London Research International

COUNTRY ASSESSMENT OF RENEWABLE ELECTRICITY SECTOR: IRELAND

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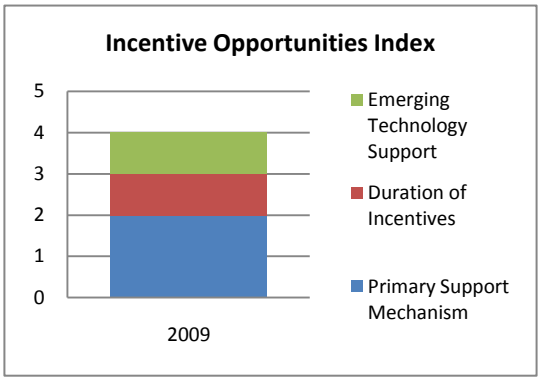
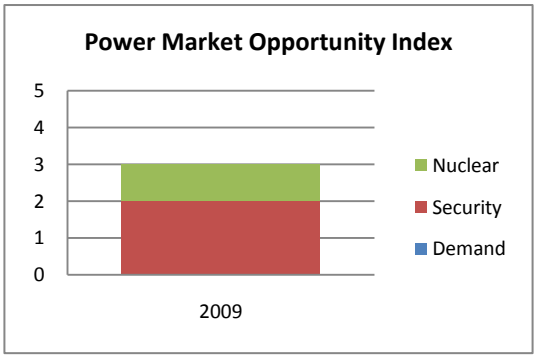
Executive Summary

Opportunities Indices

1. Incentive Opportunities Index	Value
Ireland has an incentive programme called the Renewable Energy Feed-in Tariff. The program, however, is similar to a variable premium, since renewable power generators must secure a power purchase agreement with a supplier. There is additional support specifically for offshore wind, wave and tidal power.	**4/5**



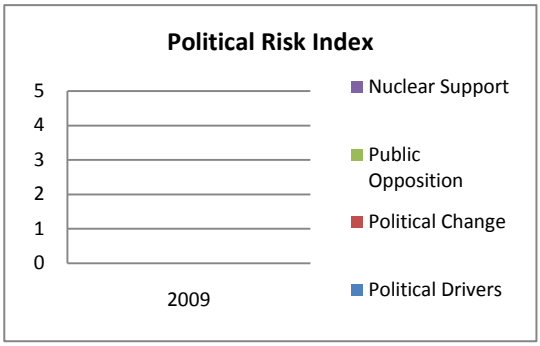
2. Power Market Opportunities Index	Value
Power demand will continue to grow in Ireland. However, because of the building of interconnectors with Continental Europe and the UK, together with the opening of an all-Ireland Single Electricity Market, there will not be a projected capacity shortage by 2020.	**3/5**



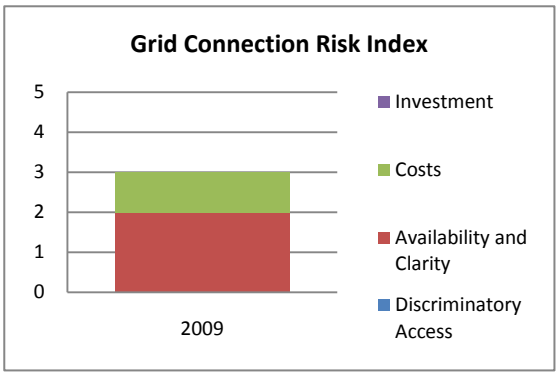
3. Technology Opportunities Index	
Established Technologies Technologies that have been established in the country with sufficient resources.	Onshore wind, Biomass
Emerging Technologies Technologies that have growth potential in the country.	Offshore wind, Wave/tidal power

Risk Indices

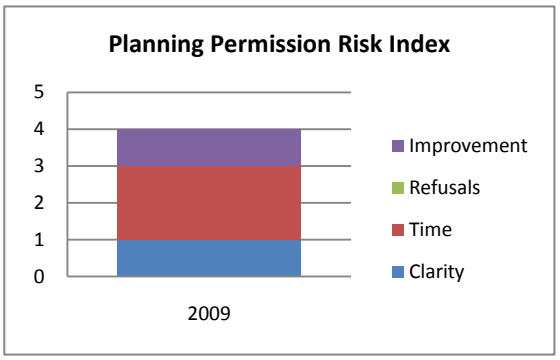
4. Political Will Risk Index	Value
All major parties provide strong political support for the development of renewable energy.	**0/5**



5. Grid Connection Risk Index	Value
Lack of grid capacity and high transmission tariffs are hindering renewable power development.	**3/5**



6. Planning Permission Risk Index	Value
Complicated procedures are causing long delays in the planning process. The government is planning to reform the planning system. However, as of early 2009, nothing specific has been announced.	**4/5**



1.1 Introduction

As an EU member state, Ireland has renewable energy and greenhouse gas emissions reductions targets. Ireland has good resources for renewable energy deployment, particularly wind and wave and tidal power, but the sector has not developed as quickly as might be expected. Increased interconnectors with Great Britain and Northern Ireland will increase the market size.

Indices

In order to measurably assess the current status and investment climate of the renewable electricity sector in different countries, we have developed six primary indices for categorising opportunity and risk in the renewable electricity sector: incentive, power market and technology as the opportunities indices; and political will, grid connection and planning permission as the risk indices. We have further established a series of sub-indices or measures to provide a comparative value for each of the critical features of the primary indices except the technology index. The specific structure and details of the indices and sub-indices are provided below.

Opportunities Indices

1. Incentive Opportunities Index: How attractive to investors and developers are the government's incentives for renewable electricity development?
2. Power Market Opportunities Index: How much demand is there or will there be for renewable electricity?
3. Technology Opportunities Index: What types of renewable electricity technologies are already established and which are emerging in the market concerned?

Measures are set for the first two indices to give a quantitative (ordinal) scale from a total of zero to five, with five being the most encouraging for renewable electricity development. Those measures are as follows:

1. Incentive Opportunity Index (maximum 5 points)

Measures	Description
Primary Support Mechanism	Three points for a feed-in tariff (FIT), two points for a premium, and one point for tradable green certificates (TGCs). *This is considered from the viewpoint of predictability of cash flow from renewable power projects. Feed-in tariff systems provide a guaranteed buyer and price. Premium systems provide a supplementary payment per unit of electricity sold by a renewable power generator on the wholesale market. Tradable green certificate systems provide revenues from wholesale electricity and certificate markets.*
Duration of Incentives	One point if the incentives provided by the primary support mechanism are secure for a reasonable period (10 years as a base).
Emerging Technology Support	One point if the primary support mechanism provides greater relative support for the development of emerging technologies. *A primary support mechanism that includes provisions to help develop emerging technology (offshore wind, solar PV, anaerobic digestion for biogas and other similar technologies) demonstrates a long-term commitment to the development of renewable electricity.*

2. Power Market Opportunity Index (maximum 5 points)

Measures	Description
Demand	Two points if there is a predicted need for additional generating capacity of more than 20 per cent of current capacity by 2020, and one point if there is a predicted need of between 10 and 20 per cent. *A measure of the amount of additional generating capacity that will be required by 2020.*
Security	Two points if there are no significant or declining indigenous energy sources for power (including nuclear), and one point if indigenous energy sources are stable while imports are increasing to meet demand. *The greater the reliance on imported energy sources, the greater the need for renewable energy development to improve energy security.*
Nuclear	One point if there is an expected decrease of nuclear capacity with no plan of replacement. *If nuclear power plants are decommissioned, there will be an increased need for non-greenhouse gas-emitting power plants.*

3. Technology Opportunity Index

Measures	Description
Established Technologies	Established technologies in the country with sufficient resources. *The technologies which have been sufficiently developed and that are best suited to the conditions in the country, based on resource availability. Established technologies generally refer to onshore wind, small hydro, solid biomass combustion, landfill gas, sewage gas, etc.*
Emerging Technologies	Emerging technologies that have growth potential in the country. *The technologies which have potential in the country but have not developed sufficiently and thus require substantial financial incentives to grow. Emerging technologies generally refer to offshore wind, wave and tidal, solar PV, concentrated solar, advanced conversion forms of biomass, etc.*

Risk Indices

1. Political Will Risk Index: How committed is the government in question to meeting its pledged targets on renewable energy and electricity and how stable is renewable electricity development on the political agenda?
2. Grid Connection Risk Index: How serious is the problem of grid connection for renewable electricity installations?
3. Planning Permission Risk Index: How serious is the problem of securing planning permission for renewable electricity installations?

Again, measures are set for each of the three indices to give a quantitative (ordinal) scale from a total of zero to five, with five being the highest level of risk involved in investing in renewable electricity in the market concerned. Those measures are as follows:

4. Political Will Risk Index (maximum 5 points)

Measures	Description
Political Drivers	Two points if politically committed targets for renewable energy and GHG emissions reductions are projected to be met, thereby reducing the future need for renewable energy expansion. One point if it is unclear as to whether a country can meet its targets, thereby creating some uncertainty of the future need for renewable energy expansion. *If the government meets its commitments, then it may reduce the level of effort to promote renewable energy development.*
Political Change	One point if political change brought about by major opposition parties could negatively affect renewable electricity development.
Public Opposition	One point if there is a sign that the general public is becoming apathetic about or less supportive of renewable electricity because they have come to think that the targets are unattainable or because they are unwilling to pay an additional cost for supporting renewable electricity development.
Nuclear Support	One point if there is a lack of significant opposition to nuclear expansion or if the government or general public becomes more supportive of nuclear power.

5. Grid Connection Risk Index

Measures	Description
Non-Discriminatory Access	One point if the transmission function is not legally separated from generation. *If the transmission system operator is controlled by an incumbent, it may be difficult for new generators to obtain non-discriminatory access to the transmission grid.*
Availability and Clarity	Two points if capacity constraints are leading to substantial delays or if there is a lack of information about grid capacity availability. This is reduced to one point if preferential access is given to renewable electricity.
Costs	One point if developers have to pay for all grid-enhancement work, or if the fees for grid connections or balancing are clearly higher than those in other EU countries.
Investment	One point if additional resources to enhance the grid to allow connection of renewable electricity development projects are not being invested.

6. Planning Permission Risk Index (maximum 5 points)

Measures	Description
Clarity	One point if there is a lack of coordination between relevant government offices or if the complexity of approval procedures is widely acknowledged as a problem. *Complex planning procedures lead to significant delays and costs during the planning process.*
Time	Two points if it normally takes more than one year to obtain approval and the situation is deteriorating (within one year is considered best practice by the industry). One point if it normally takes more than one year, but the situation is improving.
Refusals	One point if refusal rates are rising or local opposition is clearly delaying projects.
Improvement	One point if the government is not trying to improve planning procedures even if they are known to be a problem. *Without government intervention, particularly in local approval procedures, problems with issuing permits could worsen as more development projects seek permission.*

The multiple measures explained above do not necessarily cover all the dimensions of each index in an exhaustive or exclusive manner, and each measure does not possess an equal level of importance to the index concerned. However, the use of the multiple measures significantly increases the accuracy and transparency of the evaluation of each index.

1.2 Incentive Opportunities Index

Measure		Value	
Primary Support Mechanism	Three points for a feed-in tariff (FIT), two points for a premium, and one point for tradable green certificates (TGCs). *This is considered from the viewpoint of predictability of cash flow from renewable power projects. Feed-in tariff systems provide a guaranteed buyer and price. Premium systems provide a supplementary payment per unit of electricity sold by a renewable power generator on the wholesale market. Tradable green certificate systems provide revenues from wholesale electricity and certificate markets.*	2	**4/5**
Duration of Incentives	One point if the incentives provided by the primary support mechanism are secure for a reasonable period (10 years as a base).	1	
Emerging Technology Support	One point if the primary support mechanism provides greater relative support for the development of emerging technologies. *A primary support mechanism that includes provisions to help develop emerging technology (offshore wind, solar PV, anaerobic digestion for biogas and other similar technologies) demonstrates a long-term commitment to the development of renewable electricity.*	1	

1.2.1 Feed-in Tariff

Since 30 May 2005, all renewable power installations in Ireland have benefited from a programme called the Renewable Energy Feed-in Tariff (REFIT). Although the programme is referred to as a feed-in tariff (FIT), the Irish REFIT is different from ordinary FIT systems in use throughout Europe. In general, it is more similar to the variable premium schemes adopted in some other EU member states than a FIT. Under the REFIT, electricity suppliers and renewable electricity generators negotiate a power purchase agreement (PPA), including a sales price, directly between them. The government then commits to providing support to the electricity suppliers to compensate them for purchasing the higher-priced renewable electricity. This compensation is based on the difference between a government-set reference price and the wholesale electricity price.

The REFIT differs from other FIT systems because the terms of the electricity sale are decided in bilateral negotiations between generators and suppliers and there is no legislated compulsory purchase obligation found in ordinary FITs such as those used in Germany or Spain. While the PPA can, and often does, include a "take-or-pay" clause, it is not compulsory.[1]

The REFIT applies to generators that begin operation prior to 2010. The tariff rates are adjusted yearly based on the consumer price index. The rates are available for 15 years or until 2024, whichever comes first. In 2008, the government expanded the REFIT to include offshore wind, wave and tidal power (see Table 1.1). The REFIT programme aims to support an initial target of at least 400 MW of new renewable power capacity. It is projected that the programme will support 55 renewable power plants at a cost of EUR 119 million over 15 years.[2] As of early 2009, there are no plans for an incentive programme after 2010, when the REFIT ends.

[1] Department of Communications, Energy and Natural Resources, REFIT Clarifications, January 2009. Available at <www.dcenr.gov.ie>.
[2] European Commission, *Ireland – Renewable Energy Fact Sheet*. Available at <http://ec.europa.eu/energy/energy_policy/doc/factsheets/renewables/renewables_ie_en.pdf>.

The government has announced a new law to promote renewable source microgeneration (up to 50 kW) that will provide a tariff rate of 190 EUR/MWh for the first 4,000 microgeneration installations over the next three years. The government has also made microgeneration projects exempt from some planning requirements.[3] Currently, The Electricity Supply Board (ESB) Customer Supply and ESB Networks (the distribution systems operator) offer a support initiative rate for domestic microgenerators for their export electricity.

Table 1.1: Reference prices for REFIT in Ireland for projects commissioned in 2008 and 2009 (EUR/MWh)

Category	Reference price (EUR/MWh)
Large onshore wind energy (>5 MW)[a]	63.739
Small onshore wind energy (≤5 MW)[a]	65.976
Biomass (landfill gas)[a]	80.513
Other biomass technologies and hydro (≤5 MW)[a]	78.276
Offshore wind[b]	140
Ocean energy (wave and tidal)[c]	220

Source: [a] Department of Communications, Energy and Natural Resources, REFIT Clarifications, January 2009. Available at <www.dcenr.gov.ie/NR/rdonlyres/67F3BEFB-FAE2-443A-A93E-93C6DEE7485F/32331/REFITclarificationsfinal2.doc>; [b] Department of Communications, Energy and Natural Resources, Minister Ryan Launches new Price Support for Offshore Wind, 8 February 2008. Available at <www.dcenr.gov.ie/Press+Releases/2008/Minister+Ryan+launches+new+price+support+for+offshore+wind.htm>; [c] Department of Communications, Energy and Natural Resources, Minister Ryan Launches Major New Ocean Energy Initiative, 15 January 2008. Available at <www.dcenr.gov.ie/Press+Releases/2008/Minister+Ryan+launches+major+new+Ocean+Energy+initiative.htm>.

1.2.2 Investment Support

In addition to the REFIT, the government offers the following investment subsidies:

- Corporate equity investments in RE projects are eligible for tax relief in the form of deductions from the company's profits for an investment in a qualifying company. This tax relief is capped at 50 per cent of all investments for a single project. This programme has recently been extended to 2011.
- Private investors that invest in new and small RE companies and hold the investment for a minimum of five years can benefit from tax relief, at their marginal tax rate, for investments up to a limit of EUR 150,000 per year. This programme is due to run until 2013.[4]
- The Irish government is investing EUR 149 million into energy research between 2007and 2013. A large proportion of this will be used for funding research in marine energy.[5]

The government is also investing in additional support programmes for marine energy. From 2008 to 2011, EUR 26 million will be invested in wave and tidal power. In 2008, the following were the main investments:

- The government spent EUR 1 million at the University College of Cork to upgrade the National Wave Basin Facility to aid in the design of new technologies.

[3] Department of Communications, Energy and Natural Resources, Minister Ryan Announces Incentives for Micro-Generation, 26 February 2009. Available at < www.dcenr.gov.ie/Press+Releases/People+power+-+Minister+Ryan+announces+incentives+for+micro-generation.htm>.
[4] Sustainable Energy Ireland, Policy Support Mechanisms. Available at <www.sei.ie/Renewables/Renewable_Energy_Policy/Policy_Support_Mechanisms/>.
[5] Government of Ireland, National Development Plan 2007-2013. Available at <www.ndp.ie/documents/NDP2007-2013/NDP-2007-2013-English.pdf>.

- EUR 2 million was provided to support the development of a full-scale grid-connected wave energy facility at Annagh, County Mayo.
- The Ocean Energy Prototype Fund was established with EUR 2 million. The fund will be dispersed on a competitive basis.
- A further EUR 500,000 was provided for Sustainable Energy Ireland to set up an Ocean Energy Development Unit to coordinate research and development.[6]

The Irish government also has grant schemes for microgeneration in homes and public buildings.[7]

1.3 Power Market Opportunities Index

Measure		Value	
Demand	Two points if there is a predicted need for additional generating capacity of more than 20 per cent of current capacity by 2020 (based on the EU baseline scenario), and one point if there is a predicted need of between 10 and 20 per cent. *A measure of the amount of additional generating capacity that will be required by 2020.*	0	**3/5**
Security	Two points if there are no significant or declining indigenous energy sources for power (including nuclear), and one point if indigenous energy sources are stable while imports are increasing to meet demand. *The greater the reliance on imported energy sources, the greater the need for renewable energy development to improve energy security.*	2	
Nuclear	One point if there is an expected decrease of nuclear capacity with no plan of replacement. *If nuclear power plants are decommissioned, there will be an increased need for non-greenhouse gas-emitting power plants.*	1	

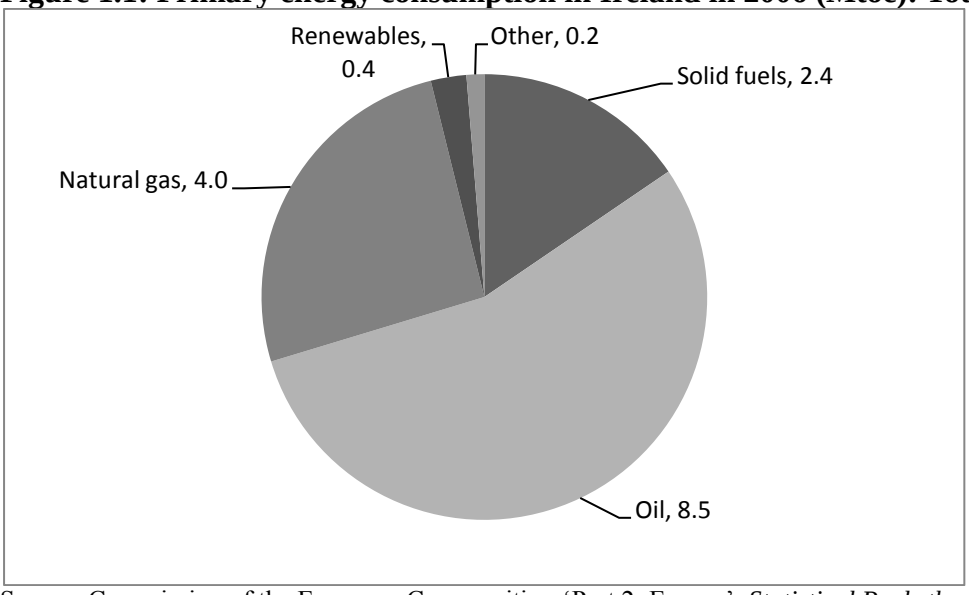
1.3.1 Energy Consumption

Ireland's primary energy consumption was 15.5 million tonnes of oil equivalent (Mtoe) in 2006, the majority of which was in the form of oil and natural gas (see Figure 1.1). Primary energy consumption increased at a compound annual growth rate (CAGR) of 1.3 per cent between 2000 and 2006.[8] Since 1990, dependency on imported energy sources has more than doubled, mainly as a result of decreased production of indigenous fossil fuels along with rising consumption. Consequently, import dependency in Ireland increased to 89 per cent in 2007.[9]

Final energy consumption in Ireland during 2006 was 13.0 Mtoe, of which 0.2 Mtoe, or 1.5 per cent, came from RE. Final energy consumption increased at a CAGR of 3.4 per cent between 2000 and 2006.[10]

[6] Department of Communications, Energy and Natural Resources, Minister Ryan Launches Major New Ocean Energy Initiative, 15 January 2008. Available at <www.dcenr.gov.ie/Press+Releases/2008/Minister+Ryan+launches+major+new+Ocean+Energy+initiative.htm>.
[7] For more information see Sustainable Energy Ireland at <www.sei.ie/Grants/Microgenpilot>.
[8] Commission of the European Communities. 'Part 2: Energy', *Statistical Pocketbook 2009*. Available at <ec.europa.eu/energy/publications/doc/statistics/part_2_energy_pocket_book_2009.pdf>.
[9] Sustainable Energy Ireland, Energy in Ireland: Key Statistics 2008, December 2008. Available at <www.sei.ie>.
[10] Commission of the European Communities. 'Part 2: Energy', *Statistical Pocketbook 2009*. Available at <ec.europa.eu/energy/publications/doc/statistics/part_2_energy_pocket_book_2009.pdf>.

Figure 1.1: Primary energy consumption in Ireland in 2006 (Mtoe): Total 15.5 Mtoe



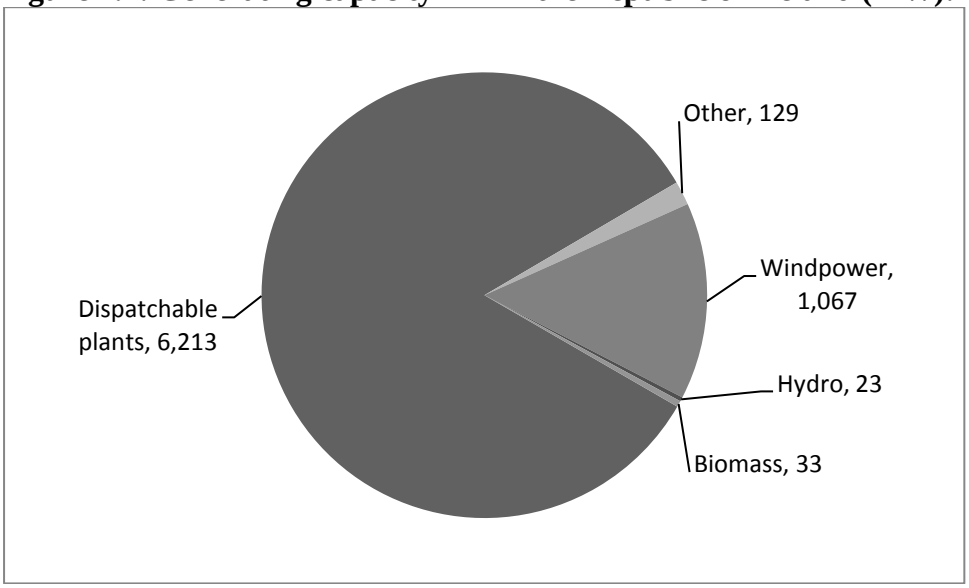
Source: Commission of the European Communities, 'Part 2: Energy', *Statistical Pocketbook 2009*, 10 February 2009. Available at <ec.europa.eu/energy/publications/statistics/statistics_en.htm>.

1.3.2 Electricity Sector

In 2007, the Republic of Ireland and Northern Ireland introduced a pooling arrangement of their power markets to create an all-Ireland Single Electricity Market (SEM) which functions as a single wholesale market. After 2012, power demand and supply will be fully shared and issues such as supply security will be dealt with on an all-island basis.

In the Republic of Ireland, total installed capacity was 7,465 MW at the end of 2008. The total installed dispatchable generating capacity was 6,213 MW (including 200 MW from interconnectors), while the non-fully dispatchable capacity amounted to 1,252 MW (see Figure 1.2). The system's peak demand was recorded in December 2007 at 5.1 GW.

Figure 1.2: Generating capacity mix in the Republic of Ireland (MW): Total 7,465 MW



Note: Dispatchable plants include large fossil-fuel fired plants and large hydro.
Source: EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.

Electricity demand has grown by approximately 2 per cent a year for the last decade. Peak demand is projected to rise to 6.4 GW by 2015. Fully dispatchable generating capacity is projected to fall by about 1.5 GW to just over 6 GW by 2012. It is difficult to project the potential capacity gap after 2012 as new interconnectors between Northern Ireland and the Republic of Ireland will result in fully sharing demand and supply in the SEM. In the all-island system, peak demand is projected to be between 7.5 GW and 8.4 GW by 2015 and the total installed capacity is projected to be just under 13 GW at the same point in time.[11]

The system's capacity margins are projected to tighten around 2012, as two gas-fired plants should be retired that year, but by 2013 the system margin is projected to increase as a result of the full implementation of the SEM (see Table 1.2). A 500-MW DC interconnector known as the East-West Interconnector, running from Ireland to Great Britain, is under construction and is expected to be completed by 2012.[12]

Table 1.2: Projected growth in generating capacity of the Republic of Ireland's system until 2012 and in the all-island system from 2013 to 2015 (MW)

Description			2008	2009	2010	2011	2012	2013[b]	2014[b]	2015[b]
Total fully dispatchable plants[a]			6,213	6,591	6,812	6,812	6,004	9,002	8,830	8,830
Non fully dispatchable plants[a]	Republic of Ireland	Wind	1,067	1,248	1,429	1,723	2,017	2,311	2,606	2,900
		Small hydro	23	24	24	24	24	24	24	24
		Biomass	33	39	46	52	58	65	71	77
		Other	129	134	139	144	149	154	159	164
	Total Northern Ireland		N/A	N/A	N/A	N/A	N/A	865	912	968
Total			7,465	8,036	8,450	8,755	8,252	12,412	12,602	12,963
System's capacity margin[c]			1,100	456	635	764	28	1,312	952	860

Note: N/A: Not applicable.
[a] Fully dispatchable plants include large fossil-fuel plants, large hydropower and interconnectors. Non-fully dispatchable plants include small hydro and other forms of renewable power.
[b] From 2013, figures are given for the all-island system.
[c] Based on the 'median' assessment by EirGrid.
Source: EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.

Electricity consumption in the Republic of Ireland in 2008 was 26,184 GWh, an increase of approximately 2 per cent from 25,643 GWh in 2007.[13] Over half of total net generation of 29,016 GWh, approximately 15 GWh, came from gas-fired generation. Gas-fired generation has grown quickly in Ireland. In 1990, it was approximately 25 per cent of gross power generation. By 2008 the figure had risen to approximately 50 per cent. The growth of gas-based generation has been largely at the expense of coal and oil-fired generation, leading to a significant drop in the carbon intensity of the power sector.[14] It is projected that a total

[11] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[12] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[13] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[14] Sustainable Energy Ireland, Renewable Energy in Ireland, 2008. Available at <www.sei.ie/Publications/Statistics_Publications/SEI_Renewable_Energy_2008_Update/Renewable Energy Update 2008.pdf>.

generation of 36.4 GWh will be needed to meet demand in Ireland by 2015. Electricity demand of the all-island system is projected to be between 42.7 GWh and 47.5 GWh by 2015.[15]

Under the EU's baseline (business-as-usual) scenario, prepared in January 2008, before the current economic recession, gross electricity generation is projected to increase at a CAGR of 1.4 per cent a year between 2008 and 2020, ultimately reaching 34.2 TWh in 2020. Gas and wind power will provide most of the increase in generation. Renewable electricity is projected to be 15.6 per cent of gross generation, compared to 9.4 per cent in 2007.[16]

The largest generator in Ireland is the Electricity Supply Board (ESB), which is 95 per cent owned by the state. ESB controls 4,651 MW of installed capacity in the country, almost two-thirds of the total installed capacity in 2008.[17]

1.3.3 Nuclear Power

Nuclear power development is prohibited under the 1999 Electricity Regulation Act,[18] although nuclear power is imported from the UK through the existing interconnectors. Recently there have been calls for a review of that policy by the government, but as of early 2009, no decision had been made whether such a review would be carried out.[19]

1.4 Technology Opportunities Index

Measure		Technology
Established Technologies	Established technologies in the country with sufficient resources. *The technologies which have been sufficiently developed and that are best suited to the conditions in the country, based on resource availability. Established technologies generally refer to onshore wind, small hydro, solid biomass combustion, landfill gas, sewage gas, etc.*	Onshore wind, Biomass
Emerging Technologies	Emerging technologies that have growth potential in the country. *The technologies which have potential in the country but have not developed sufficiently and thus require substantial financial incentives to grow. Emerging technologies generally refer to offshore wind, wave and tidal, solar PV, concentrated solar, advanced conversion forms of biomass, etc.*	Offshore wind, Wave/tidal power

1.4.1 Renewable Electricity Generation

Wind power, most of which is onshore, has seen the fastest growth rate of all renewable power technologies since 2000 (see Table 1.3). In 2007, the last year for which detailed figures are available, 9.4 per cent of electricity consumption was met by renewable electricity.[20] The total contribution of renewable electricity to the country's gross electricity consumption has increased by 296 per cent since 1990, at a CAGR of 8.4 per cent (see Table 1.4).

[15] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[16] P. Capros, L. Mantzos, V. Papandreou, N. Tasios, Model-based Analysis of the 2008 EU Policy Package on Climate Change and Renewables: Appendix 1 Baseline scenario, January 2008. Available at <ec.europa.eu/environment/climat/pdf/climat_action/analysis_appendix.pdf>.
[17] For more information see the ESB website at <www.esb.ie>.
[18] Office of the Attorney General, Irish Statute Book, *Electricity Regulation Act.* Available at <www.irishstatutebook.ie/1999/en/act/pub/0023/print.html>.
[19] 'Nuclear Debate', Independent (Ireland), 11 January 2008. Available at <www.independent.ie/opinion/editorial/nuclear-debate-1262687.html>.
[20] Sustainable Energy Ireland, Energy in Ireland: Key Statistics 2008, December 2008. Available at <www.sei.ie>.

Table 1.3: Total installed capacity of renewable electricity power generation in Ireland from 1990 to 2007 (MW)

Technology	2000	2005	2006	2007	CAGR 2000-2007 (%)
Wind	117	495	746	783	31.2
Hydro (all)	236	234	234	235	-0.1
Biomass	12	18	25	27	12.3
Total	365	747	1,005	1,045	16.2

Source: Sustainable Energy Ireland, Energy Policy Statistical Support Unit, *Renewable Energy in Ireland 2008 Report*. Available at <www.sei.ie/Publications/Statistics_Publications/SEI_Renewable_Energy_2008_Update/Renewable%20Energy%20Update%202008.pdf>.

Table1.4: Renewable electricity generation from 1990 to 2007 in Ireland (GWh)

Source	1990	1995	2000	2005	2006	2007	CAGR
Hydro (all)	697	713	847	361	724	667	-0.6
Wind	0	16	244	1,112	1,622	1,958	232.6
Solid biomass	0	0	0	8	8	13	27.5
Landfill gas	0	0	95	106	108	102	2.4
Biogas	0	0	0	16	12	17	3.1
Total	697	729	1,186	1,873	2,475	2,757	8.4
Share of gross electricity consumption	4.9%	4.2%	4.9%	6.8%	8.6%	9.4%	N/A

Notes: N/A: Not applicable.
Source: Sustainable Energy Ireland, Energy in Ireland: Key Statistics 2008, December 2008. Available at <www.sei.ie/Publications/Statistics_Publications/EPSSU_Publications/Energy_in_Ireland_Key_Statistics/Energy_in_Ireland_Key_Statistics_2008.pdf>.

1.4.2 Resource Potential

The potential for solar power development in Ireland is relatively low given its solar irradiation levels. On average, the country receives between 1,100 to 1,200 kWh/m2 of solar irradiation a year, which is similar to northern Germany or Denmark.[21] On the other hand, Ireland has some of the best wind resources in Europe. The western and north-western coastal region of the country has an average wind speed of over 11.5 m/s on hills and ridges, and eastern coastal regions have wind speeds of 10.0 to 11.5 m/s on hills and ridges.[22]

Ireland has great potential for biomass- and biogas-based energy production. The agricultural industry is large, and much of the agricultural waste could be used for energy production (e.g., straw waste, manure, slurry, and tallow). Ireland also has a good climate for growing dedicated energy crops. It is estimated that 10 per cent of Ireland's primary energy consumption could be met through biomass by 2020.[23]

Ireland has considerable potential for wave and tidal power development. The deepwater wave power off the west coast of Ireland is 60-70 kW/m of wave crest, one of the highest in

[21] Šúri M., Huld T.A., Dunlop E.D. Ossenbrink H.A., 2007. Potential of solar electricity generation in the European Union member states and candidate countries. *Solar Energy*, 81, 1295–1305, 2007. Available at <re.jrc.ec.europa.eu/pvgis>.
[22] Riso National Laboratory, European Wind Atlas. Available at <www.windatlas.dk>.
[23] Sustainable Energy Ireland, What is Biomass? Available at <www.sei.ie/uploadedfiles/RenewableEnergy/REIOBiomassFactsheet.pdf>.

Europe. There is potential for 30 GW of wave power off the west coast of Ireland.[24] The north-east and the east coasts have good potential for tidal power development, with tidal ranges in excess of 2 m/s.[25]

In 2008, an EU-sponsored report presented a balanced scenario for every member state to meet its EU 2020 RE target. The scenario is based on the resource availability in the country and future efficiency increases, while only currently available technologies in the country are considered. It is also assumed that governments would pursue pro-active energy policies to promote RE development. Under this scenario, Ireland's renewable electricity generation potential for 2020 is projected to be 12.5 TWh in 2020, compared to 2.8 TWh in 2007. This figure will represent over 37.3 per cent of gross electricity demand of the year (see Table 1.5). Wind is projected to have the largest potential.[26]

Table 1.5: Potential renewable electricity deployment in Ireland in 2020 under the EU's balanced scenario (TWh)

Technology	Potential generation in 2020 (TWh)[a]	Generation in 2007 (TWh)[b]	CAGR required between 2007 and 2020 (%)
Biogas	1.9	0.02	42.0
Biomass (including waste)	2.5	0.01	52.9
Hydro	0.8	0.7	1.0
Solar PV	0.2	0.0	N/A
Onshore wind	2.8	2.0	9.2
Offshore wind	3.5		
Wave and tidal	0.8	0.0	N/A
TOTAL	12.5	2.8	12.2

Note: N/A: not applicable
Source: [a] Futures-e, 20% RE by 2020: A Balanced Scenario to Meet Europe's RE Target, July 2008. Available at <www.futures-e.org>; [b] See Table 1.4 above. Numbers do not add up due to rounding.

1.4.3 Levelised Generation Costs

Table 1.6 compares the generation compensation in Ireland and levelised generation costs in the EU for different generating technologies. The rates offered under the Irish REFIT programme provide sufficient generation compensation to offshore wind and probably some forms of biomass generation. The REFIT rate for wind power seems to be insufficient. However, it is likely to be sufficient when other factors are considered, such as investment incentives and good wind resources in Ireland, as well as the evidence of large growth in wind power in recent years.

[24] IEA Ocean Energy, Wave and Marine Current Energy, 2003. Available at <www.iea-oceans.org/_fich/6/IEA-OES_Wave_and_Tidal_report.pdf>.
[25] Garth Bryans, Feasibility of Tidal Energy on the Irish Grid System. Available at <www.sei.ie>.
[26] Futures-e, 20% RE by 2020: A Balanced Scenario to Meet Europe's RE Target, July 2008. Available at <www.futures-e.org>

Table 1.6: Comparison of the Irish REFIT programme rates and levelised generation costs in the EU in 2007 (EUR/MWh)

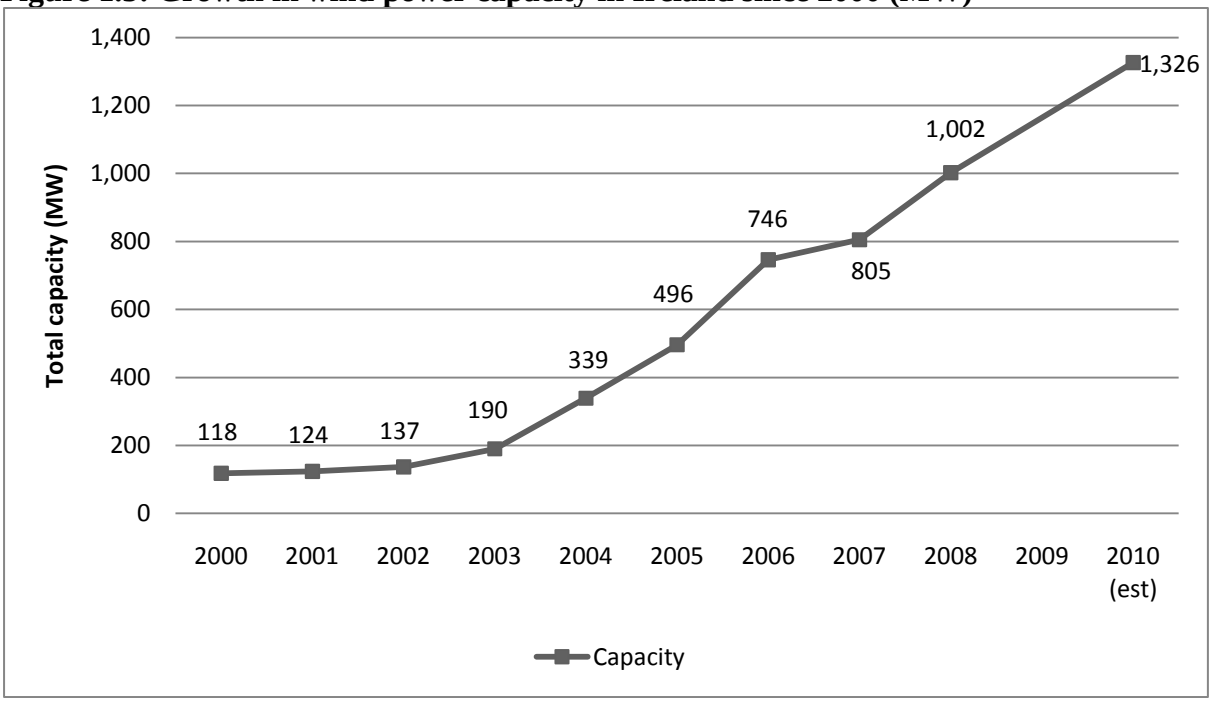
Technology	REFIT rate[a]	Levelised generation cost in 2007[b,c]
Onshore wind (> 5 MW)	63.739	75-110
Offshore wind	140	85-140
Landfill gas	75-90	55-215
Solid biomass	49	80-195
Wave and tidal	220	N/A

Notes: N/A: Not Available.
[b] 2007 costs of a state-of-the-art facility in the EU, expressed in constant 2005 price.
Sources: a See Incentives Opportunities Index above.
[c]"Levelised generation costs in 2007 (under High Fuel Scenario)," Commission of the European Communities, Second Strategic Energy Review: Energy Sources, Production Costs and Performance of Technologies for Power Generation, Heating and Transport, November 2008. Available at <ec.europa.eu/energy/strategies/2008/doc/2008_11_ser2/strategic_energy_review_wd_cost_performance.pdf>.

1.4.4 Wind Power

Wind power has seen the largest increase in installed capacity of all renewable energy in Ireland, growing from 118 MW in 2000 to 1,002 MW in 2008, at a CAGR of 30.7 per cent. Wind power has been the focus of renewable power policies and targets, and as such it has received the largest slice of research, development and demonstration funding for renewable energy.[27] Figure 1.3 shows the growth of wind power in Ireland.

Figure 1.3: Growth in wind power capacity in Ireland since 2000 (MW)



Source: The European Wind Energy Association, Pure Power – Wind Energy Scenarios up to 2030, March 2008. Available at <www.ewea.org>.

[27]Irish Energy Research Council, *An Energy Research Strategy for Ireland*, March 2008. Available at <www.dcenr.gov.ie/NR/rdonlyres/2DAEBBFF-6162-4D88-8220-654E2E9ED2B1/30799/EnergyResearchStrategyApril2008.pdf>.

Of the 915 MW of wind power connected to the grid as of September 2008, just under half, 422.8 MW, was connected to the high-voltage transmission grid. The remainder was connected to the distribution grid. Signed grid connection agreements will add a further 1,457.71 MW of new capacity. Just under half of this, 700 MW, will be connected to the high-voltage transmission system.[28]

EirGrid, the Irish transmission system operator (TSO), projects that a total of 5.4 GW of wind power will be required by 2020 to meet the government's 2020 target of 40 per cent of electricity consumption from renewable energy sources. In addition to a total capacity of 1.5 GW, which has already secured grid connection permission, there is an additional total of 7 GW of new wind farm projects, both onshore and offshore, that have applied for permission to connect to the grid.[29]

1.4.4.1 Onshore Wind Power

At the end of 2008, 977 MW of onshore wind power was installed in Ireland. This constituted 98 per cent of total wind power capacity,[30] with 107 onshore wind farms.[31] Onshore wind is projected to be the largest contributor towards meeting the government's 2010 targets.[32]

1.4.4.2 Offshore Wind Power

As of January 2009, Ireland only had one offshore wind farm in operation, a 25.2 MW installation at Arklow Bank, 10 km off the eastern coast. Four offshore wind farms are expected to be built in the near future (see Table 1.7).

Table 1.7: Status of offshore wind power projects in Ireland as of January 2009

Status	Name	Capacity (MW)	Year of commissioning
In operation	Arklow Bank	25.2	2004
Under planning	Codling Wind Park	1,100	By 2015
	Kish and Bray	48	
	Oriel Wind Farm	330	
	Skerd Rocks	100	

Source: EWEA, Offshore Wind Power, January 2009. Available at <www.ewea.org>.

1.4.5 Biomass

By October 2008, 30 MW of biomass generating capacity had been installed, mainly landfill gas based. There were also 47.5 MW of applications waiting to be connected to the grid. EirGrid assumes that 6 MW of new biomass generating capacity will be added to the system every year until 2015.[33]

[28] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[29] EirGrid, Generation Adequacy Report, 2009-2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR 2009-2015.pdf>.
[30] European Wind Energy Association, Wind Power Installed at the End of 2008, January 2009. Available at <www.ewea.org>.
[31] IWEA, *Wind Farms by* Country. Available at <www.iwea.com/index.cfm/page/bycounty>.
[32] See Department of Communications, Marine and Natural Resources, Delivering a Sustainable Energy Future for Ireland: The Energy Policy Framework 2007-2020. Available at <www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf>.
[33] EirGrid, Generation Adequacy Report 2009- 2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR%202009-2015.pdf>.

1.4.5.1 Solid Biomass

Solid biomass is used mainly for heat production in Ireland. Only 13 GWh of electricity was produced from solid biomass in 2007, all in CHP plants and up from 8 GWh the year before.[34] The government has a target of 30 per cent peat co-firing at the three state-owned coal plants by 2015, although peat is not considered to be a renewable energy source by the EU.[35]

1.4.5.2 Biogas

Biogas, mainly from landfill gas, was used to produce 118.8 GWh of electricity in 2007, down slightly from 122.0 GWh in 2006. Only 14 per cent of this electricity was produced in CHP plants, but the share of CHP in biogas generation is rising.[36]

1.4.6 Solar Energy

1.4.6.1 Solar PV

Solar power has never played a large role in Ireland. However, there are some programmes to encourage residential housing projects to use solar power for their own power needs.[37]

1.4.6.2 Concentrated Solar-thermal Power

No concentrated solar-thermal power projects have been implemented in Ireland.

1.4.7 Small Hydro

There is approximately 22.6 MW of installed small hydropower capacity (under 5 MW), with an additional 0.85 MW of new capacity waiting to be connected. Further expansion is not expected in this sector because of a lack of suitable undeveloped locations.[38]

1.4.8 Geothermal

Geothermal power has never played a large role in Ireland and is not expected to do so in future due to lack of suitable resources.[39]

1.4.9 Marine (Wave/Tidal)

The Irish government plans to have at least 500 MW of wave and tidal power capacity installed by 2020.[40] In Ireland, there are no commercial marine power projects. Presently,

[34] EurObserv'ER, *Solid Biomass Barometer*, December 2008, No. 188. Available at <www.energies-renouvelables.org/observ-er/stat_baro/observ/baro188.pdf>.
[35] EirGrid, *Generation Adequacy Report 2009- 2015, November 2008.* Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR%202009-2015.pdf>.
[36] EurObserv'ER, *Biogas Barometer*, July 2008, No. 186a. Available at <www.energies-renouvelables.org/observ-er/stat_baro/observ/baro186_a.pdf>.
[37] Sustainable Energy Ireland, Energy Policy Statistical Support Unit, *Renewable Energy in Ireland 2008 Report*. Available at <www.sei.ie/Publications/Statistics_Publications/SEI_Renewable_Energy_2008_Update/Renewable%20Energy%20Update%202008.pdf>.
[38] EirGrid, Generation Adequacy Report 2009- 2015, November 2008. Available at <www.eirgrid.com/EirgridPortal/uploads/Library/GAR%202009-2015.pdf>.
[39] Sustainable Energy Ireland, Energy Policy Statistical Support Unit, *Renewable Energy in Ireland 2008 Report*. Available at <www.sei.ie/Publications/Statistics_Publications/>.
[40] Department of Communications, Marine and Natural Resources, Delivering a Sustainable Energy Future for Ireland: The Energy policy Framework 2007-2020. Available at <www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf>.

there are two test wave plants at the government's Galway Bay Wave Energy Test Site. One makes use of WaveBob technology and the other is run by the company Ocean Energy.[41]

Marine energy received EUR 0.56 million in funding during 2005.[42] Owing to this and future research, the 2006 Ocean Strategy report anticipates that between 2011and 2015 approximately 10 MW of wave and tidal devises will be connected to the grid. Large-scale commercial deployment is not expected before 2016.[43]

1.5 Political Will Risk Index

Measure		Value	
Political Drivers	Two points if politically committed targets for renewable energy and GHG emissions reductions are projected to be met, thereby reducing the future need for renewable energy expansion. One point if it is unclear as to whether a country can meet its targets, thereby creating some uncertainty of the future need for renewable energy expansion. *If the government meets its commitments, then it may reduce the level of effort to promote renewable energy development.*	0	**0/5**
Political Change	One point if political change brought about by major opposition parties could negatively affect renewable electricity development.	0	
Public Opposition	One point if there is a sign that the general public is becoming apathetic about or less supportive of renewable electricity because they have come to think that the targets are unattainable or because they are unwilling to pay an additional cost for supporting renewable electricity development.	0	
Nuclear Support	One point if there is a lack of significant opposition to nuclear expansion or if the government or general public becomes more supportive of nuclear power.	0	

1.5.1 Government Structure

The three major political parties in the Republic of Ireland are the Fianna Fail, the Fine Gael, and the Labour Party. The prime minister, known as the taoiseach, is Brian Cowen of Fianna Fail. All three parties support expanding renewable energy and see it as an opportunity to create jobs and to develop domestic industries. Fine Gael is concerned about the rise in energy prices, but would like Ireland to become an exporter of wind power and to move away from fossil fuels. It is therefore unlikely that the current favourable policy towards renewable energy will be changed substantially in the foreseeable future.[44]

1.5.2 Targets and Commitments

Ireland has a long way to go to meet its GHG emissions reduction and RE commitments (see Table 1.8). In 2006, GHG emissions were 25 per cent above their 1990 levels, well above the Kyoto Protocol burden-sharing target of limiting the increase of emissions to 13 per cent above the 1990 base year.[45] Also in 2006, RE accounted for only 1.5 per cent of final energy

[41] Marine Institute, Galway bay Wave Energy Test Site. Available at <www.marine.ie/home/aboutus/organisationstaff/researchfacilities/Ocean+Energy+Test+Site.htm>.
[42] Irish Energy Research Council, *An Energy Research Strategy for Ireland*, March 2008 Available at </www.dcenr.gov.ie/NR/rdonlyres/2DAEBBFF-6162-4D88-8220-654E2E9ED2B1/30799/EnergyResearchStrategyApril2008.pdf>.
[43] Department of Communications, Marine and Natural Resources, *Ocean Energy in Ireland*, October 2005. Available at <www.marine.ie/NR/rdonlyres/86491414-3E7E-48E5-A0E1-287CA9191C61/0/OceanEnergyStrategy.pdf>.
[44] For more information see the parties' websites at <www.finegael.ie>, <www.fiannafail.ie>, and <www.labour.ie>.
[45] European Environment Agency, GHG Trends and Projections, October 2008. Available at

consumption,[46] well below the EU's target of 16 per cent by 2020. Renewable electricity generation has increased in recent years. However, as only 9.4 per cent of gross electricity consumption in 2007 came from RE sources, more investment will be required to meet the government's targets.

Table 1.8: Irish government commitments

GHG emissions[a]	A Kyoto Protocol burden-sharing target of an increase in GHG emissions of no more than 13 per cent from the 1990 level by 2012. An EU 2020 target to reduce GHG emissions by 20 per cent in areas not covered by the Emissions Trading Scheme.
RE[b]	An EU target of sourcing 16 per cent of final energy consumption from renewables by 2020.
Renewable electricity[c]	The government aims to have 40 per cent of electricity generated from RE sources by 2020, up from a previous target of 33 per cent by the same year.

Sources: [a] European Environment Agency, GHG Trends and Projections, October 2008. Available at <www.eea.europa.eu/publications/eea_report_2008_5>;
[b] Commission of the European Communities, Ireland – Renewable Energy Fact Sheet, January 2008. Available at <ec.europa.eu/energy/climate_actions/doc/factsheets/2008_res_sheet_ireland_en.pdf>;
[c] Department of the Environment, Gormley Outlines Carbon Budget, 15 October 2008. Available at <www.environ.ie/en/Environment/News/MainBody,18676,en.htm>.

1.5.3 Public Sentiment

An EU survey conducted in 2008 suggests that only 39 per cent of respondents in Ireland were prepared to pay more for green energy, compared to the EU-27 average of 44 per cent. However, only 19 per cent were against paying more, with the remainder undecided. Only 7 per cent of respondents said that they had switched to a green energy tariff, compared to the EU-27 average of 8 per cent.[47]

1.6 Grid Connection Risk Index

Measure		Value	
Non-Discriminatory Access	One point if the transmission function is not legally separated from generation. *If the transmission system operator is controlled by an incumbent, it may be difficult for new generators to obtain non-discriminatory access to the transmission grid*.	0	**3/5**
Availability and Clarity	Two points if capacity constraints are leading to substantial delays or if there is a lack of information about grid capacity availability. This is reduced to one point if preferential access is given to renewable electricity.	2	
Costs	One point if developers have to pay for all grid-enhancement work, or if the fees for grid connections or balancing are clearly higher than those in other EU countries.	1	
Investment	One point if additional resources to enhance the grid to allow connection of renewable electricity development projects are not being invested.	0	

<www.eea.europa.eu/publications/eea_report_2008_5>.
[46] Commission of the European Communities, 'Part 2: Energy', *Statistical Pocketbook 2009*, 10 February 2009. Available at <ec.europa.eu/energy/publications/statistics/statistics_en.htm>.
[47] Eurobarometer, Europeans' Attitude Towards Climate Change, September 2008. Available at <ec.europa.eu/public_opinion/archives/ebs/ebs_300_full_en.pdf>.

1.6.1 Functional Separation

The transmission assets are owned and maintained by ESB (Electricity Supply Board), the state-owned former power monopoly which is still 95 per cent owned by the state. The transmission system operator (TSO) in Ireland is EirGrid. It is owned by the government and it is not engaged in any generation or supply business (i.e., ownership unbundled).[48] The only distribution system operator (DSO) in Ireland is ESB Networks, also owned by ESB. The distribution function is also legally unbundled from generation or supply function.[49]

The Commission for Energy Regulation (CER) is the Irish energy regulator. The CER was established in 1999, and has seen its role increase following the development of the all-island Single Electricity Market (SEM). The SEM went live in November 2007.[50]

1.6.2 Grid Capacity

The major constraint to the development of renewable power is a lack of available grid capacity and insufficient interconnection with the UK market. It can take up to three years to secure grid access. In some cases, planning permission has expired due to the delay in receiving grid connection offers. The grid connection issue is seen as a significant problem particularly for wind power developers. Fossil-fuel generators are reportedly to be given favour at the expense of renewable power generators, as they can, in some cases, be connected in less than 90 days.[51] Furthermore, the grid connection procedure is more suited to large conventional generators, as grid enhancement work requires long lead times. Delays then occur as renewable power installations are generally completed much quicker than conventional power plants.[52] Another problem cited by developers is that the power grid is weakest in the west of the country although this is where the most promising wind and marine energy resources are located.[53]

On 30 March 2009, the government officially confirmed that consent had been given to EirGrid for the construction of their East-West interconnector. The 500-MW DC interconnector will connect Ireland and Wales via a 260 km cable, 180 km of which will be undersea. This cable will allow a two-way flow of power, giving Ireland greater access to the UK market. The project is estimated to cost EUR 600 million and will be financed largely by EirGrid, along with an EU contribution of EUR 110 million.[54]

Furthermore, Grid25 is a strategy for the development of Ireland's electricity grid to allow for more renewable power.[55] EirGrid recently announced that EUR 4 billion would be spent over

[48] For more information see EirGrid's website at <www.eirgrid.com>.
[49] For more information see the ESB's website at <www.esb.ie>.
[50] Commission for Energy Reduction, *About Us – Overview.* Available at <www.cer.ie/en/about-us-overview.aspx>.
[51] Airtricity, Response by Airtricity to Energy Green Paper, 2006. Available at <www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27090/Airtricity.pdf>.
[52] Mario Ragwitz, Barriers to the Development of Renewable Energy, PROGRESS, Final Report, June 2008. Available at <www.res-progress.eu>.
[53] Mario Ragwitz, Barriers to the Development of Renewable Energy, PROGRESS, Final Report, June 2008. Available at <www.res-progress.eu>.
[54] Department of Communications, Energy and Natural Resources, *Government gives green light to €600 million East-West Interconnector*, March 2009. Available at <www.dcenr.gov.ie/Press+Releases/Government+gives+green+light+to+€600+million+East-West+Interconnector.htm>.
[55] EirGrid, *Grid25: A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future.* Available at

17 years to double the capacity of the grid by 2025 in order to accommodate increased power demand and renewable power generation.[56]

1.6.3 Access and Connection Cost

Renewable power is not given priority access to the grid. All generators are treated equally.[57] Ireland sets a relatively high transmission tariff, approximately 11 EUR/MWh, compared with other European countries. (On the other hand, EirGrid does not charge for transmission losses.) Generators have to pay "partially deep" connection charges. Thus, if a generator wishes to connect to a sub-station or extension already built and paid for by another developer, they have to pay a part of the cost so that they do not benefit unfairly from previous investments.[58]

1.7 Planning Permission Risk Index

Measure		Value	
Clarity	One point if there is a lack of coordination between relevant government offices or if the complexity of approval procedures is widely acknowledged as a problem. *Complex planning procedures lead to significant delays and costs during the planning process.*	1	**4/5**
Time	Two points if it normally takes more than one year to obtain approval and the situation is deteriorating (within one year is considered best practice by the industry). One point if it normally takes more than one year, but the situation is improving.	2	
Refusals	One point if refusal rates are rising or local opposition is clearly delaying projects.	0	
Improvement	One point if the government is not trying to improve planning procedures even if they are known to be a problem. *Without government intervention, particularly in local approval procedures, problems with issuing permits could worsen as more development projects seek permission.*	1	

1.7.1 Complexity and Expected Timescales

The procedure for any planning application falls under the Irish Planning Act 2000.[59] Granting permits for renewable energy projects is dealt with mostly by the relevant local authority.[60] Developers have complained that planning procedures are not always clear, and that different levels of government have different schedules and do not communicate with

<www.eirgrid.com/EirgridPortal/uploads/Announcements/EirGrid%20GRID25.pdf>.

[56] "EirGrid to Invest EUR4 Billion in Electricity Infrastructure," Belfast Telegraph, 8 October 2008. Available at <www.belfasttelegraph.co.uk/breaking-news/ireland/eirgrid-to-invest-euro4bn-in-electricity-infrastructure-13995693.html>.

[57] EirGrid, General Conditions of Connection and Transmission Use of System. Available at <www.eirgrid.com/media/Connection Agreement - General Conditions.pdf>; Electricity Regulation Act 1998, Sec 34. Available at <www.dcenr.gov.ie/NR/rdonlyres/2DACF4BD-B640-43C6-85AB-CA90CDD19BBB/25792/ElectricityRegulationAct1999.pdf>.

[58] European Transmission System Operators, ETSO Overview of transmission tariffs in Europe: Synthesis 2007, June 2008. Available at <www.etso-net.org/upload/documents/11.a.%20Final_Synthesis_2007_18-06-08.pdf>.

[59] Sustainability Energy Ireland, *Guidelines for Wind Farm Development.* Available at <www.sei.ie/Renewables/Wind_Energy/Wind_Farm_Development/Guidelines_for_wind_farm_development/#4>.

[60] Department of Communications, Energy and Natural Resources, *Policy Technical and Planning Information*. Available at <www.dcenr.gov.ie/Energy/Sustainable+and+Renewable+Energy+Division/Policy+Technical+and+Planning+Information.htm>.

each other. On average it takes over 50 months to obtain planning permission for a renewable power project, one of the longest lead times in Europe.[61]

Delays in obtaining permission to connect to the grid are causing problems for developers. Developers are given development permits for five years and construction must begin before that time. However, it can take up to six years to receive permission to connect to the grid. As the project finance is generally secured only after all permits, including the grid connection permit, are awarded, developers sometimes fail to start construction before the five-year development permit expires.[62]

1.7.2 Local Opposition and Procedural Improvements

For larger projects, the visual effects on the landscape are often cited by developers as the major reason why some projects, such as wind farms, are not approved.[63] The government has indicated that planning is an issue to be addressed, but as of early 2009 it had not made any firm plans.[64] Guidelines for planning an onshore wind farm were published by the government in 2006.[65] Special considerations are made for microgeneration installations regarding permission requirements.[66]

1.8 Conclusion

The Irish power market is relatively small. In order to expand the renewable power sector, interconnections with other markets are required.

Ireland has strong wind resources, particularly offshore wind. There is also high potential for increased biomass and biogas generation in Ireland, although these resources may be diverted to heat production rather than electricity generation. Wave and tidal power have great potential and could play a large role in the Irish power market, but as yet there are no operational commercial projects.

Securing planning permission is time-consuming and complex. Delays with securing a grid connection permit could seriously hinder a development project.

[61] Mario Ragwitz, Barriers to the Development of Renewable Energy, PROGRESS, Final Report, June 2008. Available at <www.res-progress.eu>.
[62] Irish Wind Energy Association, Current Issues. Available at <www.iwea.com>.
[63] Mario Ragwitz, Barriers to the Development of Renewable Energy, PROGRESS, Final Report, June 2008. Available at <www.res-progress.eu>.
[64] Department of Communication, Marine and Natural Resources, *Delivering a Sustainable Energy Future for Ireland*, Available at <www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf>.
[65] For more information see Planning Guidelines, available at <www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownLoad,1633,en.pdf>.
[66] See Sustainable Energy Ireland website at <www.sei.ie>.