection between the island of Ireland and Great Britain. The second major North-South

[16] http://www.EirGrid.com/aboutus/publications/

interconnector connecting Northern Ireland and Ireland will lead to a more secure, stable, and efficient all-island system.

Another area outlined in the National Renewable Energy Action Plan is the further development of energy storage. At present Ireland relies primarily on pumped storage at Turlough Hill providing 294 MW[17] which has been operational since the 1970's. A number of developments are currently being investigated for further developments in the Pumped Hydro area.

There is 21 MW of small scale hydro installed at present. Support via REFIT2 has been extended to include hydro. In the medium term this is likely to further bolster investment in this area which contributes to overall renewable levels.

2.3.1 Gas Electricity Emergency Planning Group

The CER chairs a group called the Gas and Electricity Emergency Planning group (GEEP), which comprises representatives from Government (DCENR), the CER and industry (ESB/EirGrid and Gaslink/BGN). The GEEP Group is concerned with the interactions between the gas and electricity sectors, and focuses on short term issues relating to security of supply and emergencies in electricity and gas. The GEEP may also encompass some longer term and wider energy/emergency policy issues, which may emerge and be of relevance to the gas and electricity sectors.

2.3.2 Construction Reports

As part of its security of supply monitoring, the CER receives quarterly updates on the progress of new plant construction and the large scale refurbishment of older large plant. Two large-scale refurbishments are currently under, list in Table 2-1:

Plant under Construction	Expected Completion Date	Size (MW)
Great Island CCGT	2014	216 MW[18]
Great Island CCGT	2016	215 MW

Table 2-1 – Large plants under construction

SSE plans to commission a new Combined-Cycle Gas Turbine (CCGT) plant at Great Island in Co Wexford in 2014. The existing oil units there will subsequently be decommissioned. The Firm Access Quantity (FAQ) at this site is assumed to be initially 216 MW, until an additional FAQ of 215 MW is assigned in 2016. The table

[17] Upgrade works have been ongoing on Turlough Hill and were completed in July 2012.

[18] This will replace the current 212MW of oil distillate at the same site.

below lists a number of project developers with connection offers currently considering whether to develop their project.

Project	Status	Size (MW)
Nore OCGT	Connection Offer Accepted	98 MW
Suir OCGT	Connection Offer Accepted	98 MW
Great Island CCGT	Connection Offer Accepted	431 MW
Dublin Waste to Energy	Connection Offer Accepted	62 MW
Cuilleen OCGT	Connection Offer Accepted	98 MW
Ballakelly CCGT	Connection Offer Accepted	445 MW

Table 2-2 Contracted generation capacity for Ireland, up to 2023

Key Messages

- The CER has developed a security of supply monitoring framework to satisfy obligations in Directive 2009/72/EC and Directive 2005/89/EC.
- There are a number of key stakeholders involved in security of supply in Ireland including the European Commission, the DCENR, the CER and the TSO.
- The CER is of the view that the monitoring arrangements currently in place are comprehensive and are adequate to assist the CER in protecting Ireland's security of supply.
- Since the submission of the last Security of Supply Report in 2012 there has been a slight diversification of fuel in Ireland. This contributes positively both to EU renewable targets and to supply security.

3.0 Balance between Supply and Demand

The requirements in Directive 2005/89/EC build upon Directive 2003/54/EC (which was replaced by Directive 2009/72/EC) and require Member States to take appropriate measures to maintain a balance between the demand for electricity and the availability of generation capacity. More specifically, the Directive 2005/89/EC requires Member States to encourage the establishment of a wholesale market framework that provides suitable price signals for generation and consumption; and requires TSOs to ensure that an appropriate level of generation reserve capacity is available. The Directive requires that where the required level of generation reserve capacity is not available Member States must adopt market based measures.

In order to provide a framework for new generation investment, the CER and the Northern Ireland Authority for Utility Regulation developed a Single Electricity Market (SEM) which went live on 1st November 2007. This is a gross mandatory pool market with an explicit Capacity Payment Mechanism (CPM). The wholesale market arrangements are discussed further in Section 4.2. The remainder of this section sets out the projected electricity supply and demand balance for the next seven years. This section also lists some of the demand side initiatives currently being undertaken in Ireland.

3.0.1 EirGrid Generation Capacity Statement

EirGrid produces an annual Generation Capacity Statement (GCS). The GCS forecasts the demand for electricity in a forward ten year period, the likely production capacity that will be in place to meet this demand, and assesses the overall supply/demand balance. The outputs from the current EirGrid GCS are the main inputs to this section of the report.

It should be noted that since 2012 EirGrid and SONI (System Operator Northern Ireland) include an assessment of generation adequacy on an Ireland, Northern Ireland and All-Island basis in the Generation Capacity Statement.

3.1 Fuel Diversity

At the outset it is useful to set out the fuel mix of electricity generated. The most recent fuel mix published refers to 2013 and are set out in Figure 3-1 below.

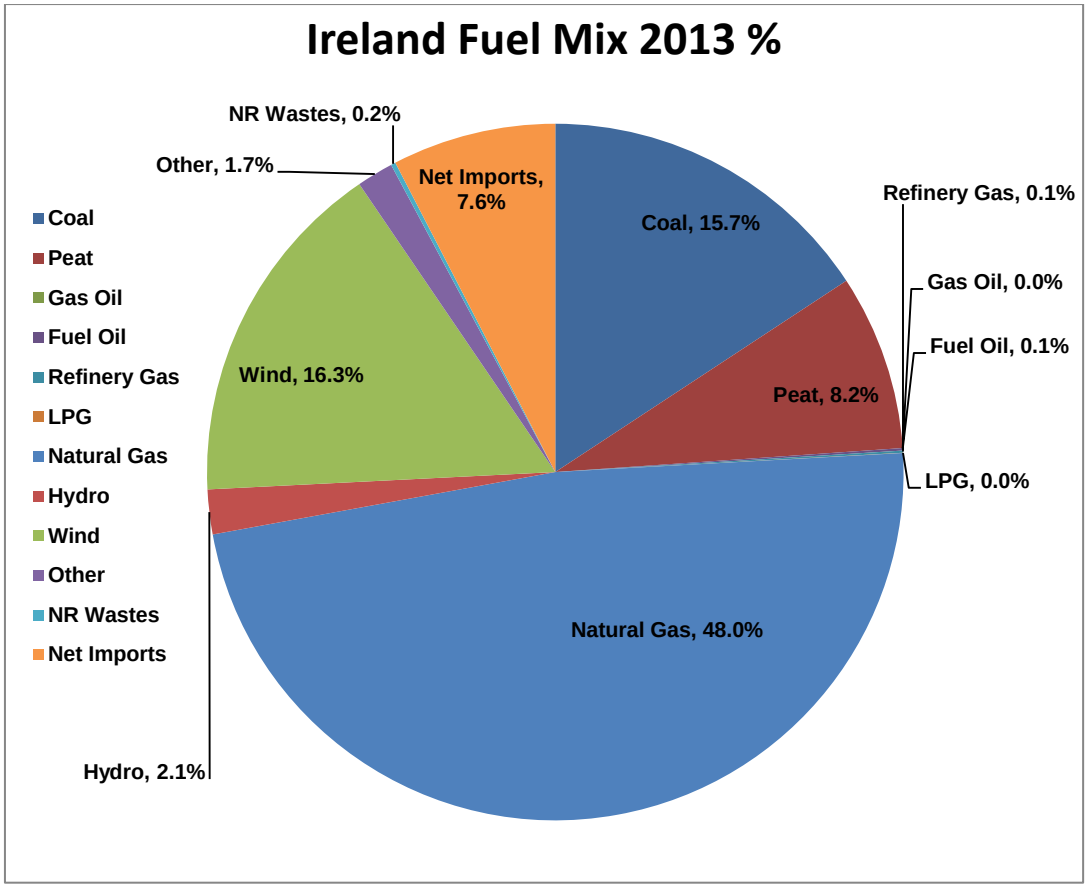

Figure 3-1 Ireland Fuel Mix 2013[19]

A noticeable feature of the generation portfolio in Ireland is the significant reliance on imported fossil fuels. It should be noted however, that renewable sources of energy are playing an increasingly important part in the generation portfolio, in particular emphasis on wind generation. In 2011 renewables contributed 19.4% of electricity needs with 15.7% coming from wind powered generation. The remaining renewable generation came from hydro 2.5% and other 1.2%. In 2013, renewable generation increased to 20.1% with 16.3% of this figure arising from wind, 2.1% from hydro and 1.7% from other. The significant increase in electricity produced by wind generators has resulted in a corresponding reduction in electricity generation from gas. This trend is accompanied by the corresponding reduction in reliance on imported fossil fuels, although it is important to note the significant unpredictability that comes with wind generation.

In 2013, 63.9% of electricity generation came from imported fuels, of which 48% was natural gas, 15.7% was coal, 0.2% was oil. 8% of electricity was generated by an indigenous fuel. This compares with 70.3% of electricity generated in 2011 from imported fuels of which 55% was gas, 15% coal and 0.3% oil. This highlights a

[19] SEAI – Electricity Generation 2013 provisional

decrease in dependence on gas and oil with a slight increase in Ireland's dependence on coal. Peat is an indigenous energy source which has been declining in importance although installed capacity has remained the same.

At present there are two gas entry points – one from Moffat in Scotland, and the other, from the Inch Entry Point in Cork. The entry point from Moffat supplies the majority of gas requirements via two subsea interconnectors. These Interconnectors supply approximately 95% of total Irish annual demand.

Production from Kinsale is now in decline and is operated primarily as a seasonal gas storage facility. The Inch entry point is used to help refill the Kinsale storage facility during the summer months. There are two natural gas projects at various stages of development within Ireland. The Corrib Gas Field is expected to provide up to 58% of total peak-day Irish demand in its first full year of operation[20]. It has an estimated lifespan of 15-20 years[21].

Shannon LNG (Liquefied Natural Gas) has indicated the earliest possible start date of 2018 for commercial operation, assuming a resolution to a number of uncertainties and delays. Shannon LNG has received planning permission for both its proposed LNG terminal near Ballylongford in Co. Kerry, and for the associated transmission pipeline that will deliver the gas into the Irish transmission system.

3.1.1 Categories of Plant

When EirGrid examines the plant available for planning and operational purposes, there is a distinction between certain categories of plant. There are three categories of plant: dispatchable, partially dispatchable and non-dispatchable. Dispatchable plant is generation capacity that can be monitored and controlled by EirGrid. This would typically include thermal plants such as gas fired CCGTs and coal stations. Larger wind farms (above 5 MW) can also be monitored and are considered partially-dispatchable i.e. their output can be reduced if required (e.g. due to transmission constraints). In addition to dispatchable plant, there is generation connected to the system whose output is not currently monitored by EirGrid and whose operation cannot be controlled. This non-dispatchable plant includes small wind farms, small scale hydro and industrial backup generation etc.

3.1.2 Dispatchable Plant

As part of the GCS, EirGrid carries out a review of the expected new plant and retiring of old plant over the next ten years. Further to this, the report examines the future generation market investment expected over the next number of years. The

[20] Network Development Plan 2014

[21] Goodbody Economic Consultant Report

Table below sets out the expected new and retired plant as per the EirGrid/SONI Generation Capacity Statement 2014-2023.

New and Retiring Plants	Capacity (MW)
New Plant with Connection Agreements	591[22]
Confirmed retiring Plant	804[23]

Table 3-1 New & Retiring Plant

Table 3-1 also shows that there is 591 MW of new capacity expected on the system by 2023. The majority of this plant is gas CCGT with the capacity arising from CCGT at Great Island. EirGrid forecasting also expects the retirement of 804 MW of plant. The majority of this capacity is heavy fuel oil fired generation plant. Table 3-2 draws this information together and sets out EirGrid's expected trend in the levels of dispatchable plant out to 2023.

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Capacity Added	216		277	0	98	0	0	0	0	0
Capacity Retired	212	0[24]	0	0	0	0	0	592[25]	0	0
Total Dispatchable Capacity	7.383	7.382	7.441	7.444	7.539	7.538	7.534	6.945	6.942	6.941

Table 3-2 Expected Dispatchable Capacity out to 2023 Source: EirGrid GCS 2014

3.1.3 Partially Dispatchable and Non-Dispatchable Plant

Table 2-2 shows a significant increase in generation capacity on an All-Island basis in 2014 with ongoing connections over the medium term. This added capacity will be further bolstered by the ongoing connections of renewables, especially wind. The next Gate[26] process will focus on a wider range of renewable sources and may

[22] See Section 1.3.2. "Construction Reports" for a detailed breakdown of new plant connections as well as current projects with connection agreements.

[23] For the purposes of this reporting period only Great Island & Tarbert has been taken into consideration. The redevelopment of Tarbert may be completed but will not be until after 2014.

[24] Ballylumford (510MW) will be retiring but is excluded for the purposes of this report as it is in Northern Ireland.

[25] Tarbet 1, 2, 3, 4 – expected closure date 2021

[26] The CER aims to publish a public Issues Paper on the new connection policy for renewable and non-renewable generators in Q3 2014; this will look at the requirement for a "new gate" and the appropriate criteria that should be considered in order for generators to obtain a connection offer. Consideration will be given to Ireland's renewable targets and Ireland's system operators requirements in the development of this policy as well as likely build out of Gate 3 connections. This consultation will also take account of learnings from the Gate 3 process which was a large Gate, aimed specifically at ensuring sufficient renewable connections were in place by 2020 to meet Ireland's targets. CER has not taken any decisions on the nature, scale or criteria for connection and access policy post Gate 3.

contribute to a more varied and secure energy mix. The REFIT2 scheme was opened in March 2012, providing support to up to 4000 MW of electricity generation from onshore wind, small hydro and landfill gas. The REFIT3 scheme, which covers support for 310 MW of biomass technology[27], opened in February 2012.

As part of their annual Generation Capacity Statements, EirGrid carries out substantial analysis and forecasting of future levels of both partially and non-dispatchable plant. The technologies examined by EirGrid include:

- Industrial generation
- Small scale CHP
- Small scale hydro
- Biomass/LFG
- Wind generation

Wind farms represent the highest percentage of plant in this category and substantial analysis is being carried out on future levels of wind and also the magnitude of the role this form of generation can be given when planning for the future.

Set out below is EirGrid's assessment of partially and non-dispatchable plant. In assessing the potential benefits of renewables, EirGrid's assessment takes into consideration the assumption that to achieve a 40% renewable target while maintaining system and supply security would require an installed capacity of between 3200 MW and 3700 MW. This range is derived from different assumptions concerning:

- the wind capacity factor
- dispatch-down of wind due to transmission constraints or system-wide curtailment
- demand forecasts
- a number of assumptions made about other renewable energy sources

The proportion of wind energy in particular has increased dramatically in Ireland over the past decade from 1.6% in 2002 to 16.3% in 2013. In the past twelve years the annual wind capacity factor has varied from 23.8% to 35%. As a result, in its predictions of how wind can contribute to the overall generation security, EirGrid refers to the capacity credit, which is an estimated measure of how much wind generation contributes to generation adequacy. In addition to wind there are other small, but significant changes, in the generation mix. These are:

- Demand side generation
- Small Scale Combined Heat & Power (CHP)

[27] State Aid clearance was granted by the European Commission in October 2011 see http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_31861

- Biofuel
- Small Scale Hydro
- Marine

Demand side generation contributes a total of 9 MW, while CHP contributes 141 MW. Fossil fuel CHP has been withdrawn from supported generation activities but High Efficiency CHP is supported under the REFIT regime. Therefore, HECHP may in future contribute more significantly to a secure fuel mix. In addition, there is currently an estimated 49 MW of landfill gas powered generation. The REFIT3 incentive for biomass-fuelled CHP plant aims to have 150 MW installed by 2020.

Small scale Hydro provides 21 MW of capacity. While this is a mature technology, the lack of suitable new locations limits increased contribution from this source. It is assumed that there are no further increases in small hydro capacity over the remaining years of the study.

Marine energy does not currently provide electricity generation to the grid in Ireland. That said, a tidal generating unit in Strangford Lough is connected to the grid providing 1.2 MW of capacity to the system in Northern Ireland. This is the first in the world to provide capacity to a national grid. This technology is not expected to contribute significantly to electricity supply in the medium term due to the early maturity of this technology.

Year	Capacity 2014 (MW)	Capacity 2023 (MW)
Industrial	9	9
Conventional CHP	141	141
Biofuel	49	205
Small-scale Hydro	21	21
Marine	0	0
Wind	2055[28]	3986
Total	**2275**	**4362**

Table 3-3 Assessment of Partially and Non-Dispatchable Plant Source: EirGrid

As outlined in Table 2-3 the total capacity from these renewable sources contributes 2275 MW to supply in 2014 with the vast majority (2055 MW) arising from wind capacity. By 2023 the total arising from renewable sources is expected to rise to 4362 MW. An installed wind capacity requirement of between 3200 MW and 3700 MW[29] is expected to meet the 40% renewable targets.

[28] http://www.EirGrid.com/media/All-Island_Wind_and_Fuel_Mix_Report_July_2014.pdf

[29] Generation Capacity Statement 2014-2023

3.1.4 Importance of Plant Availability

Having ample capacity on the system is important but it is equally important that the installed capacity provides a reliable supply of generation when required. For this reason, the availability of generation plant is very important. In general, each power station goes on an annual planned outage for required maintenance. This is coordinated and planned with EirGrid so that not all plant is unavailable at the same time and that there is sufficient plant available to meet demand. For example, if all baseload power plants went on annual outage in June there may not be enough remaining capacity left to satisfy demand or the remaining plant may be much more expensive to run causing price spikes. EirGrid publishes an annual schedule of power station planned outages which is updated monthly throughout the year.

In addition to planned outages, there are unexpected or forced outages that occur throughout the year. These occur where part, or all, the output of a power station is unavailable for generation due to an unforeseen problem. There may be many reasons for such outages. EirGrid monitors the overall levels of these forced outages. They also communicate with generators about forced outages to understand the underlying causes. A series of Generator Performance Incentives (GPI's) are in place to optimise generator performance and ensure a balanced All-Island generation market. Late Synchronisation by generators, for example will incur a penalty. GPI's such as this incentivise generators to perform to best capability at all times thus ensuring supply security. Figure 3.2 below shows the historic and forecast outage rates in Ireland.

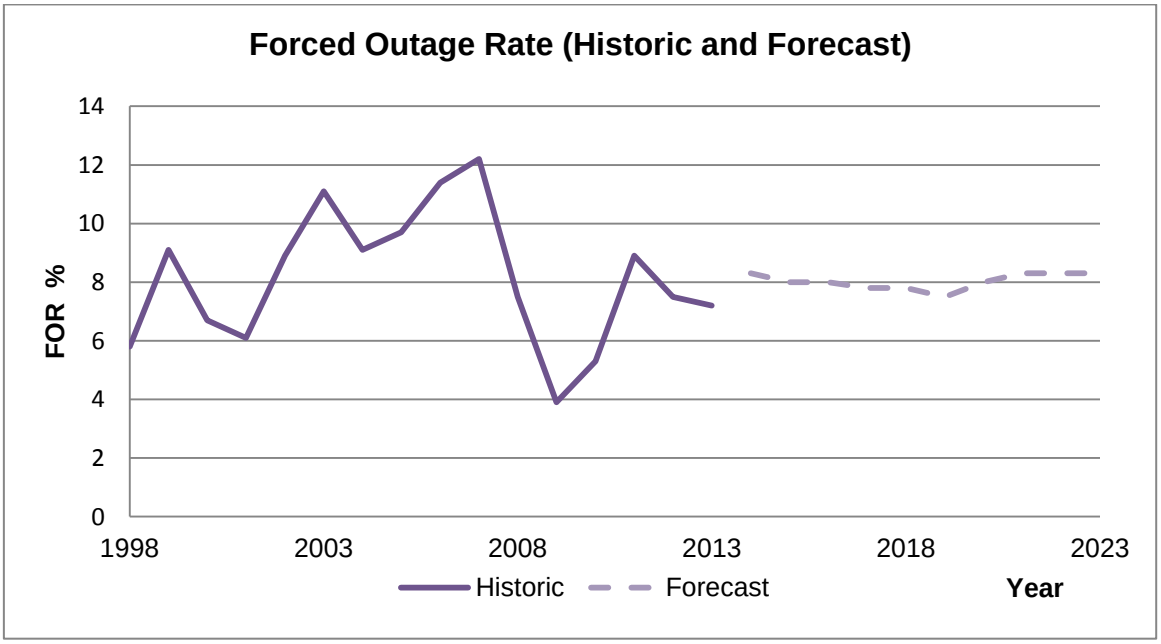

Figure 3.2 Historic and Forecast Forced Outage Rates

As can be seen from the graph above, the forced outage rate peaked in 2007. The reductions from 2007 onward were caused by a combination of factors, including new generators joining the system, older generators decommissioning, and

upgrading of existing plant. These factors are accompanied by a number of other changes ongoing in generation plants in Ireland. Peat fuelled plants are being converted to biomass[30] to ensure that Ireland reaches its 2020 carbon reduction targets.

Outlined in Table 3-4 below is the total of dispatchable, partially dispatchable and non dispatchable generation for 2014.

Generation Type	Total Capacity (MW)
Dispatchable	7383
Partially dispatchable (wind)	2223
Non-dispatchable	220
Total	**9826**

Table 3-4 Total dispatchable, partially and non-dispatchable capacity

3.1.5 Generation Reporting

At present both the CER and NIAUR are proposing to enhance current reporting requirements for generators. This would allow for a clearer financial picture to be established of the generation market. This is expected to assist in the creation of a transparent and effective generation market. This is of particular importance given the significant market changes that have occurred in Ireland since the opening up of electricity generation to competition.

The threshold for financial reporting by generators has been increased slightly from 20 MW to 25MW, so that all generation companies - including all affiliates and related undertakings - with a combined installed generation capacity equal to or greater than 25 MW will be required to complete the financial reporting template. This will provide the RAs with sufficient data on all generation types and, with only approximately one quarter of wind generation companies required to report, exclude smaller generators from any reporting requirements.

There is no change to the financial reporting template completed annually by generation companies above the 25 MW threshold. The information provided should align with the regulated accounts provided to the RAs, and expanded guidance notes which detail what is to be included in the template have been provided in this paper. A completed financial reporting template for each generation site must be delivered to the RAs within six months of the end of their financial year. Given that there is no

[30] See REFIT3 specific to biomass.

great deviation from the standard accounting format, generation companies over 25 MW should have the data readily available. The RAs do not view the reporting requirements set out in this document as constituting an excessive administrative burden.

3.2 Demand

In developing the annual GCS, EirGrid carries out detailed analysis on future electricity demand forecasts using their electricity forecast model. The model is explained in detail in the GCS and put simply predicts electricity demand based on changes in Gross Domestic Product (GDP), Personal Consumption of Goods and Services (PCGS) and population change. Additional scenarios such as extreme weather events, plant availability, loss of interconnection with Great Britain and loss of CCGT plant are all scenarios which are examined. This allows for numerous scenarios to be analysed.

Since the last CER Security of Supply Report in 2012, a slight increase in overall electricity demand in 2013 of 0.6% is seen. In 2013 a reduction of 1.1% in peak demand was seen. In 2014, the GCS assumes GDP growth of 3.8% per year in the period 2014 - 2020 and increase by 2.2% per year in the period 2021 - 2025. As a result of this, in the median scenario electricity demand is expected to rise slowly by 1% in 2014 and by 1.2% in 2015[31].

EirGrid qualify demand assessments by utilising a high, median and low demand scenario (see Figure 3-3). This is of particular significance given economic uncertainty in the Eurozone as a whole at present[32]. As a result it is considered that the median forecast is the best prediction to utilise for demand forecasting. A median forecast model assumes a low return to growth rate over the next number of years with demand returning to 2008 levels in 2019.

[31] EirGrid, Generation Capacity Statement 2014-2023 page 18

[32] Note that economic growth rates for Ireland have since publication of economic forecasts for this report been revised downwards see

http://www.oecd.org/eco/outlook/ireland-economic-forecast-summary.htm

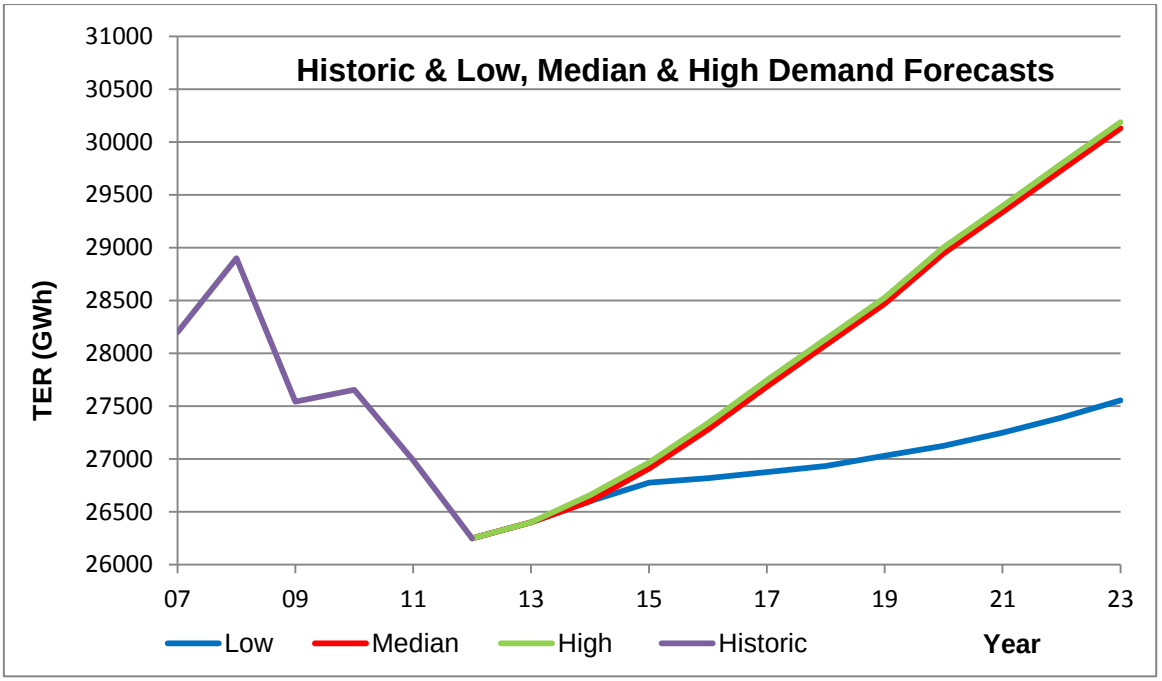

Figure 3-3 Historic Demand & Low, Median & High Demand forecasts

EirGrid carried out an analysis of electricity requirements in 2014 for the years up to and including 2023. In all scenarios total electricity requirements are expected to rise[33]. In a low growth scenario, growth of 1 % is expected in 2014, 0.7% in 2015 and 0.2 in 2016. In a median growth scenario a rate of 1 % is expected in 2014 with 1.2 % and 1.4 % in the following years. Finally, utilising a high demand scenario a rate of 1 % would be expected for 2014 with this rising to 1.2 % in 2015, and 1.4 % 2016.

3.2.1 Peak Demand Forecast

The EirGrid peak demand model is based on the historical relationship between the annual electricity consumption and the winter peak. The relationship between average and peak consumption is often referred to as a customer's load factor. In general large energy users with 24-hour operations will have a high load factor as their demand is quite constant. A domestic customer on the other hand generally has a low load factor where they use large amounts of electricity for short periods of time, typically between 17:00 and 19:00 and have small loads during the night. In general, electricity is most expensive to generate at peak times as more expensive, less efficient plants need to be called upon. Historically, EirGrid has found that the winter peak is somewhat erratic and difficult to model as it is subject to many disparate influences. Figure 3-4 shows the results of EirGrid's peak demand forecasting as per the latest GCS.

[33] This is partly due to the increased use of electricity for transport purposes.

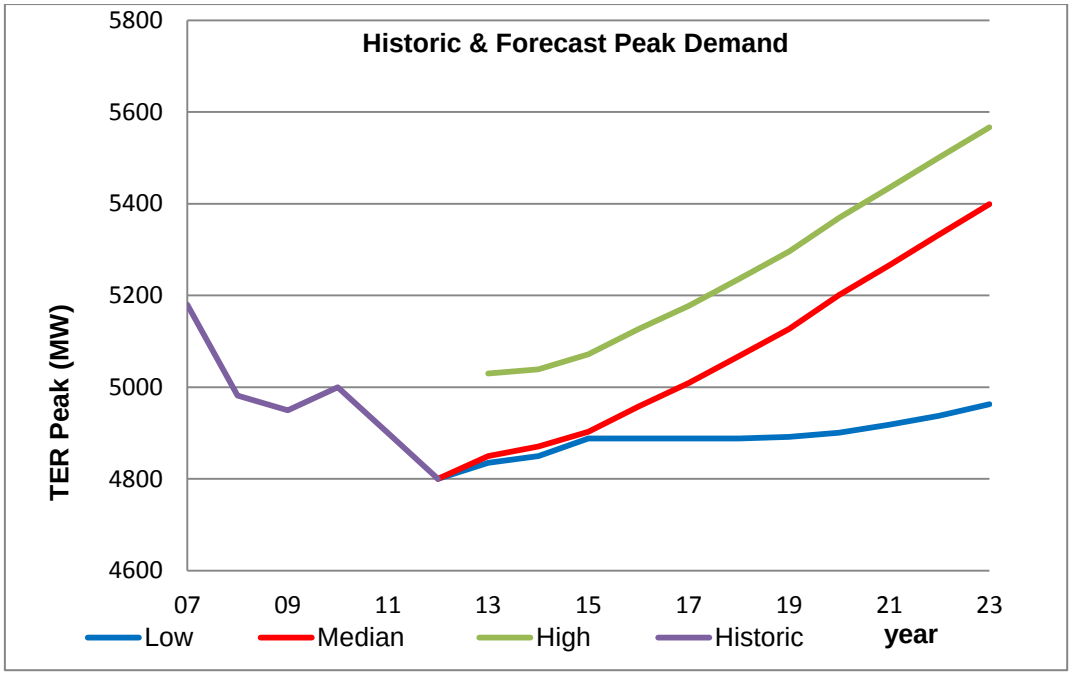

Fig 3-4: Historic[34] and Forecast Peak Demand (Source: EirGrid)

Demand is highly influenced by temperature. By modelling historical energy and temperature data, it is possible to apply a temperature correction to past winter peaks. This approach shows what peaks would have occurred had the temperatures been average compared against an average cold spell. This is an average temperature assessed from a number of winters.

The ACS is estimated from an average of 10 years. Peak demands are forecast for future years assuming the weather will be average. A one-in-10 year peak refers to temperatures that are the coldest experienced in a 10-year dataset. This is the high forecast.

In addition, a low peak demands are forecast based on the low energy forecasts.

3.3 Supply and Demand Balance

This section compares the forecast levels of generation capacity with the forecast demand that needs to be satisfied out to 2016. EirGrid uses a software program for forecasting surplus available capacity or shortfalls. This software takes the outage rates for generators into account and also considers the system security of supply standard into account which is set using a loss of load expectation. A detailed description of the adequacy assessment methodology used by EirGrid is set out in their annual GCS. Figure 3-5 sets out the forecast generation adequacy levels under the different EirGrid demand scenarios outlined above.

[34] A peak demand of 5090MW was reached on the 21st December 2010 due to inclement weather.

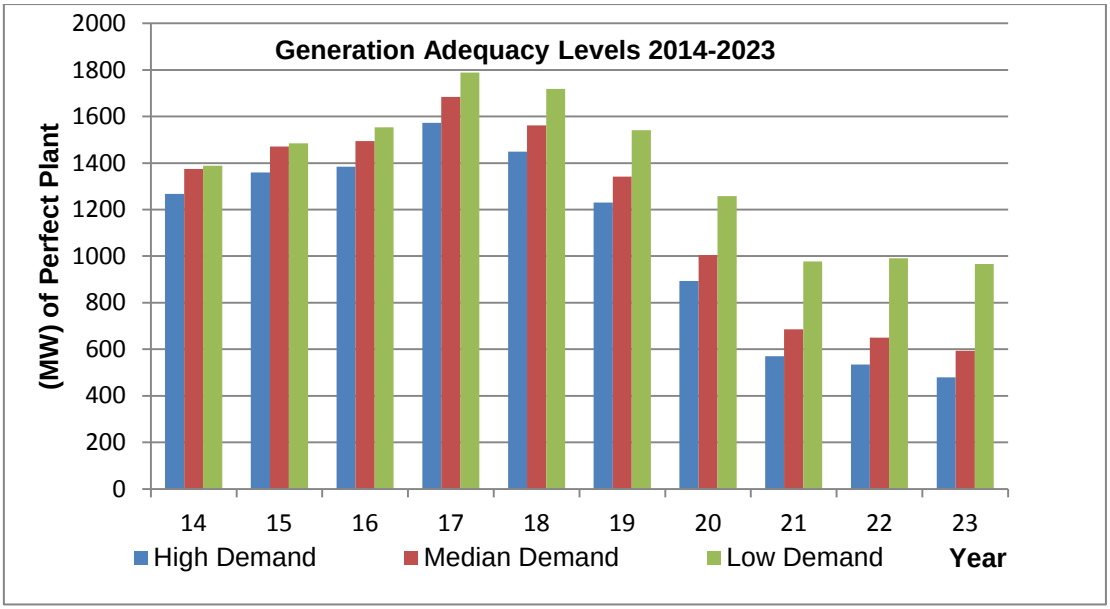

Figure 3-5 Generation Adequacy (Surplus) Levels (Ireland) Source: EirGrid

The results for Ireland show it to have a large surplus of over 1000 MW for most years. This begins to fall off towards the later years as older plant is assumed to come to the end of their lives. There is a large drop in 2021 as all units at Tarbert are decommissioned. In addition to these plant shut-downs, changes in adequacy are caused from year to year by demand growth, plant additions and increased wind penetration.

Further adequacy assessments are carried out taking into consideration various scenarios that may impact on demand or supply. These are:

- the loss of a CCGT station
- the loss of Interconnectors with Great Britain
- older plant removal (such as peat)
- one in 10 year weather conditions

With its large surplus of plant, the adequacy in Ireland remains well above forecast demand for most years. However, by 2021, the surplus falls to lower levels, and so the security of supply begins to be put at risk. The loss of a CCGT would be expected to lower the generation adequacy surplus to 986 MW in the end 2019. The loss of Interconnection would result in an adequacy capacity reduction to 609 MW in 2020.

3.3.1 Demand Side Initiatives

Article 5 of Directive 2005/89/EC allows Members States to take measures to encourage real-time demand initiatives. Demand side initiatives (see Figure 3-6) are generally used to reduce peak electricity demand. Under certain conditions it may be more cost effective to pay for a reduction in demand at peak times rather than starting a potentially inefficient high cost plant. As Ireland has moved successfully to

a Single Electricity Market system, coupled with a reduction in demand and increase in generation capacity the need for centrally organised demand side initiatives has diminished.

For the last ten years, EirGrid operated a Demand-Side Management (DSM) scheme called the Winter Peak Demand Reduction Scheme (WPDRS), which rewarded participating customers for reducing their electricity demand at peak winter hours. However, the WPDRS was withdrawn from 2013.

A concurrent scheme “Powersave” will continue to be run during “Powersave Events” when system demand is close to available supply. Further to this, electricity suppliers generally offer a night-saver tariff where electricity prices are cheaper during night hours which incentivise customers to move their load from day to lower demand times at night. At present circa 11% of domestic customers in Ireland are on a night saver tariff.

A Demand Side Unit (DSU) is a demand site that can be instructed by EirGrid to reduce electricity demand. Instructions to reduce electricity demand are called dispatch instructions. Where a DSU consists of more than one individual demand site it is called an aggregated DSU. A DSU uses a combination of on-site generation and/or plant shutdown to deliver a demand reduction in response to an instruction from EirGrid.

Short Term Active Response (STAR) is a scheme operated by Eirgrid whereby electricity consumers are contracted to make their load available for short term interruptions. This service provides 'reserves' that are utilised in the event of the loss (tripping) of a large generating unit.

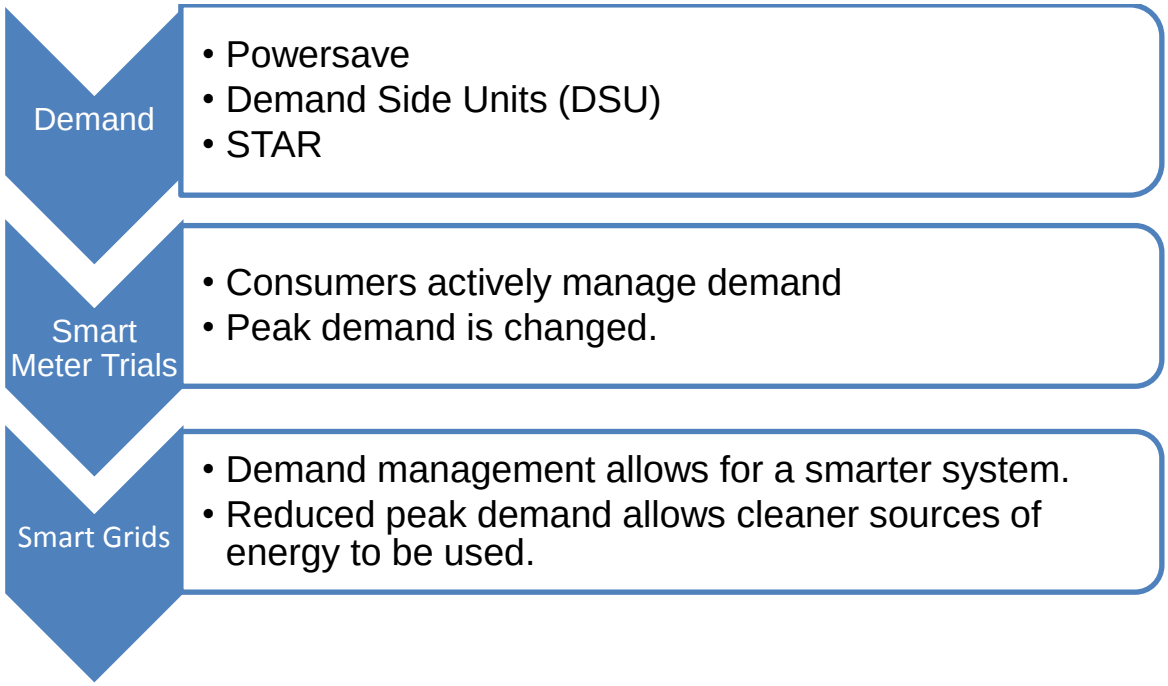

Figure 3-6 Demand Side Management

3.3.2 Smart Meter trial conclusions

Smart meters are recognised at an EU wide level as an integral component in ensuring continuing security and allowing consumers to become more active in their consumption patterns. As stated earlier, Article 5 of Directive 2005/89/EC allows Members States to take measures to encourage real-time demand technologies including advanced metering systems. Smart metering promotes security of supply by transforming consumers from a passive state to being active, responsive consumers. This encourages efficiency in usage on the demand side. As set out in the Electricity Security of Supply Report 2012, the CER established the National Smart Metering Programme (NSMP) in late 2007 in conjunction with the ESB Networks and Bord Gáis Networks and working closely with the DCENR. In Phase 1 of the NSMP, an electricity Customer Behaviour Trial (CBT) was carried out. The CBT looked at the measurable reduction in electricity consumption overall and more specifically during peak demand periods. The trial concluded that there was:

- an increase in overall electricity consumption of 0.6%
- a reduction of 1.1% during peak demand periods

In July 2012, the CER made the decision to proceed with the national rollout of electricity and gas smart metering to all residential consumers and a significant proportion of small-to-medium (SME) consumers. The decision was based on the positive results of the electricity and gas smart metering trials and associated cost-benefit analysis[35]

The strategic objectives of the NSMP are to:

1. encourage Energy Efficiency
2. facilitate Peak Load Management
3. support Renewable and Micro Generation
4. enhance Competition and Improve Consumer Experience
5. improve Network Services

With the successful conclusion of Phase 1 of the NSMP, a phased approach to the national implementation of electricity and gas smart metering has been agreed. Broadly this comprises of the remaining three phases:

- Phase 2: Requirements Definition and Procurement
- Phase 3: Build & Test
- Phase 4: Deployment

[35] See CER/11/080a, CER/11/080b, CER/11/080c for further detail on the CBT, technology trials and cost benefit analysis.

The NSMP is currently in Phase 2. Since the previous Electricity Security of Supply Report, much work and consultation has been completed on the high level design, functionality and implementation approaches of the rollout. The CER published its draft decision paper on Smart Metering High Level Design in December 2013[36], with its final decision paper to follow in Q3 2014. The overall aim of the NSMP is to achieve the target set in Directive 2009/72/EC of 80% roll out of electricity smart meters by 2020.

Key Messages

- Adequacy assessments for Ireland demonstrate that there will be sufficient capacity in a low, medium and high demand scenario. An assessment of adequacy using differing scenarios such as loss of plants, interconnectors and inclement weather also illustrate adequate levels in these scenarios.
- There are a number of demand side initiatives under way including the Powersave scheme, Demand Side Units and a smart metering trial. These will assist in the achievement of demand reduction.
- A decision to proceed with the national rollout of electricity and gas smart metering to all residential consumers and a significant proportion of small-to-medium (SME) consumers was taken in July 2012.
- The overall aim of the National Smart Metering Programme is to achieve the target set in Directive 2009/72/EC of 80% roll out of electricity smart meters by 2020.

[36] See CER/13/268

4.0 Longer Term Security of Electricity Supplies

Article 7 of Directive 2005/89/EC requires Member States to report on the prospects for security of electricity supply out to 10 years from the report date. While it is quite difficult to forecast new generation capacity out to ten years, this section of the report sets out the policy and market framework that is currently in place in Ireland and also the current generation investment intentions. The Department of Communications, Energy and Natural Resources recently published a Green Paper on 12th May 2014. As outlined in the Green Paper, Ireland's energy use altered in recent years due to the recession – less transport energy and industrial energy demands. However, with an upturn in the economy underway it is important that forward planning is undertaken to ensure that Ireland's energy demands are kept in check and also that rising energy prices can be controlled. This Green Paper on Energy Policy in Ireland aims to stimulate a discussion between citizens, policymakers, businesses and stakeholders on such a vision for Irish energy policy. The Green Paper sets out six policy priority areas listed below:

- Empowering Energy Citizens
- Markets, Regulation and Prices
- Planning and Implementing Essential Energy Infrastructure
- Ensuring a Balanced and Secure Energy Mix
- Putting the Energy System on a Sustainable Pathway
- Driving Economic Opportunity

Six key priorities are identified for discussion to help formulate the next Irish Energy White Paper. The next White Paper on Energy Policy should provide a vision of a sustainable energy system for Ireland and the policy framework needed to achieve it.

4.1 Government and EU Energy Policy

The current framework for Government energy policy out to 2020 is set out in the White Paper on Energy published in 2007. The seven years since the publication of the 2007 Energy Policy Paper, *"Delivering a Sustainable Energy Future for Ireland"*, have been transformational for the Irish and all-island energy market. The 2007 policy paper was the first comprehensive Irish energy policy document in several decades.

As the EU looks towards 2030 and 2050, it is timely to reflect on what has been achieved and to reorient Irish energy policy priorities towards the 2030 horizon. The following section highlights key developments in the Irish, EU and international energy markets and sets out the changing economic backdrop. This contextualises the approach to the following chapters, which focus on energy policy as it interacts with citizens and as an input and driver to economic recovery. Six key priorities are

identified for discussion to help formulate the next Irish Energy White Paper. This section addresses the following areas:

(i) Key Irish energy policy achievement

(ii) Key energy policy developments

(iii) Collective delivery

(iv) International developments

(v) Developments in the EU

(vi) Developments since 2007: economic context and energy prices

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% as per Article 4 of Directive 2009/28/EC[37]. This action plan was submitted to the European Commission in July 2010. Article 22 of Directive 2009/28/EC obliges ongoing reporting on Member States. To this effect Ireland submitted its first report to the Commission in January 2012[38].

The Government has set a target of 40% electricity consumption from renewable sources by 2020. In the last 5 years in particular, Ireland has made major strides in accelerating renewable generation. In the 2001 EU RES-E Directive 2001/77/EC, Ireland was set a target of moving from 3.6% RES-E to 13.2% RES-E by 2010. Ireland achieved 14.4% RES-E in 2009 and is on track to exceed the national target of 15% in 2010.

The significant growth in electricity from renewable sources in recent years is largely attributable to onshore wind. As Ireland moves towards achieving circa 40% RES-E by 2020, the Irish grid is increasingly have to cope with the challenges posed by large amounts of intermittent power. As outlined in the plan, EirGrid, is involved in detailed examination of the issues and is pioneering several renewables facilitation studies with a view to ensuring the appropriate management of the grid and stability of the electricity system during this transition.

The Action Plan details the financial, regulatory and technical measures being implemented alongside infrastructure projects to ensure Irelands renewable targets are met whilst ensuring security of supply. The wide range of measures practically aimed at ensuring Ireland meets renewable targets are succinctly laid out in the Action Plan. The broad range of examples reflects the aim of ensuring a sustainable

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[37] On the Promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/E see http://europa.eu/legislation_summaries/energy/renewable_energy/en0009_en.htm

[38] http://www.dcenr.gov.ie/NR/exeres/0B956228-14AC-4BA0-B795-EDD53EBA19FB.htm

and secure supply system. The range of measures in place ensures that reliance and dependence is not overly weighed on any one specific aspect. The NREAP consolidates numerous measures in place as of 2014 that positively impacts on supply security (see Table 4-1).

Financial	Renewable Energy Feed-in Tariff Schemes (REFITs)	Increase in electricity from renewable sources via a feed in tariff mechanisms
Regulatory	Revised application procedures for authorisations to construct and licences' to generate.	SI 383 and 384 of 2008 simplify the granting of authorisations and licences to generating stations with installed capacity of 10MW or less. CER/10/098 introduced a simplified procedure for generators with installed capacity up to 40 MW
Technical	Smart Metering Pilot Programme	Cost benefit analysis trial conducted into benefits of Smart Metering rollout
Infrastructure	East West Interconnector	A 500 MW interconnector between Ireland and Britain has been completed and it allows for electricity exports from Ireland to the UK and facilitates integration of renewable generation on the Irish system

Table 4-1 NREAP Current actions

To help achieve this and to promote and accommodate longer term security of supplies the CER (in conjunction with the Utility Regulator in Northern Ireland in many instances) has endeavoured to ensure the economic viability of renewable energy.

An issue raised in the NREAP is the possibility of conflict between wind potential harnessing capacity and the desire to ensure the preservation of areas of nature conservation and biodiversity importance.

Connections to the network are made on the basis of a "Group Processing Approach" (GPA) where all developers within a "Gate" are given a connection offer. There have been three Gates to date. Gate 3 Direction (CER/08/260) allows for the connection of 3900 MW of renewables and over 1300 MW of conventional plant. The GPA process allows for the efficient and optimal connection of generation onto the system and will assist in reaching the 40% target of renewables by 2020. The Gate 3

connection process has been the largest Gate to date and includes sufficient renewable generation to meet the 2020 targets, particularly given the fall in forecasted 2020 demand since the Direction was published.

4.1.1 2009 Renewable Energy Sources Directive - a European Perspective

In addition to domestic targets, there is over-arching renewables legislation in the form of Directive 2009/28/EC on the promotion of the use of energy from renewable sources. This Directive, which came into force on 25 June 2009, establishes a common framework for the promotion of energy from renewable sources in order to limit greenhouse gas emissions by promoting renewable energy, cleaner transport and energy efficiency. This Directive sets an EU wide target for 20% of final gross energy consumption to be made up of renewables. As part of this Ireland is required to produce 16% of final gross energy from renewable sources and to meet this there is a government target for 40% of electricity consumption to come from renewable sources.

Additionally there has been a number of communications and Directives at European level which Ireland is obliged to follow. This includes the Energy End Use Efficiency and Energy Services Directive 2006/32/EC. This Directive specifically references the aim of creating stronger demand side incentives[39]. Article 13 of the Directive also references the need for competitively priced smart meters availability to accurately reflect demand side consumption. There is ongoing discussion on a revised and updated Directive to accurately reflect energy targets.

4.1.2 REFIT- Financial Support for long term security

To support the renewables target REFIT has been extended to include a number of new renewable energy sources. REFIT currently covers onshore wind, small scale hydro, biomass landfill gas and other biomass. REFIT3 specifically covers Biomass technologies and was notified by the Minister for Communications, Energy and Natural Resources on the 27th March 2012. Subject to State Aid clearance (as per Article 87 (ex. Article 9) REFIT has been extended to include anaerobic digestion, high efficiency CHP, offshore wind and ocean energy. This will help to encourage the further development of a wide and sustainable fuel mix to ensure delivery of a secure and sustainable electricity supply that meets the established renewable targets. Due to the high levels of onshore wind capacity being installed in Ireland there is no requirement from a generation security perspective to extend REFIT at present to include offshore wind production.

[39] Article 7, Directive 2006/32/EC

4.2 High Level Market Framework

The Single Electricity Market (SEM) is a bi-jurisdictional market governed by Ireland and Northern Ireland and consists of a gross pool market into which all electricity generated (from generators above 10 MW in size) or imported onto the island of Ireland must be sold, and from which all wholesale electricity for consumption or export from the island of Ireland must be purchased. In addition to the pool there is also a capacity payment mechanism. The SEM went live on 1st November 2007 and is governed by the SEM Committee. The SEM Committee comprises the CER, NIAUR (together the Regulatory Authorities) and an Independent member. The SEM Committee takes any decision as to the exercise of a relevant function of CER or NIAUR in relation to a SEM matter. Figure 4-1 below sets out the high level workings of the SEM.

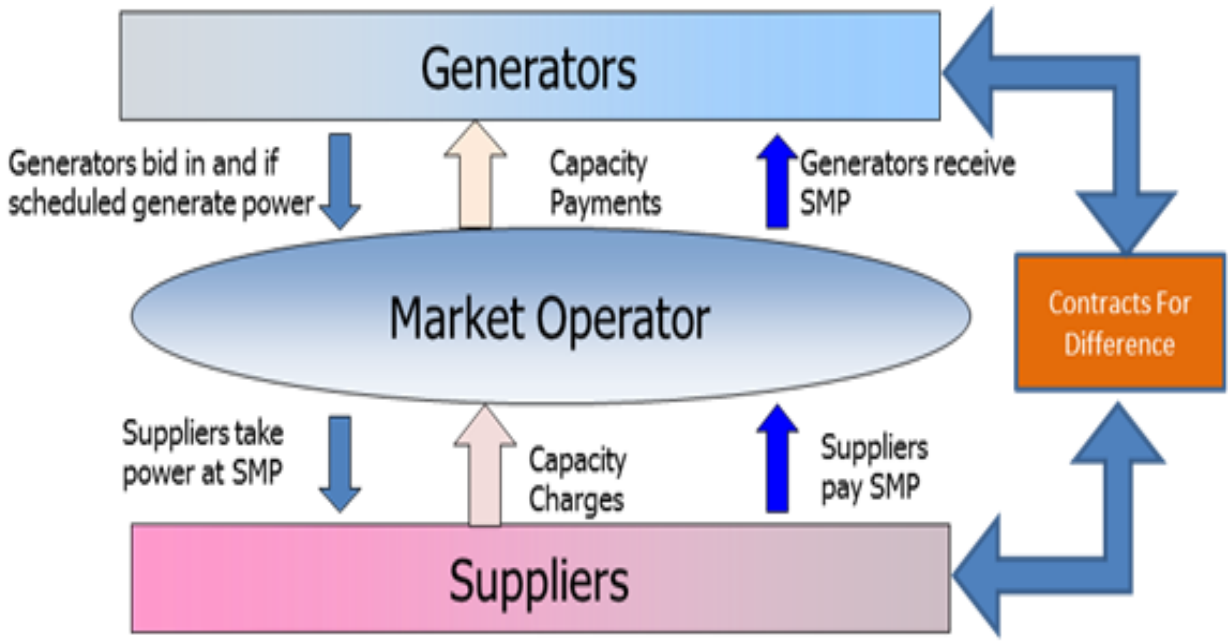

Figure 4-1 High Level SEM Framework

4.2.1 The SEM and the Capacity Payment Mechanism

As stated previously, the SEM is a gross mandatory pool with an explicit capacity mechanism. The Capacity Payment Mechanism (CPM) provides a stream of revenue for generators based on their availability rather than just receiving revenue streams when they generate electricity. Without this explicit capacity mechanism generators would need to recover all their costs when they run. This would have the potential to cause price spikes in times of low margin when lesser used peaker plants are called on. Some of the advantages of an explicit capacity mechanism are:

- improved stability in pricing
- reduced barriers to market entry

- greater transparency
- increased potential for competition
- stable investment signals

The CPM is designed to reimburse the fixed costs of a Best New Entrant (BNE) peaking plant in the SEM. The BNE peaker is seen as the marginal plant and may not run very often in the market. The CPM therefore ensures that the investment and ongoing costs of the BNE plant are reimbursed whether or not the plant actually runs thereby significantly reducing the risk on the investor. The capacity payment is paid to all generators based on their availability. The total pot of capacity revenue is currently calculated on a year ahead basis by looking at the cost of the BNE plant and also the capacity requirement for the coming year.

In March 2012, the SEM Committee published a Medium Term Review of the Capacity Payment Mechanism. The review has led to some minor changes to the operation of the mechanism but has otherwise confirmed that the mechanism remains fit for purpose.

In 2014 the SEM Committee published a Consultation proposing options for a Capacity Remuneration Mechanism as part of the new market design. A Decision Paper on the High Level Design indicating a proposed new design for the energy market from 2016 to ensure compliance with the European Target Model will be published September 2014. In the Draft High Level Design Decision Paper the SEM Committee proposed that a Capacity Remuneration Mechanism be required in the High Level Design of the I-SEM and should be developed in parallel to the energy market detailed design.

In the Draft High Level Design Decision Paper the SEM Committee was of the view that the form of CRM should be Centralised Reliability Options issued by a central party. Reliability Options is a market based mechanism, which is a key consideration at EU level, providing a market based valuation of capacity and also providing a market based mechanism for non-delivery on obligations.

4.2.2 The Gate Connection Process

The Government target to generate 40% of electricity from renewable sources by 2020 is expected to be met mainly by wind generation. The process for offering new generation connection (including wind) to the electricity network in Ireland is now largely governed by a procedure known as the “Group Processing Approach” (GPA). The CER, along with Eirgrid and ESBN, developed this process in 2005 as a response to the significant increase in parties requesting connection of renewables. As the name suggests the process allows for the processing of applications in groups or “Gates”. To date there have been three Gates which have been sequentially larger, see table 4-2 below:

• Gate1 in 2005 provided for 365MW
• Gate2 in 2006 provided for 1300 MW
• Gate 3 in 2008 provided for 3900 MW

Table 4-2 Gate Connection Offers

Gate 3 allows for the connection of sufficient capacity to meet the Government's 2020 renewable electricity sources target of 40%. As of Q2 2014 just over 3400 MW of Gate 3 connection offers have been accepted.

The CER continues to chair the Generator Connections Liaison Group (Gate 3 Liaison Group), a group comprising the TSO, DSO and industry participants. The Group has recently turned to examining post issuance matters. As Gate 3 offers have new been accepted, the CER is now considering the appropriate post-Gate 3 connection process. The Gate process has proved reliable in ensuring that multiple source generation are being facilitated into the transmission system by EirGrid.

4.2.3 Gate 3 and Conventional Plant

In conjunction with Gate 3, the CER is also considered the balancing of the increasing level of renewables on the system with the ongoing need for security of supply and improved generation efficiency. Accordingly, after extensive public consultation, the CER published in December 2009 a direction relating to Gate 3 which decided on the criteria for deciding which conventional (non-renewable) applicants will receive a connection offer to the electricity network. The total connection offer amount was based on criteria rather than an absolute number and provided for the issuance of connection offers to approximately 1300 MW of conventional generation projects and, in addition, a merchant interconnector project. 512.4 MW of conventional generation has been accepted in 2014. From these projects a CCGT and an OCGT generation have advanced to construction and three other OCGT's have accepted their connection offer.

4.2.4 Connections outside the Gate Process

In addition there is also a process in place to address the treatment of small, renewable and low carbon generators outside the group processing approach. This approach was consulted upon in 2009 and provides a route for fast-tracking new generation capacity where it satisfies specific public interest criteria such as diversity of fuel mix, environmental benefits and research. As Ireland diversifies its fuel-mix with various renewables it is expected that connections outside the Gate Process may increase. This is as a result of the additional support that will be given to varied renewables under REFIT3. Below, new connections that have occurred outside the Gate Process are listed.

Energy Type	Number of Connections	Connected & energised Capacity (MW)
Biogas	2	1.06
Small Wind (<0.5MW)	1	0.4
Hydro	0	0
Biomass	1	1
LFG	4	10.5
Natural Gas	0	0
CHP	1	1.6
Total	**9**	**14.56**

Table 4-3 New Connections outside the Gate Process

These connections outside the Gate Process although small, contribute to a diverse fuel mix which in turn contributes to facilitating a secure and reliable supply security. Some will also contribute to 2020 renewable generation targets.

4.3 Planned Investment

4.3.1 Conventional Generation

There is a significant capacity of new generation currently contracted to connect to the system in Ireland (see table 4-4). EirGrid publishes listings of both contracted and connected plant on its website. The table below shows the larger stations with connection agreements in place.

In addition to these, there are a number of other developers that have expressed an interest in connecting to the network in the next number of years. Commissioning dates have not been provided in these cases, and they therefore have been excluded from this assessment.

Plant	Fuel Type	Capacity (MW)	Expected Commissioning Date
Ballakelly CCGT	Gas/Distillate	445	NA
Endesa (Great Island) CCGT	Gas/Distillate	431	2014 - 2016
Nore OCGT	Gas/Distillate	98	NA
Dublin Waste to Energy CHP	Waste	62	NA
Cuilleen OCGT	Gas/Distillate	98	NA
Suir OCGT	Gas/Distillate	98	NA
Total	**-**	**1,232**	**-**

Table 4-4 New Large Power Stations with Connection Agreements in Place

4.3.2 Renewable Generation

The Government target to generate 40% of electricity from renewable sources by 2020 is expected to be met mainly by wind generation but also with hydropower, wave, tidal, biomass, solar and landfill gas. To enable the realisation of ambitious renewable energy targets the Government launched the renewable energy feed in tariff (REFIT) scheme in 2006. The programme provides support to renewable energy projects over a fifteen year period.

REFIT2 opened in March 2012 and increases the quantity of onshore wind supported under the original REFIT scheme. Further support is being given to small-scale hydro and landfill gas. A further REFIT3 scheme specifically targets biomass. Further to this, renewable generation in Ireland receives priority dispatch whereby they are dispatched by the system operator in preference to conventional generation.

4.3.2.1 Wind Generation

The explicit Government support for renewables in tandem with the CER and Eirgrid's gate connection regime has seen large numbers of wind farm developers seeking connection to the system. Wind has been by far the most popular renewable technology choice to date which may not be surprising given Ireland's specific weather attributes and the advanced stage of wind technology compared to other renewable energy technologies. While the range of renewable power sources supported by feed-in tariffs, it is expected that onshore wind, due to its proven technology is likely to continue to be a major component of the supported energy sources.

Table 4-5 below sets out the wind generation already connected as of the data freeze for this report.

System	Capacity (MW)
Transmission	794
Distribution	978

Table 4-5 Transmission & Distribution Capacity of connected wind farms Source 2013: EirGrid

The connections dates for the contracted plant will depend on electricity network developments and how early new capacity can be accommodated. This is discussed in further detail in the Networks section of this report.

4.3.2.2 Other Renewable Generation

In addition to wind, it is expected that there will be significant connection of other renewable energy sources. There are also explicit government targets for these non-wind renewable sources. The table below sets out the non-wind renewables greater than 5MW recently connected and contracted for connection to the system. The CER envisages that connection Feed in Tariffs will continue to expand the support available for other sources of energy as outlined above. While marine energy is in its infancy, there are two such test sites in the West of Ireland at present. These projects aim to assess the ability of wave and tidal energy to contribute to the electricity requirements of Ireland. Due to advances in technology, these may in time contribute to the fuel mix.

Fuel Type	Capacity (MW)
Hydro	21
Biomass /Landfill gas	49[40]
CHP	141[41]
Industrial	9
Total	**220**

Table 4-6 New Other Renewable Connections

[40] Includes Meath Waste to Power (17MW)

[41] Includes Dublin Waste to Energy (62MW). Not including the 161 MW centrally dispatched CHP plant operated by Aughinish Alumina.

4.4 Summary

This section has looked at matters relevant to the security of electricity supplies over ten years. In addition it is also useful to examine the prospects for longer term security of supply. Forecasting new levels of generation further than a few years is quite difficult given that a view is being taken on the investment intentions of commercial organisations. This will inevitably be subject to other factors such as electricity demand, the financial climate and the ability to raise finance. The CER maintains a watching brief on the longer-term security of electricity supplies and implements measures that are designed to provide for longer term security of supply.

Key Messages

- The Single Electricity Market (SEM) has provided a successful wholesale market for the Island of Ireland. The nature of the market ensures that there is sufficient capacity to meet demand in the medium term.
- In 2012 a review of the capacity payment mechanism was completed which has confirmed that it is fit for purpose.
- The I-SEM Committee published a Draft High Level Design Decision Paper to ensure compliance with the Target Model. The proposed design includes an energy and Capacity Remuneration Mechanism components.
- There is a Government target to generate 40% of electricity from renewable sources by 2020.To this effect a National Renewable Energy Action Plan has been published which outlines how this target is to be achieved. An update to this action Plan was submitted to the European Commission in January 2012.
- Gate 3 offers have been successfully completed by July 2011 with offers made of approximately 3900 MW of renewables and 1300 MW of conventional plants.
- Support is now being given to new types of renewable generation via REFIT2 & 3. Those supported generation types include biomass, hydro, further onshore wind, and biomass gas.

5.0 Networks Investment

Article 6 of the 2005 Directive requires Member States to establish a regulatory framework that provides investment signals for both the transmission and distribution system network operators. This framework should facilitate TSOs and DSOs to develop their networks in order to meet foreseeable demand from the market and facilitate maintenance and, where necessary, renewal of their networks. This section contains a description of the electricity network in Ireland. The section also sets out the regulatory framework in place and a high level description of investment intentions.

5.1 Network Description

The national grid plays a vital role in the supply of electricity, providing the means to transport power from the generators to the demand centres using a system comprising 400 kV, 220 kV and 110 kV networks. The 400 kV and 220 kV networks form the backbone of the grid. The key components of the transmission system are set out in Table 5-1 below.

Power Lines	Total Line Lengths (km)
400kV	439
275kV	97
220kV	1917
110kV	4200
Transformers	**Number Of Items**
400/220kV	6
275/220kV	3
220/110kV	46

Table 5-1 Source: EirGrid Transmission System Performance Report 2013

In addition to the current transmission system, there are a number of projects underway to provide stability and security to the system. This investment is focused on both increasing the capacity of the transmission system and refurbishing the existing system. This is of particular importance to maintain security of supply and facilitate the increasing amounts of renewable energy, much of which is located along the west coast of Ireland.

5.2 Regulatory Framework

The Irish transmission arrangements were certified by the CER in accordance with Article 1 of the European Commission Decision of 12th April 2013, pursuant to Article 3(1) of Regulation (EC) No 714/2009 and Article 10(6) of Directive 2009/72/EC. EirGrid, a publicly owned company, is the transmission system operator. ESB, a publicly owned vertically integrated utility, is the transmission and distribution system owner through its ring fenced business unit ESB Networks. The distribution system is operated by ESB Networks Ltd, a wholly owned, legally separate, subsidiary of ESB.

5.2.1 Revenue Regulation

By their nature, the electricity networks are operated as monopoly businesses - it does not make sense, either economically or environmentally to construct or operate competing electricity networks. Regulation of the monopoly network owners and operators is therefore a fundamental role of the CER. The bodies involved – ESB Networks as Distribution System Operator (DSO) and Transmission Asset Owner (TAO) and EirGrid as Transmission System Operator (TSO) are required to submit their proposals for required revenues, including capital expenditure over the five-year period of the review. The CER analyses and reviews their proposals, with the aim of achieving operational efficiencies while ensuring the correct level and type of investment in the electricity networks. The companies are benchmarked against similar organisations internationally and areas of their business where improvements need to be made are targeted. To date there have been three electricity networks revenue reviews, referred to as Price Reviews.

5.3 Network Investment

5.3.1 Grid25 is ensuring regional investment in the future network.

Grid25 is EirGrid's programme for the long-term development of Ireland's transmission system. Grid25 is a significant investment programme which relates to the upgrading of existing infrastructure and the construction of new stations and circuits where required. The CER approved €1.45 billion for transmission capital investment between 2011 – 2015 and will consider further investment for 2016 – 2020 in the upcoming price review (PR4). Approximately 1150 km of new circuits is envisaged[42]. This represents an increase of about 20% on the total length of the existing network. Of this, 800 km will need to be at 220 kV or higher and the other 350 km will be at 110 kV. In addition to these, new lines will also be needed to connect many of the new generators to the Grid. A sizeable proportion (2300km) of the existing transmission network will need to be upgraded to provide greater capacity. This includes 1100 km (or 70%) of the existing 220 kV network, and 1200 km (or 29%) of the 110 kV network[43].

[42] http://www.eirgrid.com/media/Grid%2025.pdf

[43] This refers to the new build and uprate in the Original Grid25 Strategy from 2008. Please note that EirGrid is currently in the process of updating Grid25 and expects to publish a report in due course.

Project Name	Project Type
Ballydine - Doon 110kV line uprate	Circuit Uprates and Refurbishments
Lisdrum - Louth 110kV line refurbishment	Circuit Uprates and Refurbishments
Butlerstown - Killoteran 110kV line uprate	Circuit Uprates and Refurbishments
Bandon - Dunmanway 110kV line refurbishment	Circuit Uprates and Refurbishments
Inchicore - Maynooth No. 1 &2 220kV line uprate	Circuit Uprates and Refurbishments
Marina - Trabeg No. 1 & 2 110kV circuit uprate	Circuit Uprates and Refurbishments
Cullenagh - Dungarvan 110kV line uprate	Circuit Uprates and Refurbishments
Butlerstown - Cullenagh 110kV line uprate	Circuit Uprates and Refurbishments
Clashavoon - Knockraha 220kV line uprate	Circuit Uprates and Refurbishments
Inniscarra- Macroom 110kV line uprate	Circuit Uprates and Refurbishments
Charleville - Mallow 110kV line uprate	Circuit Uprates and Refurbishments
Cathaleen's Fall - Drumkeen (to Clogher) 110kV line uprate	Circuit Uprates and Refurbishments
Kellis - Kilkenny 110kV line refurbishment	Circuit Uprates and Refurbishments
Athea 110kV station	Connections for Generators
Booltiagh Wind Farm Extension	Connections for Generators
Reamore 110kV station	Connections for Generators
Great Island 220kV station connection of Generation	Connections for Generators
Cloghran 110kV station	Connections for Generators
Mount Lucas 110kV station	Connections for Generators
Marina 110kV station replacement	Station Uprates and Refurbishments
Ballydine 110kV station busbar uprate	Station Uprates and Refurbishments
Thurles 110kV station installation of reactive support	Station Uprates and Refurbishments
Butlerstown 110kV station busbar uprate	Station Uprates and Refurbishments
Mullingar 110 kV station installation of reactive support	Station Uprates and Refurbishments
Thurles 110kV station busbar A1 uprate	Station Uprates and Refurbishments
Tralee 110kV station installation of a new coupler	Station Uprates and Refurbishments
Woodland 400kV Station - 3rd 400/220 500MVA transformer	Station Uprates and Refurbishments
Ennis 110kV station busbar uprate	Station Uprates and Refurbishments
Clonkeen 110kV station reconfiguration	Station Uprates and Refurbishments
Cushaling 110kV station busbar uprate	Station Uprates and Refurbishments
Cathaleen’s Fall 110kV station busbar A1/B1 uprate	Station Uprates and Refurbishments
Bellacorick 110kV station busbar uprate	Station Uprates and Refurbishments

Table 5-2 Significant Transmission Capital Projects Completed in 2013[44]

[44] ESB Networks

This investment in strengthening capacity connections between regions allows regional demand to be met efficiently. This is of particular importance due to the geographical distribution of demand in Ireland. Whereas the maximum wind potential is located along the west coast, Ireland's population is concentrated along the east coast. As a result of this, it is important that the grid is capable of facilitating this regional increase in future generation on the network and successfully facilitates its transmission.

The rollout of an upgraded electricity network is a key requirement in achieving the ambitious renewable generation targets and for maintaining a secure and reliable system. To this end, significant investment in the transmission and distribution networks is expected in the coming years. The timely rollout of Gate 3 and the Grid25 project will require a joined up approach and co-operation between government bodies, market participants and electricity customers.

5.3.2 Monitoring of Grid25

EirGrid regularly updates the CER regarding Grid25 progress[45]. A number of Grid25 projects have already been completed and are set out in table 5-3 below. Regular reports submitted to the CER assist in ensuring that Grid25 is delivered in a timely fashion. These reports are jointly submitted by EirGrid and ESB Networks.

Project Name	Project Type
Laois-Kilkenny	400/kV Reinforcement Sceme
Tarbet	220 kV Station Refurbishment
West Galway	110 kV New Station
Sligo	110 kV Station Busbar Uprate
Finglas	220 kV Station Busbar Reconfiguration
Aghada	220 kV Station Busbar Reconfiguration
Knockraha	220 kV Station Busbar Reconfiguration

Table 5-3 Updated Grid25 Investment Projects Planning lodged 2013

[45] With specific reference to capital projects over €10 million in value.

Project Name	Project Type
Dublin North Fringe	220 kV Project
Kinnegad-Mulingar	110 kV New circuit
Tarbert	220 kV Station Refurbishment
Killonan	220 kV Station Refurbishment
West Galway	110 kV New Station
Sligo	110 kV Station Busbar Uprate
Finglas	220 kV Station Busbar Reconfiguration
Raffeen-Trabeg 1	110 kV Line Uprate

Table 5-4 Updated Grid25 Investment Projects Planning granted 2013

5.3.3 Conclusion

The electricity system in Ireland is regulated by the CER with specific roles held by EirGrid and ESB Networks. As a result of changes occurring on the transmission and distribution systems a coordinated approach is required from all players to ensure efficient and effective investment in the electricity network.

Key Messages

- The CER regulates the transmission and distribution system operators and owners in Ireland.
- The effective and efficient rollout of an upgraded transmission network is a key requirement in achieving the ambitious targets for renewable generation and maintaining an integral system especially with the ongoing renewable connections onto the system.
- The EirGrid Grid25 work plan was put in place in anticipation of changing demand and supply patterns.
- As a result, work has already begun to reinforce and upgrade the essential infrastructure needs of the network with many projects in the development stages.

6.0 Operational Network Security

Article 4 of the 2005 Directive contains requirements in relation to operational network security. In particular the Directive requires Member States to ensure that transmission system operators (and where appropriate distribution system operators) set and comply with minimum operational rules and obligations on network security.

This section describes the operational framework in place for the operation of the system and also the measures in place for ensuring operational network security.

6.1 System Operation

6.1.1 Operational Framework and Rules

The technical rules governing the operation, maintenance, and development of the transmission system, and procedures governing the actions of transmission system users, is set out in the Grid Code. In 2004, a section specifically addressing the technical requirements of wind generators was incorporated into the Grid Code.

EirGrid is responsible for the administration of the Grid Code through the Grid Code Review Panel (GCRP). The GCRP is a standing body with representation from across the electricity industry. The GCRP proposes reviews and discusses modifications to the Grid Code. While the GCRP may recommend modifications to the Grid Code any modifications must be approved by the CER. Individual generators may apply for derogations from the Grid Code, which must be assessed by EirGrid and approved by the CER.

In addition, EirGrid uses its own Operating Security Standards, which set out the criteria to which the TSO operates the system at all times.

The Grid Code will be impacted by the introduction into law of the EU Network Codes. In particular the Requirements for Generators (RFG) and the Demand Connection Code (DCC) will require substantial revisions to the current Grid Code document. A working group of the GCRP and several sub-working groups have been set up to prepare detailed proposals on the transposition of the new requirements into the Grid Code. The first impact analyses for three Codes (RFG, HVDC[46] and LFCR[47]) are due to be presented to the GCRP in November 2014. This is a substantial body of work and will continue into 2015.

[46] Network Code High-voltage direct current connections

[47] Network Code on Load frequency control and reserves

6.1.2 Performance Incentives

The CER has implemented a scheme of performance incentives for Eirgrid. In July 2011 the CER published a decision on Transmission Incentives to run until 2015[48]. The successful roll out of Gate 3 and the Government's target of 40% of electricity coming from renewable generation is central to the CER's thinking in developing incentives. A particular focus of performance incentives is the movement away from incentivising system availability while focusing on incentivising scheduled outages.

In addition, the CER has decided to introduce a new TSO network delivery incentive. With regard to the TAO, the CER has decided to introduce an incentive mechanism around network delivery, times for the return to operation after scheduled outages and the construction and energisation of transmission assets.

Incentives are split between system performance (40%) and system development (60%). Within system performance there are two separate incentives - system minutes lost and system frequency. In the case of transmission system development, there are incentives regarding planning permission, project agreement and delivery of enhanced network capacity.

6.1.3 Performance Reporting

As per their TSO licence, EirGrid is required to publish the Transmission System Performance Report annually to outline its performance over the previous year. This report is based on performance criteria approved by the CER. The key areas that EirGrid report on are as follows:

- Basic System Data (i.e. throughput, number of connections etc.)
- Grid Development and Maintenance
- Transmission System Availability and Outages
- Generation Availability and Outages

Some key information from the report is included in Table 6-1 and Table 6-2 below.

Generation & Transmission Data	2012	2013
Total Operational Generation Capacity (ROI only)	8473MW	8767 MW
Total Energy Produced (ROI only)	25724GWh	25957 GWh
Peak Winter Demand (All-Island)	6305 MW	6229 MW
Minimum Summer Night Valley (All-Island)	2176 MW	2217 MW

Table 6-1 Generation and Transmission Data Source: EirGrid GCS

[48] CER/11/128

System Availability	2012 %	2013 %
400kV Circuit	98.13	90.58
220kV Circuit	94.07	93.41
110kV Circuit	96,17	92.88
Generation System (Average Weekly)	87.14	86.17
Generation System (Minimum)	70.61	73.02
Forced Outages (Average Daily)	6.74	7.88
Forced Outages (Maximum)	17.43	21.13

Table 6-2 System Availability Data

6.2 Ancillary Services

As stated earlier, Article 5 of the 2005 Directive requires transmission system operators to ensure that an appropriate level of generation reserve capacity is available and/or to adopt equivalent market based measures. In Ireland this is currently achieved through mandatory Grid Code obligations to provide ancillary services and ancillary services contracts between EirGrid and the individual generators.

Ancillary services are a key requirement in maintaining the supply/demand balance. Ancillary Services can be described as products, other than energy, that are required to ensure the secure operation of the transmission system. Some of the products offered as ancillary services include:

- Operating reserve
- Reactive power
- Black start
- Multimode operation
- Warming contracts

The ancillary services framework is being revised through the DS3 Programme. This is due to the continuing connection of intermittent energy onto the system and the associated increase in the role of ancillary services. DS3 is outlined in more detail in the following section.

6.3 DS3 Programme - Investing in Ireland's Energy Future

The Renewable Energy Directive 2009/28/EC states that system operators are obliged to "take appropriate grid and market related operational measures in order to minimise the curtailment of electricity from renewable sources on the electricity system". In accordance with this Directive, EirGrid is implementing the DS3 Programme to ensure a secure, reliable and efficient energy system in a changing environment. To successfully fulfil the 40% renewable target a total of approximately 4.600MW of wind generation will need to be connected to the system by 2020 on an All-Island basis. This portfolio change poses significant challenges to the network in Ireland above and beyond non-synchronous facilitation challenges posed in other jurisdictions.

The TSOs in Northern Ireland and Ireland formally commenced the DS3 Programme in September 2011, following a review by the Regulatory Authorities of the TSOs' Report on Ensuring a Secure, Reliable and Efficient Power System in July 2011. This followed a request by the SEM Committee for the TSOs to put in place a programme of work to solve the challenges which would occur with operating the electricity system in a secure manner as levels of wind penetration increase. These issues had been identified by the TSOs in the Facilitation of Renewables Study - a large body of work which concluded in 2010.

The DS3 programme consists of eleven separate work streams: System Services, RoCoF, Grid Code, Demand Side Management, Voltage Control, Frequency Control, Control Centre Tools, Model Development and Studies, wind-security assessment tool (WSAT), Renewable Data, and Performance Monitoring and Testing. The purpose of the DS3 programme is to enhance the capability of the system to allow the TSOs to safely operate the system at 75% System Non-Synchronous Penetration (SNSP) up from the current, already reached limit of 50%. A SNSP limit of 75% means that at any given time wind generation can contribute 75% of total electricity generation. This will allow the system to make the best use of wind generation when it is available, lowering curtailment levels and increasing the average share of renewable generation to meet the 40% target. The current status of all the DS3 work streams can be found on EirGrid's website[49].

One of the key work streams in the DS3 programme is the Review of System Services (or Ancillary Services). The aim of the system services review is to put in place the correct structure, level and type of service in order to ensure that the system can operate securely. The TSOs have statutory responsibilities in Ireland and Northern Ireland in relation to the economic purchase of services necessary to support the secure operation of the system. At present, the SEM Committee approves the policy, rates and overall All-island monies for harmonised ancillary

[49] http://www.eirgrid.com/operations/ds3/

services as the cost is included in transmission charges and recovered from demand customers.[50]

The TSOs have published three consultation papers and a Recommendations Paper on the System Services Review[51]. The TSOs also published a report carried out by DNV KEMA into system services in international markets[52]. In addition to this the TSOs held a public workshop on their recommendations paper on 26th June 2013.
To date the TSOs have been responsible for the consultation process with industry. At the June 2013 meeting of the SEM Committee the TSOs presented their recommendations to the SEM Committee. The Regulatory Authorities' advisors at also presented their review of the Recommendations Paper. Following these discussions the SEM Committee decided to publish the consultation paper SEM-13-060 which:

- set out the Committee's thinking on the TSOs' recommendations and how the Committee planned to proceed with the project
- invited comments on the Committee's initial conclusions on the technical aspects of the recommendations and, more specifically, on the services to be included in the project

Following receipt of responses from industry, the Regulatory Authorities held an industry workshop in October 2013. At this workshop the Regulatory Authorities presented an overview of the comments received and opened the floor for a discussion with industry on each of the products. The Regulatory Authorities also outlined their initial views on their approach to the economic analysis to be conducted. Comments were invited from industry on this approach. In order to assist with its supply side analysis the Regulatory Authorities also issued a call for evidence following the workshop inviting providers (existing and potential) to make submissions regarding the capability of units to provide the proposed system services, timeline for any necessary works and an indication (non-binding) of the associated investment and operational costs..

On 20th December 2013, the SEM Committee published its Decision paper on the Technical Definitions of the DS3 System Services. This paper also outlined the SEM Committee's approach to the economic analysis:

- demand side analysis to determine the value of the system services and the volumes likely to be required
- supply side analysis to determine the size and structure of revenues required to realised the necessary investment in system services

[50] SEM Committee paper on HAS and OSC are available here

[51] TSO papers are available here

[52] KEMA Report available here

- analysis on the options for procurement mechanisms

In July 2014 the SEM Committee published the results of its economic analysis and its proposals for the design of the procurement mechanism for system services. The SEM Committee plans to publish a decision on the procurement design by the end of 2014 and commence the detailed design and implementation phase in 2015.

6.4 Secondary Fuel Capability Obligations

Directive 2003/54/EC (which was replaced by Directive 2009/72/EC) as transposed in Ireland by SI 60 of 2005 enhanced the CER's role in relation to security of supply and enabled the CER to take any necessary actions to protect security of supply. Regulation 5 of SI 60 of 2005 states that "*the Commission shall take such measures as it considers necessary, to protect security of supply.*"

Secondary fuel obligations are of particular importance in the SEM. This is due to the fact that the majority of electricity requirements on an all Island basis are being met from gas.

As the majority of gas is supplied through a single entry point onto the island of Ireland it is essential from an electricity supply perspective that emergency provisions are put in place. To this end generators have to hold reserves of either their primary or secondary fuel and they must be capable of running at 90% plus of capacity on a secondary fuel. The specific requirements on generators to hold reserves are set out in table 6-3 below. EirGrid has an obligation[53] to examine fuel stocks and may test fuel stocks twice per annum.

In May 2012 EirGrid carried out a Capacity Report to assess the possibility of increasing secondary fuel obligations above the current requirements. The report concluded that various scenarios were possible including an option for key generation plants in particular to increase their secondary obligations if necessary.

In its decision paper on Secondary Fuel Obligations in 2009 the CER committed to keep secondary fuel obligations under continuous review to address potential issues arising from gas supply sources and the increase in intermittent renewable generation on the electricity network. In 2014 the CER commenced analysis to estimate the impact of the current policy under various potential future scenarios.

Gas dependency in Ireland increased between 2005 and 2010 as oil plants were decommissioned. In 2011, gas generation fell due to increasing wind on the system (see Figure 6-1). As the predominant generation fuel remains gas the secondary fuel obligations are of particular importance to security of supply.

[53] http://www.cer.ie/docs/000452/cer09001.pdf

The secondary fuel obligations are monitored on an ongoing basis by the CER and EirGrid.

As previously outlined Ireland cooperates regionally with the UK through the UK & Ireland Gas Emergency Group that ensures proportional market sector supplies will be distributed to Ireland if a gas emergency is declared in the UK.

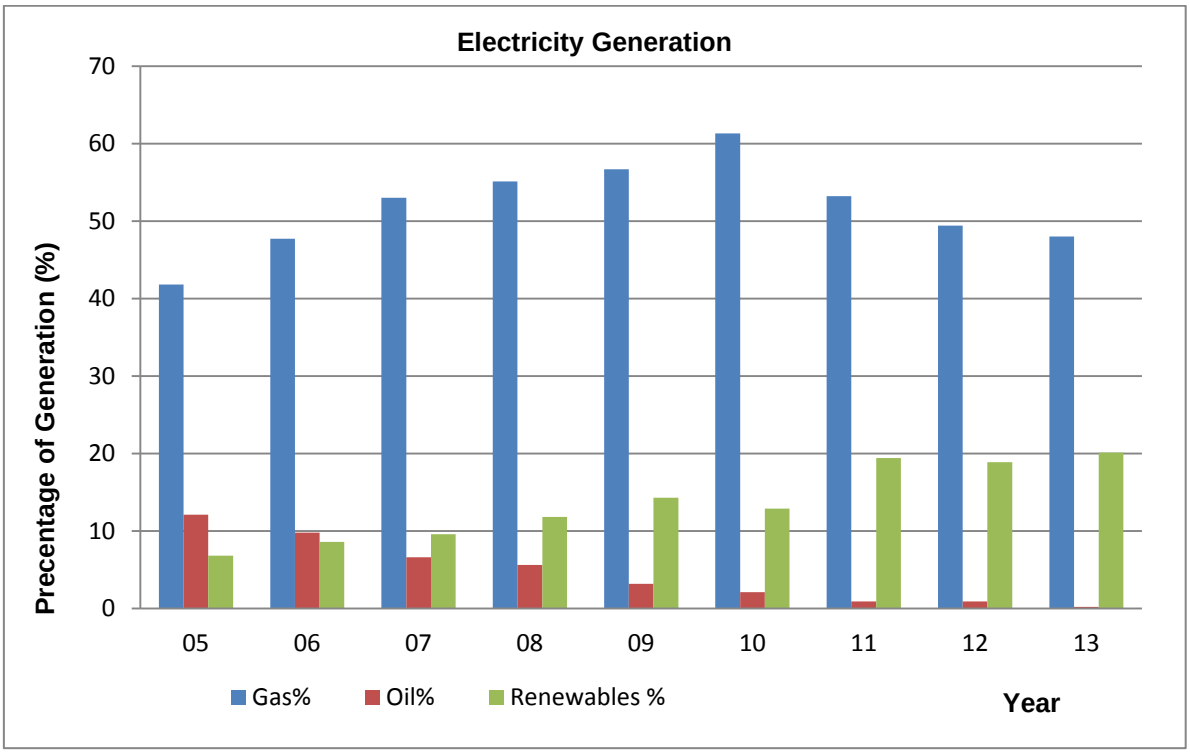

Figure 6-1 Percentage of Total Generation

It should be noted that infrastructure projects such as the East-West Interconnector, as well as the growing level of renewables, have impacted the running time of conventional generators considerably.

Due to the importance of gas as a fuel for electricity generation and to minimise the impact of a gas security of supply incident, the CER requires base load gas powered plants to stock five days of secondary fuel. Peaking plants are generally required to stock three days of secondary fuel. Generating plants with operating hours above 2630 hours per annum are categorised as higher merit while plants operating below 2630 hours per annum are categorised as lower merit generating units[54].

[54] http://www.cer.ie/docs/000452/cer09001.pdf

Primary Fuel Type of the Generating Unit	Requirement to be capable of running on a secondary fuel	Requirement to hold stocks of that fuel	Number of Days Storage Required (Continuous running at primary fuel rated capacity)	
Gas units and CHP units of more than 10MW	Yes (At 90% of units capacity)	Requirement to hold secondary fuel	Higher Merit	5
			Lower Merit	3
			CHP>10MW	1
Non-gas units such as oil and coal (excluding renewable and peat units)	No requirement	Requirement to hold primary fuel	Higher Merit	5
			Lower Merit	3
Renewable[55] units	No requirement	No requirement	N/A	
CHP units of 10MW and less	No requirement	No requirement	N/A	
Peat units	No requirement	No requirement	N/A	

Table 6-3 Secondary Fuel Requirements

[55] Renewables is as defined in the Electricity Regulation Act 1999

Key Messages

- The rules governing the physical operation of the electricity system are set out in the Grid Code. EirGrid is responsible for the development and maintenance of the Grid Code through the Grid Code Review Panel (GCRP).
- The CER has implemented a scheme of performance incentives for EirGrid.
- Ancillary services are a key requirement in maintaining the supply/demand balance. As part of the Single Electricity Market in Ireland the rates for ancillary services are harmonised in Ireland and Northern Ireland.
- It is expected that the development of new ancillary services will be done against the backdrop of changes in the generation portfolio where more intermittent generation is connected and increasing use of interconnectors.
- To this end a technical and regulatory work programme - DS3 has been put in place to ensure that future and current changes in generation can be safely facilitated.
- Gas generators in Ireland must be able to switch from their primary fuel to their secondary fuel while operating continuously and run on their secondary fuel for a defined period of time (1-5 days)
- Non-gas fired generation stations must hold primary fuel in storage to run for a defined number of days (3-5 Days)
- Compliance with the primary and secondary fuel requirements is monitored by EirGrid.

7.0 Interconnection and Regional Market Integration

Article 22 of Directive 2009/72/EC requires TSOs to submit to the regulatory authority a ten-year network development plan based on existing and forecast supply and demand after having consulted all the relevant stakeholders. That network development plan shall contain efficient measures in order to guarantee the adequacy of the system and the security of supply.
The ten-year network development plan shall in particular:

a) indicate to market participants the main transmission infrastructure that needs to be built or upgraded over the next ten years
b) contain all the investments already decided and identify new investments which have to be executed in the next three years
c) provide for time frame for all investment projects

Regulation 347/2013 sets up guidelines for the timely development and interoperability of priority corridors and areas of trans-European energy infrastructure. In particular, this Regulation:

a) addresses the identification of projects of common interest necessary to implement priority corridors and areas falling under the energy infrastructure categories in electricity, gas, oil and carbon dioxide
b) facilitates the timely implementation of projects of common interest by streamlining, coordinating more closely, and accelerating permit granting processes and by enhancing public participation
c) provides rules and guidance for the cross-border allocation of costs and risk-related incentives for projects of common interest
d) determines the conditions for eligibility of projects of common interest for European Union financial assistance

The PCI projects in Ireland are outlined in Table 7-1:

Country	Project of Common Interest/Cluster of PCIs	Description of PCI/s relevant for the country concerned	Priority Corridor
Ireland	1.6. PCI France – Ireland interconnection between La Martyre (FR) and Great Island or Knockraha (IE)	A new 320 kV – 500 kV (depending on the technology, to be fixed at a later stage in detailed design studies) HVDC subsea connection of approximately 600 km and with a capacity of around 700 MW between Ireland and France (offshore).	**Electricity Northern Seas Offshore Grid (NSOG)**
Ireland	1.9. Cluster connecting generation from renewable energy sources in Ireland to United Kingdom, including one or more of the following PCIs: 1.9.1 PCI Ireland – United Kingdom interconnection between Co. Offaly (IE),	1.9.1.: Around 40 individual onshore wind farms, totalling 3GW, collected together through and underground private network in the midlands of Ireland, connected directly to the UK national grid via two 600 kV HVDC sub-sea cables of approximately 500 km and with a capacity of 5 GW	

Ireland	Pembroke and Pentir (UK) 1.9.2 PCI Ireland – United Kingdom interconnection between Coolkeeragh - Coleraine hubs (IE) and Hunterston station, Islay, Argyll and Location C Offshore Wind Farms (UK) 1.9.3 PCI Ireland – United Kingdom interconnection between the Northern hub, Dublin and Codling Bank (IE) and Trawsfynyd and Pembroke (UK) 1.9.4 PCI Ireland – United Kingdom interconnection between the Irish midlands and Pembroke (UK) 1.9.5 PCI Ireland – United Kingdom interconnection between the Irish midlands and Alverdiscott, Devon (UK) 1.9.6 PCI Ireland – United Kingdom interconnection between the Irish coast and Pembroke (UK)	in Wales (onshore and offshore). 1.9.2., 1.9.3.: An offshore interconnected electricity grid based on renewable resources (wind, wave and tidal, connecting 3200 MW) consisting of 850 km of HVDC interconnectors with a capacity of 500-1000MW in the northern area (offshore). 1.9.4., 1.9.5., 1.9.6.: Energy Bridge (EB) HVDC underground cable of +/- 320kV for the 1st circuit and +/- 500kV for 2 and 3, respectively, and with a total capacity of 5 GW. The length of the 3 circuits will be 290 km, 190 km and 129 km, respectively. The cable will route large amounts of renewable electricity generated in a series of interconnected Irish wind farms directly into the UK market (onshore and offshore).	**Electricity Northern Seas Offshore Grid (NSOG)**
Ireland	1.11. Cluster of electricity storage projects in Ireland and associated connections to United Kingdom, including one or more of the following PCIs: 1.11.1. Hydro-pumped storage in North West Ireland 1.11.2. Ireland – United Kingdom interconnection between North West Ireland (IE) and Midlands (UK) 1.11.3. Hydro-pumped (seawater) storage in Ireland – Glinsk 1.11.4. Ireland – United Kingdom interconnection between Glinsk, Mayo (IE) and Connah's Quai, Deeside (UK)	1.11.1.: Large Scale Hydro Storage facility with a daily capacity of 90 GWh (32850 GWh annually). 1.11.2.: A 320-400 kV HVDC underground cable interconnection of approximately 450km and with a capacity of 1200 MW between Ireland and the UK (onshore and offshore). 1.11.3.: Combined 1900 MW wind generation, with a 6.1 GWh (2226.5 GWh annually) storage in Glinsk, Mayo (IE). 1.11.4.: A 500kV HVDC VSC cable of 530 km (subsea Atlantic 75, cross country Ireland 222km, Irish Sea approx.230, 1-3 km onshore Pembroke) with a capacity of 1300 MW, connecting the combined wind generation and storage facility in Glinsk, Mayo (IE) to Connah's Quai, Deeside (UK) (onshore and offshore).	**Electricity Northern Seas Offshore Grid (NSOG)**
Ireland	2.13. Cluster Ireland – United Kingdom (Northern Ireland) interconnections, including one or more following Projects of Common Interest: 2.13.1. Ireland – United Kingdom interconnection between Woodland (IE) and Turleenan (UK – Northern Ireland) 2.13.2. Ireland – United Kingdom Interconnection between Srananagh (IE) and Turleenan (UK – Northern Ireland)	2.13.1.: A new 400 kV AC single circuit (OHL) of 140 km and with a capacity of 1,500 MVA between Turleenan 400/275 kV in Northern Ireland (UK) to Woodland 400/220 kV (IE) (onshore). 2.13.2.: A new 275 kV and partly 220 kV AC cross border circuit (OHL) of 196 km and with minimum capacities of 710 MVA and partly 431 MVA between Srananagh 220 kV station in Co. Sligo (IE) and Turleenan 400/275 kV station in Northern Ireland (UK) that will facilitate the integration of a planned wind generation of approximately 768 MW, which equates to 0.1 GW/1000km² (onshore).	**Electricity WEST**
	5.1. Cluster to allow bidirectional flows from Northern Ireland to Great Britain and Ireland and	5.1.1.: Physical reverse flow at the Moffat interconnection point, which is currently uni-	

Ireland	also from Ireland to United Kingdom including the following PCIs: 5.1.1. Physical reverse flow at Moffat interconnection point (Ireland/United Kingdom) 5.1.2. Upgrade of the SNIP (Scotland to Northern Ireland) pipeline to accommodate physical reverse flow between Ballylumford and Twynholm 5.1.3. Development of the Islandmagee Underground Gas Storage (UGS) facility at Larne (Northern Ireland)	directional, supporting forward flow only from UK to IE, the Isle of Man and Northern Ireland (onshore). The planned capacity is 38.5 GWh/d.	**Gas WEST**
Ireland	5.3. PCI Shannon LNG Terminal located between Tarbert and Ballylongford (Ireland)	Shannon LNG will deliver gas into the existing Bord Gáis Éireann owned national gas transmission network near Foynes, County Limerick in IE via a 26 km high pressure onshore pipeline (with a design pressure of 98 bars). The planned capacity is 117.7 GWh/d.	**Gas WEST**
Ireland	10.1. North Atlantic Green Zone Project (Ireland, UK / Northern Ireland): Lower wind curtailment by implementing communication infrastructure, enhance grid control and establishing (cross-border) protocols for Demand Side Management	A major cross border network infrastructure project delivering a 'smart grid'. This project comprising intelligent distribution networks with increased cross-border capability, overlaid with high speed communications, enabling operational excellence and leveraging the involvement of all users will be the blueprint for future network deployment on the island of Ireland, and across Europe.	**Smart Grids**

Table 7-1 Irish PCI projects[56]

EirGrid and Soni (System Operator for Northern Ireland) are jointly proposing a new high capacity electricity interconnector between the electricity networks of Ireland and Northern Ireland. This project is progressing and has been given PCI status. The North-South interconnector connecting Northern Ireland and Ireland will lead to a more secure, stable and efficient All-Island system.

EirGrid and its French counterpart, RTE (Reseau de Transport D'Electricite), have signed a Memorandum of Understanding to commission further preliminary studies on the feasibility of building a submarine electricity interconnector between Ireland and France. An Ireland-France interconnector would, if developed, run between the south coast of Ireland and the north west of France, and would comprise a cable length of approximately 600 kilometres. The capacity of the Ireland-France interconnector is expected to be approximately 700 MW and could be in place by 2025.

The Ten Year Network Development Plan (TYNDP) contains projects of European significance, some of which obtained Projects of Common Interest status in 2013 (see Table 7-2), as defined in Regulation 347/2013.

[56] http://ec.europa.eu/energy/infrastructure/pci/doc/2013_pci_projects_country.pdf

Project Name	TYNDP Project No
North South	81
Renewables Integration Development Project (RIDP)	82
Gridlink	83
Dunstown Woodland	84
Ireland GB Interconnector	106
Celtic Interconnector	107
Grid West	115
Greenwire IE - GB	185
Marex	228

Table 7-2 Proposed Interconnector & Common Interest Projects (Ireland)

7.1 European Market Integration

At the February 2011 European Council meeting, Member States committed to deliver a fully-functioning, interconnected and integrated internal energy market by 2014. The Communication on the Internal Energy Market published by the European Commission on 15 November 2012 highlighted the benefits of a truly integrated European market and identified the need for further action in a number of areas including consumer protection, enforcing the existing rules and investing in the modernisation of energy infrastructure.

In this context, a key focus for the CER during 2013 was to develop plans to integrate the SEM into this pan-European electricity market to promote cross-border competition and deliver significant benefits to consumers.

The EU "Target Model" for electricity evolved out of the EU's Third Energy Package in 2009, which is a set of legislative measures that aim to create a single competitive European energy market. The Agency for the Cooperation of Energy Regulators (ACER), established under the third Package of EU energy legislation, is coordinating the NRAs in drafting guidelines to further the integration of Member States' energy markets. These include methods for calculating interconnector capacity available across borders and determining appropriate market zones. One example is the area of the allocation of cross-border capacity in different timeframes namely forwards, day ahead and intraday.

7.2 SEM & Intra-Day trading

The introduction of intra-day congestion management arrangements is required under the Congestion Management Guidelines (as annexed to Regulation 714/2009/EC). This was the subject of infringement proceedings brought by the European Commission against Ireland and the UK in 2009 & 2010. Accordingly, the Regulatory Authorities in Ireland and Northern Ireland launched a project in 2010 to implement intra-day trading in the SEM and on the SEM interconnectors. The SEM Committee issued a decision letter on the final Modification to implement intra-day trading in the SEM on 14 February 2012.

The SEM Committee considers that introduction of intra-day trading in the SEM is a significant step forward in the efficient use of cross-border capacity as the level of wind generation increases on the island of Ireland.

This improvement in cross-border trading opportunities is also of importance to security of supply given that these trading arrangements will apply to both of the Interconnectors serving the island of Ireland. The full utilisation of capacity may be of security benefit within an Ireland-Britain context as it will facilitate the cross border flow of the most efficient energy sources whilst utilising the electricity interconnectors flexibly in accordance with market conditions.

7.3 North-South Tie-line

There is one major electricity transmission line between the Ireland and Northern Ireland (NI) electricity grids consisting of a 275 kV double circuit overhead line. This line is considered to be a tie-line rather than an interconnector because there is one wholesale market in Ireland and Northern Ireland. In addition, there are also two small 110 kV standby North-South tie-lines which allow the TSOs in Northern Ireland (SONI) and Ireland (EirGrid) to provide mutual short-term technical assistance.

EirGrid and SONI are jointly proposing a new high capacity electricity interconnector between the electricity networks of Ireland and Northern Ireland. The new line will be 138 km in length and will be 400 kV. This project is progressing and has been given PCI status.

7.4 Moyle Interconnector

The Moyle Interconnector connects the Northern Irish and Scottish electricity systems. The Interconnector contributes to the generation adequacy position in Northern Ireland and consequently, benefits the Irish system in terms of capacity adequacy. The Moyle Interconnector has a technical capacity of 450MW but is currently operating at 250MW. Full operation is expected to return from 2017.

In previous years the export capacity of Moyle from Ireland was contractually limited to 80 MW. However due to EU obligations pertaining to Article 15(2) of Regulation 714/2009 EC[57] this limitation has been extended to 295 MW[58]. The trading conditions for Moyle have also been altered and have been moved towards a computerised auction system. This allows the Interconnector to provide a greater variety of products of differing durations. Revised access rules also allow participants to acquire capacity close to the start of the tariff year to align with customer contracts. An auction platform of both Moyle and East-West Interconnector has been procured together. This will provide flexible and competitive trading rules that help to bolster supply security on an All-Island basis.

The Moyle Interconnector is part of a wide scale programme of infrastructure which allows Ireland to connect to a European wide programme of Interconnection. EirGrid published an Interconnection Economic Feasibility Report which reviewed the Moyle and East-West Interconnectors (detailed further below), from an economic and supply security perspective. The report concluded that the two interconnectors are integral to the island of Ireland energy market. The Report also concluded that a third Interconnector is economically viable in particular where ongoing renewables are connected onto the system.

7.5 East West Interconnector (EWIC)

The East-West Interconnector (EWIC) links the electricity transmission grids of Ireland and Great Britain. EWIC runs between Deeside in north Wales and Woodland, County Meath in Ireland. It is owned by EirGrid Interconnector Limited (EIL) a wholly owned subsidiary of EirGrid. The EWIC became fully operational in May 2013. The EWIC has bi-directional capacity of 500 MW and uses High Voltage Direct Current (HVDC) technology. With a power rating of 500 MW, it is the highest capacity link of its kind – based on voltage source converter (VSC) technology – to go into commercial operation. The EWIC consists of a 264 km cable, 187 km of which is beneath the Irish Sea. Figure 7-1 below sets out a schematic of the EWIC.

[57] "A general scheme for the calculation of total transfer capacity and the transmission reliability margin based on the electrical and physical features of the network" shall be published.

[58] Between September and April, 287MW May to August

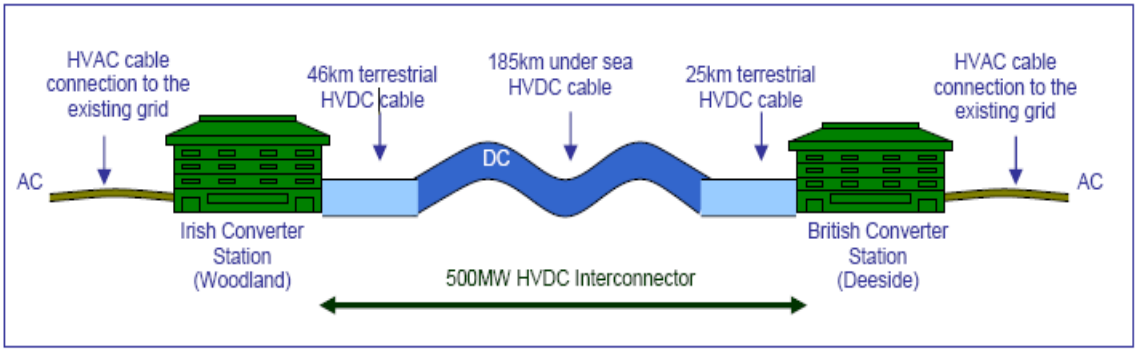

Figure 7-1 East West Interconnector Schematic (Source: EirGrid)

This Interconnector is of particular importance to overall energy policy and security in Ireland and within the EU. Specifically:

- energy security for a growing population both within Ireland and in the UK
- promotion of competition in the electricity sector, EWIC makes an additional 500 MW of bi-directional capacity available between Ireland and Britain
- encourages the growth of renewable energy in Ireland by encouraging excess energy to be exported to Great Britain
- allows a wider energy market that allows companies in both Ireland and Great Britain to sell to a larger market, this would help foster wider competition and increase security through diversification of generation sources

A study was carried out by the SEM examining the effect of EWIC on prices. The study examined the first six months of its operation, effectively rerunning the market schedule for those months and graphing market prices with, and without, EWIC in full operation. This report showed that on average EWIC reduced the System Marginal Price (SMP) by €4/MWh, or 8%, for those months[59].

7.5.1 Regional Interconnection Projects

Great Britain has 4GW of interconnection through four interconnectors – 2 GW of interconnector capacity with France (through the interconnector known as IFA), 1 GW to the Netherlands (BritNed) and two links of around 500 MW each to the Island of Ireland (Moyle and EWIC). IFA was developed in the mid-1980s. Moyle, which goes between Scotland and Northern Ireland, began operation in 2002 and is a mutualised company wholly owned by Northern Irish consumers. BritNed was developed as a merchant project jointly between National Grid Interconnector Limited[60] and TenneT, the Dutch TSO. It came online in 2011.

[59] http://www.eirgrid.com/media/Generation%20Capacity%20Statement%202014.pdf

[60] A commercial arm of National Grid plc.

The most recent interconnector to be developed was the East-West Interconnector between Wales and Ireland which became active in 2012 – a project undertaken by EirGrid and wholly underwritten by Irish consumers.

These projects allow for the interconnection of energy jurisdictions across Northern Europe. This greatly enhances security of supply by suitably absorbing the large volumes of wind capacity that are being connected to European grids as the region progresses towards a more sustainable energy future. This ensures that Ireland as an EU Member State contributes to the dual goals of renewable targets and to the development of a secure European supply system.

7.5.2 Regional Market Integration

Due to its centralised structure and gross mandatory pool design, it has been agreed that the SEM requires significant modifications in order to implement the Target Model. In recognition of the scale of the changes required to the SEM, it was granted a two-year derogation to implement the Target Model from 2014 to 2016.

In January 2012, the SEM Committee published a Consultation Paper seeking views on options for the implementation of the Target Model in Ireland and Northern Ireland in a manner that is consistent with national and EU policy objectives. In addition, the RAs hosted a number of industry workshops and engaged with a wide range of stakeholders including Government Departments, System Operators, Ofgem and ACER to discuss the issues involved in integrating SEM into the European market.

The SEM Committee published a proposed decision paper on the next steps in the process of market integration in November 2012 and a final decision paper in February 2013. The main conclusions of this decision paper include:

- the establishment of a set of high-level principles which will govern the design and implementation of the new market
- the establishment of project governance arrangements with strengthened stakeholder engagement to ensure that consumer groups and market participants are adequately involved in the project
- a commitment to maintaining the current structure of the SEM until 2016 and to carrying out an impact assessment on the new market design in line with best practice
- a working assumption that the new market will continue to be based on transparent, centralised trading arrangements with least-cost dispatch
- the total remuneration from energy payments, capacity payments and ancillary services will be sufficient to ensure security of supply

Following the publication of the Next Steps decision paper the RAs initiated the project to develop a new SEM High Level Design. As part of the development of the Consultation Paper, the RAs established a High Level Design (HLD) Review Group

consisting of experts from across the energy industry and consumer groups. The HLD Review Group met on four occasions from October 2013 to January 2014 and discussed various elements of the European Target Model and how SEM could be changed to meet its requirements.

In early February 2014 the SEM Committee published a consultation paper on the 'High Level Design for Ireland and Northern Ireland from 2016'. This consultation paper contains four distinct options for energy trading arrangements, including a qualitative assessment of each option against the High Level Design criteria. These four options allow full consideration of the choices facing the SEM in achieving compliance with the European Target Model. The consultation paper also contained a description of possible approaches to the explicit remuneration of capacity that can be used to support any of the four proposed options for the high-level energy trading arrangements. As per the Consultation Paper, the SEM Committee has named the new market to be in place from 2016 the Integrated SEM or I-SEM for short.

The SEM Committee published a Proposed Decision on the I-SEM High Level Design in June 2014. This will be followed by a final Decision on the High Level Design in August 2014, along with a full impact assessment. The I-SEM Project will then move to detailed design phase with go live of the new market planned for end 2016.

7.5.3 Framework Guidelines and Network Codes

The detailed rules of the Target Model are developed by the Agency for Cooperation of Energy Regulators (ACER) and the European Network of Transmission System Operators for Electricity (ENTSOE) and are finalised by the European Commission in conjunction with the Member States.

ACER initiates the process by developing Framework Guidelines in collaboration with the Member States' independent national regulatory authorities (NRAs). Based on these Framework Guidelines, ENTSOE develops detailed Network Codes. This is all done in consultation with stakeholders. The final Network Codes will be made into binding Regulations following a comitology process. More information on this process and the individual Framework Guidelines and Network Codes is available on the ACER and ENTSOE websites[61].
There are ten proposed Electricity Network Codes on:

- Capacity Allocation and Congestion Management (CACM)
- Requirements for Generators
- Electricity Balancing
- Forward Capacity Allocation

[61] https://www.entsoe.eu/major-projects/network-code-development/requirements-for-generators/Pages/default.aspx

- Demand Connection
- Operational Security
- Operational Planning and Scheduling
- Load Frequency Control and Reserves (LFCR)
- High Voltage Direct Current (HVDC)
- Emergency Planning

ACER finalised the last Framework Guideline in 2012 and therefore the focus during 2013 was on providing Reasoned Opinions on ENTSOE Network Codes. In addition to this, a number of Network Codes have entered the informal stages of the comitology process.

ACER issued Recommendations to the European Commission to adopt the Network Code CACM, the Network Code on Requirements for Generators, and the Demand Connection Code, in March 2013. The CACM Network Code entered the comitology process in December 2013.

In September 2013 the final Network Code on Operational Security and the final Network Code on Operational Planning and Scheduling were resubmitted to ACER by ENTSO-E, following amendments. ACER issued a positive reasoned opinion to the European Commission and a recommendation to adopt the Network Code on LFCR in the same month.

In October 2013 ENTSO-E delivered its draft Network Code on Forward Capacity Allocation to ACER. ACER published its Opinion on this Code, outlining a number of issues on which it considers adjustments are required in December 2013. The main issues raised by ACER in its response related to firmness of cross border capacity and timelines for implementation. ENTSOE is currently reviewing ACER and other stakeholders' comments with a view to resubmitting the code in 2014.

In December 2013, ENTSO-E delivered the Network Code on Electricity Balancing to ACER. ACER issued its opinion of the network code in April of this year, calling for a more ambition in harmonising and standardising balancing services across the EU.

7.5.4 EC Consideration of Generation Adequacy in the EU

In late 2012 the DG Energy published a Consultation Paper on generation adequacy in the EU in the context of their communication on the Internal Energy Market.

A key message of that Communication is the importance of allowing the market to work and ensuring that any interventions are well designed and effective. The consultation paper put forward for consideration potential criteria on assessing capacity remuneration mechanisms and other related interventions.

The European Commission subsequently published a Communication in November 2013 titled "Delivering the internal electricity market and making the most of public intervention". In the communication, the European Commission assessed the main features of public interventions to correct market failures and considered how they

can be designed or respectively adapted in order to increase their effectiveness. A key message in the Commission document was that well-designed, targeted and proportionate public intervention allows authorities to achieve their objectives without distorting markets beyond what is necessary.

Later in 2013, DG Competition published a Consultation Paper entitled "Draft Guidelines on Environmental and Energy State aid for 2014-2020". The draft guidelines consultation sought to set out the conditions under which state aid measures may be declared compatible with the internal market.

7.5.5 France – UK - Ireland (FUI)

In order to enable an efficient transition to the single European market, a number of regional initiatives were launched in 2006. These initiatives bring together Regulators, TSOs, the European Commission, Member States, industry and stakeholders to develop and implement common policies for the trading of electricity across borders in each region. Ireland is part of the France-UK-Ireland (FUI) region. The SEM Committee continues to progress work related to increasing electricity market integration with neighbouring jurisdictions in the FUI region. Key areas of cooperation include:

- liaison between Regulators on progress with implementation of the European Target Model and ensuring coordination between developments in energy and capacity market designs
- progress by TSOs in the region on developing more robust countertrading and balancing arrangements in region
- approval with access rules for East West and Moyle interconnectors including rules on curtailment and auctioning of capacity

Key Messages

- There are a number of projects with Project of Common Interest status in Ireland
- The two interconnectors – Moyle and EWIC – with a combined technical capacity of 950MW play a key role in Ireland's security of supply and the integration of the Irish market with the broader France-UK-Ireland market.
- Regional market integration and the implementation of the European Target Model is a priority work item for the SEM Committee. The new Integrated- SEM (I-SEM) will be implemented by 2016.
- The European Network Codes are progressing and are expected to a have a major impact on the functioning of the Irish of the electricity market.