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Report

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Medium to long-term prospects for bulk trade volumes at Dublin Port

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1. Background

Dublin Port is preparing a Master Plan during 2011 which will consider the long-term prospects for the port and its core activities. The first stage in the process is the production of an Issues Paper which will form the basis of a consultation exercise during March/April/May and will be central to the work of the Masterplanning Team. Part of the issues paper will consider the medium to long-term prospects for traffic volumes at Dublin Port and will highlight any key issues which are likely to impact on volumes over the long-term.

DKM has been commissioned by Dublin Port to draft three sections of the Issues Paper, focusing on the prospects for the bulk commodities associated with three sectors, notably:

- ✓ Energy (Section 11 of the Issues Paper)
- ✓ Construction (Section 12), and
- ✓ Agriculture (Section 14)

For the purposes of this exercise, these three sections are written as independent sections which can be extracted into the main report. This report does not include an economic overview as this will be separately covered in Section 9 of the Issues Paper.

The methodology generally followed in each section is to:

- ➢ Review current trends in the respective bulk traffic volumes both nationally and in Dublin Port,
- ➢ Consider the medium to long-term prospects for each sector and the implications for the respective bulk trades handled by Dublin Port, and
- ➢ Consider the key issues likely to influence trade volumes in each sector over the long-term.

The official data sources used throughout the report in regard to trade activity are:

- ✓ CSO External Trade data (latest available October 2010),
- ✓ CSO Statistics on Port Traffic (2009 latest available), and
- ✓ Historical trends on cargo volumes by product type received from Dublin Port (latest available 2010).

Any other sources used are referenced throughout the report.

11. Medium-term prospects for energy products

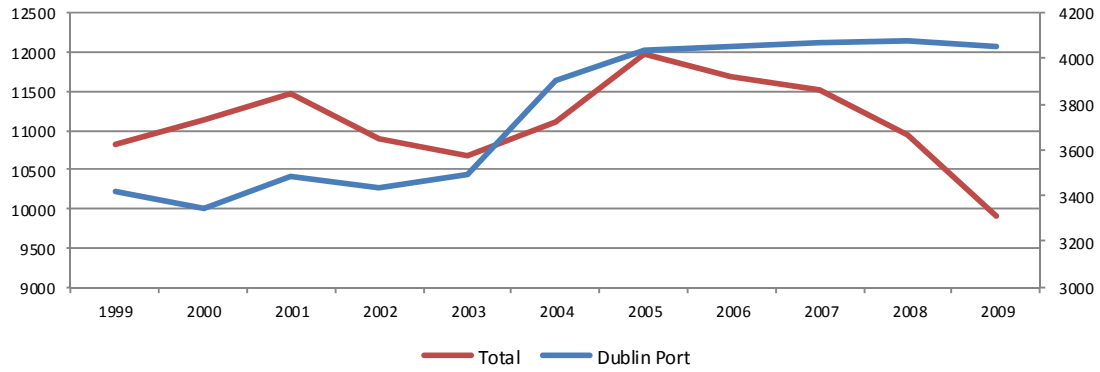
11.1 Introduction

Energy products are an important element of the overall traffic handled by Dublin Port and had been an area of strong growth until recent years. However, the changing policy environment and efforts to improve energy efficiency in key end-use sectors and efforts to promote renewable energy are likely to impact on port traffic volumes in coming years.

11.2 The Significance of Energy Products to Dublin Port

The following chart shows CSO figures on the tonnage of bulk liquids[1] received by Dublin Port and the total for all Irish ports from 1999 to 2009.

Figure 11.1: Bulk Liquids Received by Irish Ports (000 tonnes)



Source: CSO Statistics of Port Traffic

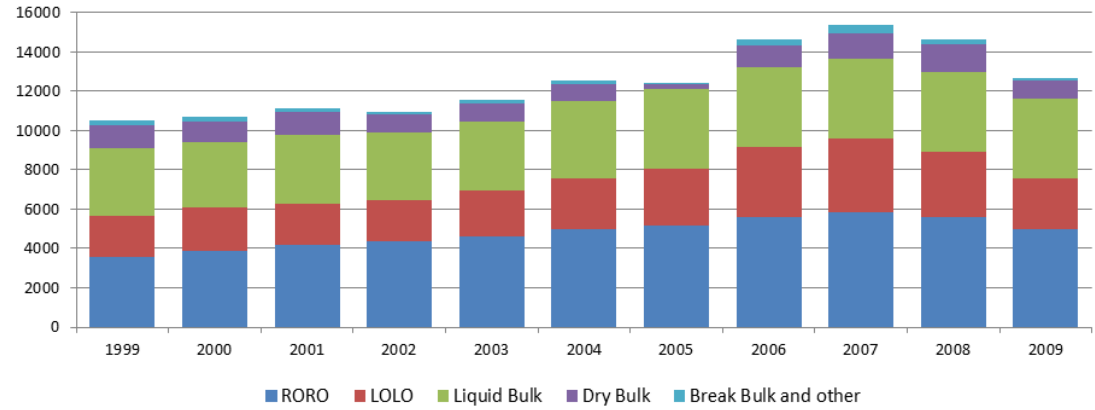
While total volumes received (shown on the left hand axis) declined by over 8% over the period, volumes handled by Dublin Port (right hand axis) recorded an increase of over 18% over the same period. As a result, **Dublin Port's share of the total volume of bulk liquids received in the country rose from just over 30% in 1999 to almost 41% in 2009** – well ahead of Cork at 34% and Shannon Foynes at 10% which were the next most important ports in terms of volumes of bulk liquids received.[2]

Statistics from the CSO[3] also serve to underline the relative importance of bulk liquid imports to Dublin Port. While there has been some variation from year to year, **bulk**

[1] Fuels, oils, and liquefied gas comprise the vast majority of the bulk liquids handled by Irish ports – the figure is in excess of 95% nationally and over 98% for Dublin Port.
[2] In terms of total tonnage of bulk liquids handled by different ports, the Port of Cork has the largest share as it is also involved in forwarding bulk liquids – on this basis, Cork accounts for 41% of all bulk liquids handled in the country, with Dublin Port's share falling to 33.5%.
[3] CSO, Statistics of Port Traffic, 2009: 6 July 2010

liquids have accounted for between 26% and 32% of the goods received by Dublin Port over the period as a whole. Moreover, although volumes of bulk liquids received have begun to decline in recent years, the rate of decline has been far less severe than in other categories of goods imported into the Port.

Figure 11.2: Tonnage of Goods Received by Dublin Port by Category of Traffic (000 tonnes)

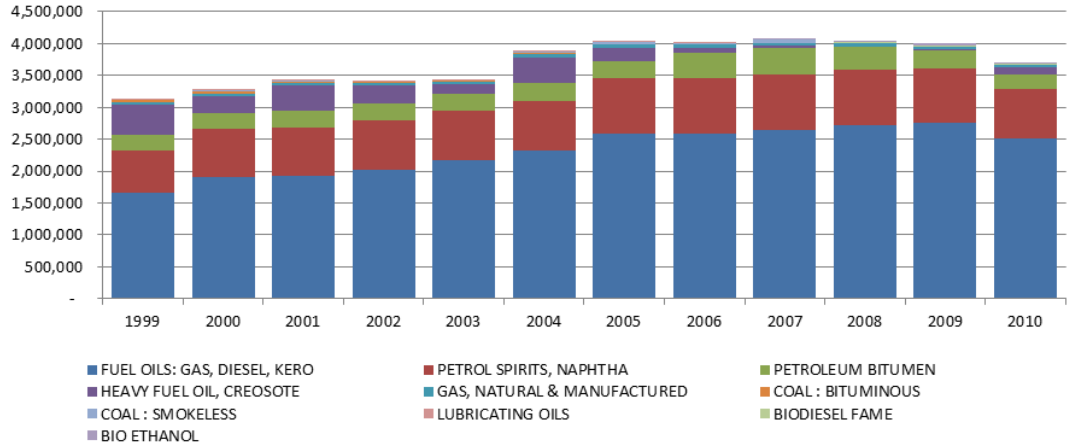


Source: CSO Statistics of Port Traffic

More detailed figures on the volume of energy products handled by Dublin Port between 1999 and 2010 are shown in the following chart[4]. These include bulk liquids such as fuel oils, petroleum, natural gases etc., as well as coal products, which fall within the bulk solid category. As illustrated in the chart, **overall tonnages increased by 30% from 1999 to reach a peak of 4.07 million tonnes in 2007, but volumes have declined in more recent years (falling to less than 3.8 million tonnes in 2010).**

[4] The figure for 2010 is a pro-rata estimate based on data for the first ten months of the year.

Figure 11.3: Dublin Port Traffic Volumes - Energy Products (tonnes)



Source: Dublin Port

The chart also serves to illustrate the **changing composition** of the energy products passing through the Port. **Fuel oils, such as gas, diesel and kerosene are by far the most significant product category both in absolute and relative terms**. Between 1999 and 2010, the volume of fuel oils handled by the Port increased from 1.65 million tonnes to an estimated 2.5 million tonnes in 2010 – an increase of 52%. As a result, the share of total energy products accounted for by fuel oils increased from just under 53% in 1999 to almost 68% in 2010.

The share of **petrol spirits** has remained broadly constant at approximately 21% over the period, but volumes of **heavy fuel oils** have been extremely erratic and, over the period as a whole, have ranged from 15% of total volumes to less than 1% in recent years. Traffic in **liquefied natural gas** has shown a modest decline over the period – from 1.4% in 1999 to less than 1% last year – while volumes of **coal** handled have gone from more than 40,000 tonnes, or 1.7% of the total in 2000, to zero by 2010. In contrast, since 2007 new products such as **biodiesel and bio ethanol** have started to emerge and although still relatively modest in terms of overall Port volumes, are estimated to have exceeded 50,000 tonnes in 2010.

11.3 The Outlook for the Energy Sector

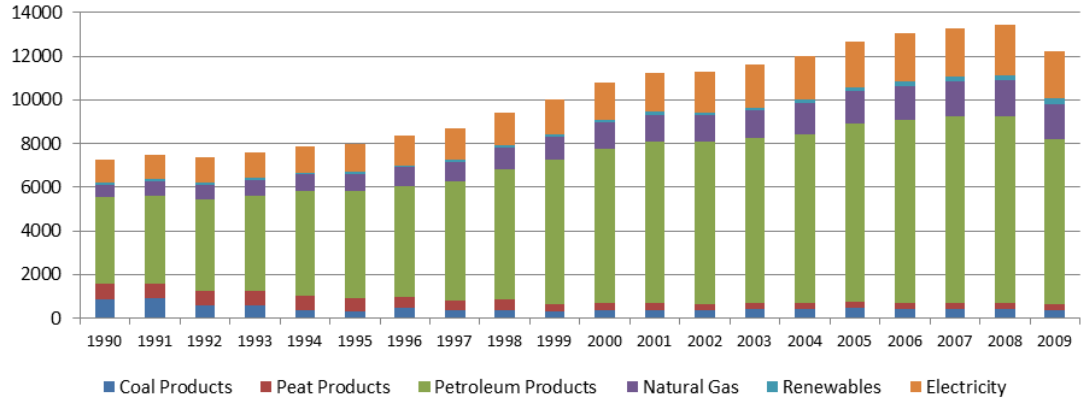
While the preceding section focused on the trends in volumes of energy products handled by the Port and the changing nature of those products, this section looks at key trends in the energy sector nationally and developments in key end use markets. **The broader policy environment will be a critical driver of change within the sector**. This is partly due to concerns about the rise in the price of oil and also to efforts to achieve some security of energy supply by reducing reliance on imported fossil fuels. However, the EU's climate change policy – and its accompanying targets to improve energy efficiency, encourage the use of renewable energy and reduce the use of fossil fuels – is likely to be the most important driver of change within the sector over the

time horizon covered by the Master Plan. (The policy environment is considered in Section 11.4 and in more detail in **Annex 1**).

Ireland's Overall Energy Consumption

The following chart shows total energy consumption in Ireland since 1990. While overall energy consumption increased significantly over this period (by 68% between 1990 and 2009), the recent economic downturn has also been accompanied by a decline in the consumption of energy products.

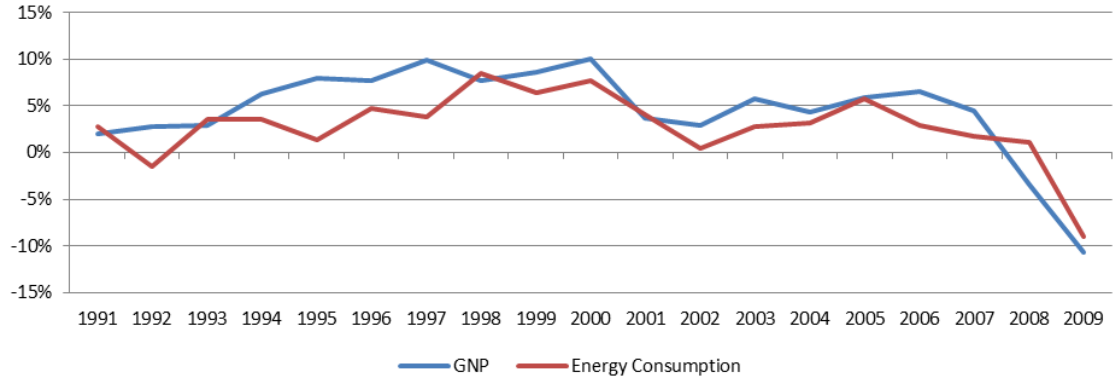
Figure 11.4: Final Energy Consumption by Fuel Type and Year (ktoe)



Source: SEAI Energy Balance Statistics (Note: kTOE = kilo tonnes of oil equivalent)

The scale of the decline is better illustrated by the following chart which shows percentage annual changes in economic activity (as measured by GNP) and in total energy consumption. The chart also serves to underline the **strong correlation, or link, between economic growth and energy demand** – a link that policy markets are keen to "de-couple".

Figure 11.5: Percentage Change in Energy Consumption and GNP

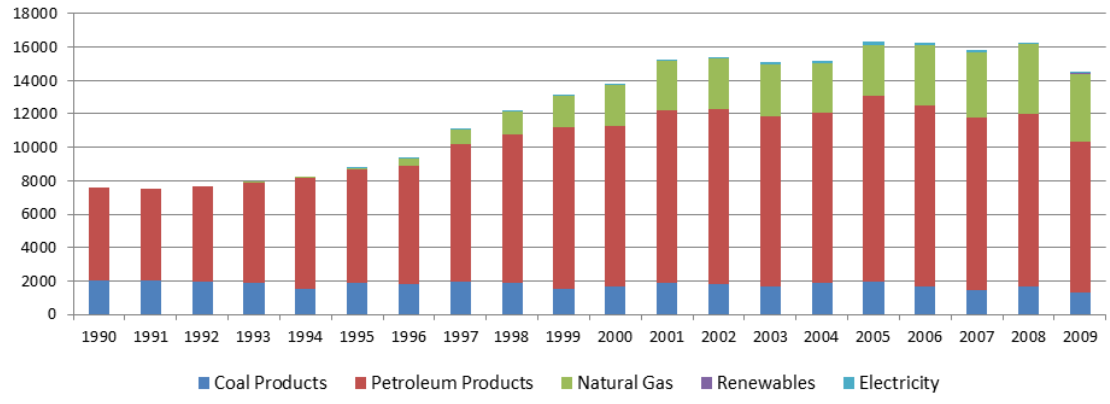


While the level of economic activity is a significant determinant of the overall energy demand, the composition of that demand has been changing. Over the period:

- The consumption of **coal products** has more than halved since the early 1990s and now **accounts for just 3% of total energy consumption** – compared to more than 12% in 1991.
- Consumption of peat products has also declined significantly over the period – both in absolute and relative terms. Having accounted for more than 10% of energy consumption in the early 1990s, **peat now accounts for just over 2%.**
- In contrast, consumption of **petroleum products** more than doubled between 1990 and 2008 and although the figures dropped in 2009, it **now accounts for 62% of all energy products consumed in Ireland.**
- **Consumption of electricity also doubled** over the period and now accounts for close to 18% of the total energy consumption.
- The **growth in the consumption of natural gas** has been even more dramatic, rising by almost 180% over the period to **account for almost 13% of all energy consumption** in 2009.
- In more recent years, too **renewable energy sources have started to increase**, though penetration levels are still relatively modest at 2.4% in 2009. However, given the EU and Government targets for renewable energy, this figure looks set to increase substantially in coming years.

While trends in overall energy consumption and composition provide a pointer to future demand for energy products, information on trends in energy imports are likely to be more closely aligned with traffic volumes through Dublin Port.

Figure 11.5: Energy Imports, Fuel Type and Year (ktoe)

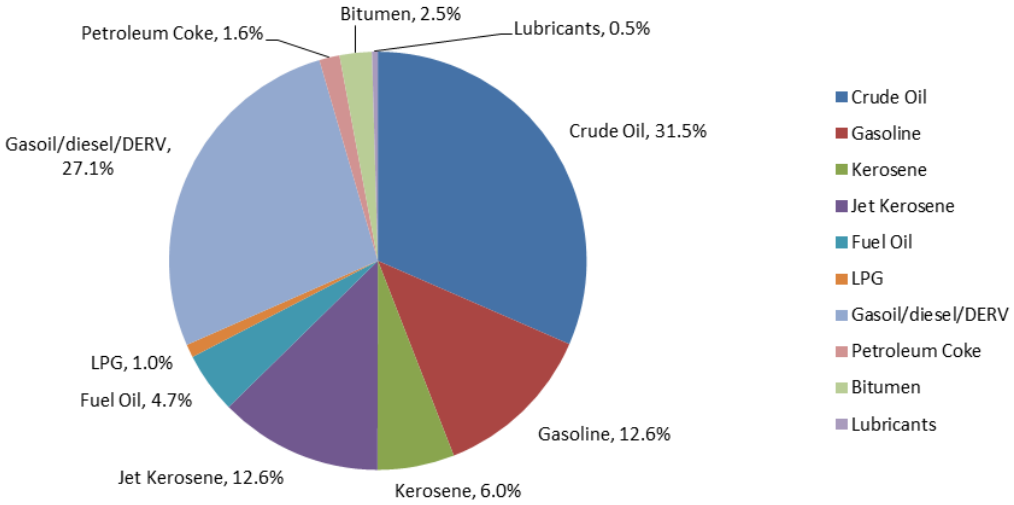


Source: SEAI Energy Balance (kTOE = thousand tonnes of oil equivalent)

Figure 11.7 shows imports of energy products since 1990. This again serves to **underline the importance of petroleum products in the overall energy mix** (a breakdown of petroleum product imports by type of fuel for 2009 is shown below.

However, its relative share has declined in recent years (from 74% to 62%) as imports of natural gas – largely via the Interconnector – have increased significantly to reach 27.5% of total energy imports by 2009. Similarly, imports of electricity – again via the Interconnector – have also been rising in recent years but are still relatively modest.

Figure 11.6: Imports of Petroleum Product by Fuel Type, 2009



Source: SEAI Energy Balance (ktoe = kilo tonnes of oil equivalent)

There are a number of factors that are expected to shape demand for imported energy products in Ireland in coming years. As illustrated above, overall energy demand has historically been very closely correlated with change in economic activity. **While economic growth will continue to be an important determinant of overall consumptions levels, policy initiatives are increasingly focusing on ways of de-coupling this link and making growth less energy-intensive** – both at a macro-economic level and also at a sectoral level. In addition, measures being introduced to promote the **development of renewable energy sources will help to reduce Ireland's reliance on imported fossil fuels**.

Forecast Energy Demand

The SEAI has recently updated its forecasts for energy demand to 2020[5]. These provide details for energy demand by fuel type at both a national level and also for the key energy use sectors. The central forecasts are based on assumptions about the growth in economic activity and also on indicators of activity in key sectors such as stocks of cars in use, the population, the number of new household created and the relative price of fuels. In formulating the forecasts outlined below, the SEAI has assumed:

- An average annual growth in GNP of 3.0% between 2011 and 2015 and 2.2% between 2016 and 2020.
- That household completion will average 32,700 in 2015 and 38,000 in 2020.
- That the population will reach 4.48 million in 2015 and 4.669 million by 2020.

[5] SEAI: Energy Forecasts for Ireland to 2020, 2010 Report. December 2010.

- That the stock of cars will be 1.891 million in 2015 and 2.032 million in 2020.

In addition, the forecasts also assume that the energy-related targets set under various policy initiatives such as the National Energy Efficiency Action Plan (NEEAP), the National Renewable Energy Action Plan (NREAP) and the EU Directive targets for renewable energy and green-house gas emissions, are met. (The changing policy environment is considered in Section 11.4 and in more detail in **Annex 1**).

Table 11.1: Final Energy Demand by Sector 2009-2020 (NEEAP/NREAP Forecast)[6]

Sector	Total Final Demand (kTOE)			Growth%	Average Annual Growth			Sectoral Shares		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Household	3099	2753	2537	-18.2	-1.8	-1.7	-2.0	25	23	21
Industry	2215	2170	2271	2.6	0.2	-0.3	1.2	18	18	19
Services	1586	1564	1491	-6.0	-0.6	-0.2	-1.2	13	13	12
Agriculture	272	367	382	40.8	3.2	4.4	1.0	2	3	3
Transport	5075	5107	5269	3.8	0.3	0.1	0.8	41	43	44
Total	**12247**	**11961**	**11951**	**-2.4**	**-0.2**	**-0.3**	**0.0**			

Source: SEAI Energy Forecasts for Ireland to 2020

As indicated in the table, **the SEAI is predicting that overall demand for energy products will fall by 2.4% over the next ten years**. The biggest reductions in energy demand are forecast for the **household (-18.2%)** and **services sectors (-6%).** The transport sector's share of final demand is expected to continue to increase, reaching 44% by 2020, despite ongoing efforts to achieve energy efficiency savings and **transport's energy requirement is expected to increase by 3.8% over the period.**

Table 11.2: Final Energy Demand by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Total Final Demand (KTOE)			Growth %	Average Annual Growth %			Fuel Shares %		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Coal	382	199	158	-57.2	-7.4	-8.4	-5.7	3	2	1
Oil	7578	7214	7014	-7.4	-0.7	-0.7	-0.7	62	60	59
Gas	1578	1452	1455	-7.8	-0.7	-1.2	0.1	13	12	12
Peat	272	167	128	-53.1	-6.6	-6.8	-6.4	2	1	1
Renewables	290	676	904	212.2	10.9	12.9	7.5	2	6	8
Electricity	2147	2253	2292	6.8	0.6	0.7	0.4	18	19	19
Total	**12247**	**11960**	**11951**	**-2.4**	**-0.2**	**-0.3**	**0.0**	**100**	**100**	**100**

Source: SEAI Energy Forecasts for Ireland to 2020

Table 11.2 shows final energy demand by fuel type. While **total oil consumption is expected to decline by over 7% over the period, it will remain the dominant energy**

6 http://www.seai.ie/Publications/Statistics_Publications/Energy_Modelling_Group/Energy_Forecasts_for_Ireland_to_2020-2010_report.pdf

source, accounting for 59% of the total in 2020. Coal and peat consumption are expected to fall significantly and demand for gas is also expected to contract – due in large part to the impact of energy savings measures. In contrast, **renewable energy's share of overall demand is forecast to grow rapidly** – from just 2% of the total in 2009 to 8% by 2020.

Table 11.3: Industry - Final Energy Demand by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Total Final Demand (kTOE)			Growth%	Average Annual Growth %			Fuel Shares		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Coal	112	106	93	-17.1	-1.7	-0.8	-3.3	5	5	4
Oil	703	627	637	-9.4	-0.9	-1.6	0.4	32	29	28
Gas	531	518	546	3.0	0.3	-0.3	1.4	24	24	24
Renewables	140	239	305	193.0	70.3	7.9	6.3	6	11	13
Wastes	13									
Electricity	716	680	690	-3.6	-0.3	-0.7	0.4	33	31	30
Total	**2201**	**2170**	**2271**	**3.2**	**0.3**	**-0.2**	**1.2**			

Source: SEAI Energy Forecasts for Ireland to 2020

Within the industrial sector, energy demand is forecast to increase by just 2.6% over the period to 2020. Again, this is due in large part to energy-efficiency measures and the impact of more stringent limits on greenhouse gas emissions for large energy users under the EU Emissions Trading Scheme. These are expected to partially offset the growth in energy usage associated with rising industrial output. In terms of fuel use, the SEAI is predicting a **significant switch away from oil (down 9.4%) and electricity (down 3.6%) towards renewable energy sources by 2020**.

Table 11.4: Household Sector - Final Energy Demand by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Total Final Demand (kTOE)			Growth%	Average Annual Growth			Fuel Shares		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Coal	257	94	65	-74.7	-11.7	-13.4	-8.7	8	3	3
Oil	1209	1188	1093	-9.6	-0.9	-0.2	-2.1	39	43	43
Gas	625	552	496	-20.7	-2.1	-1.7	-2.7	20	20	20
Peat	272	167	128	-53.0	-6.6	-6.7	-6.4	9	6	5
Renewables	52	76	92	75.8	5.3	5.4	5.0	2	3	4
Electricity	685	676	664	-3.2	-0.3	-0.2	-0.5	22	25	26
Total	**3099**	**2753**	**2537**	**-18.2**	**-1.8**	**-1.7**	**-2.0**	**100**	**100**	**100**

Source: SEAI Energy Forecasts for Ireland to 2020

The **household sector** – which currently accounts for some 25% of energy demand, is expected to record an **18% reduction in energy consumption** over the forecast period - effectively returning to 2000 levels.

The SEAI points out that this reduction is mainly due to **energy-savings** arising from the Government's proposed **National Retrofit Scheme**, which aims to improve the energy performance of as many as one million existing dwellings by 2020. In addition to this, future improvements to **building regulations**, transitioning to a low-carbon-homes standard, savings expected from a phase-out of low-efficiency lighting, and replacement of existing boilers with high-efficiency boilers will have a strong impact on demand reduction in coming years.

These measures are expected to lead to substantial savings in oil and gas over the period 2009–2020. As shown in Table 4, **oil demand is projected to fall by 9.6%** and gas demand by almost 21% between 2009 and 2020. Demand for solid fuels is also expected to continue to contract over the forecast period.

Table 11.5: Services Sector - Final Energy Demand by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Total Final Demand (kTOE)			Growth%	Average Annual Growth			Fuel Shares		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Coal	0	0	0							
Oil	462	290	132	-71.4	-10.8	-6.4	-17.9	29	19	9
Gas	423	382	413	-2.2	-0.2	-1.4	2.0	27	24	28
Renewables	19	83	126	557	18.7	23.3	10.9	1	5	8
Electricity	683	809	820	20.1	1.7	2.5	0.3	43	52	55
Total	**1586**	**1564**	**1491**	**-6.0**	**-0.6**	**-0.2**	**-1.2**	**100**	**100**	**100**

Source: SEAI Energy Forecasts for Ireland to 2020

In the **services sector**, which is expected to see strong output growth in coming years, energy demand is also expected to decline moderately over the period from 2009 to 2020. As with other sectors, this is mainly due to the impact of **energy efficiency** targets which more than offset increases in demand associated with increased levels of economic activity. In addition, however, renewable energy heat target are also reflected in the **forecast increase in renewable energy use.**

Table 11.6: Transport - Final Energy Demand by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Total Final Demand (kTOE)			Growth%	Average Annual Growth			Fuel Shares		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Oil Total	4993	4814	4848	-2.9	-0.3	-0.5	0.2	98	94	92
- Kerosene	767	861	1011	31.8	2.5	1.7	4.1	15	17	19
- Petrol	1741	1410	1254	-27.9	-2.9	-3.0	-2.9	34	28	24
- Diesel	2485	2543	2583	3.9	0.4	0.3	0.4	49	50	49
Biofuels	77	278	381	392.6	15.6	20.0	8.2	2	5	7
Electricity	4	16	41	961.1	24.0	22.3	26.9	0.1	0.3	0.8
Total	**5074**	**5107**	**5269**	**3.9**	**0.3**	**0.1**	**0.8**			

Source: SEAI Energy Forecasts for Ireland to 2020

Table 11.6 shows the SEAI's forecasts for energy demand from the **transport sector**. Transport is expected to be a key sector in terms of energy use and greenhouse gas emissions. This reflects the fact that transport is currently responsible for around a quarter of all EU greenhouse gas emissions, making it the **second biggest greenhouse gas emitting sector after power generation,** and is also one of the fastest growing sectors and one of the most difficult to address

In Ireland too, the **transport sector** is critically important as it **accounted for some 41% of final energy demand in 2009** and was responsible for responsible for some 36% of Ireland's energy-related CO2 emissions, higher than any other sector[7]. In addition, a key characteristic that distinguishes energy use in transport from other sectors is the **almost total dependence on imported oil as a fuel – over 99%**.

There has, however, been a marked change in the type of fuel used within the sector in recent years, with a very **significant increase in diesel's share of the market** – from 34% to 49% over the period 1990 – 2008 while the share of petrol has declined from 47% to 34%[8]. Kerosene accounted for 15% of transport energy in 2009 while bio-fuels reached 2%.

In considering the outlook for energy demand in the sector over the period to 2020, the SEAI has taken account of the range of measures contained in the Department of Transport's Sustainable Travel and Transport Plan. These include efficient-driving measures, mobility-management plans encouraging modal shift to public transport, e-working and more sustainable public transport fleets. In addition, measures to promote the uptake of electric-vehicles and the use of bio-fuels are also taken into account (these policy measures are set out in Section 11.4 and in more detail in **Annex 1**) as are the potential impact of the changes to VRT and motor tax over the forecast period.

In spite of all these policy changes, it is still expected that **energy demand from the transport sector will increase by 3.9% over the period to 2020**. This does, however, represent a significant de-coupling of the relationship between overall economic activity and transport-related energy demand.

Power Generation

While not of major significance to the volumes of energy products handled by Dublin Port, developments in the power generation sector also serve to underline the **changing nature of Ireland's energy landscape** and how this is likely to change in coming years.

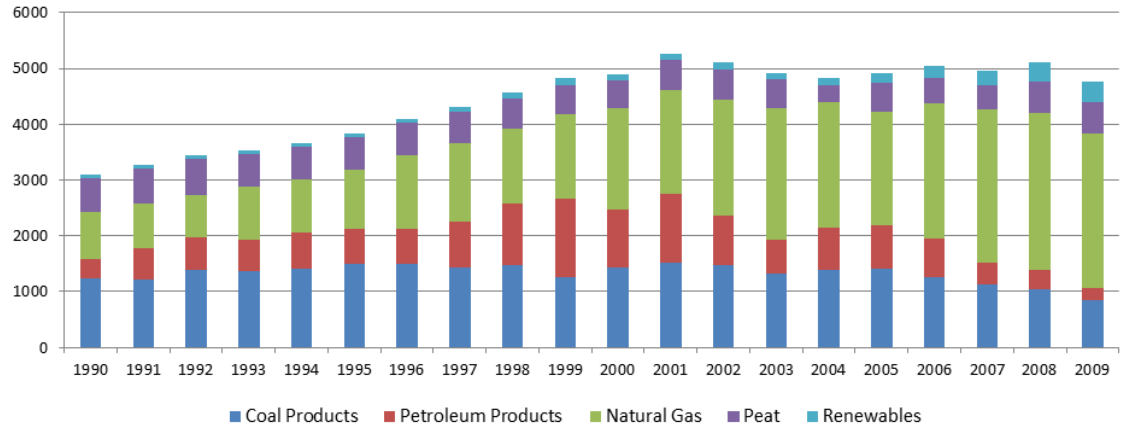
The following chart shows fuel used in electricity production since 1990. Of particular note is the **rapid growth in gas-powered generation** over the period and the decline

7 http://www.seai.ie/Publications/Statistics_Publications/EPSSU_Publications/Energy_in_Transport/Energy_In_Transport_2009_Report.pdf

8 http://www.seai.ie/Publications/Statistics_Publications/EPSSU_Publications/Energy_in_Ireland_2009.pdf

in coal and oil powered electricity generation. Also of note is the increase in the **importance of renewables** in more recent years.

Figure 11.7: Fuel Used in Electricity Production (ktoe) by Fuel Type and Year



Source: SEAI Energy Balance

This is also reflected in Table 7 which shows that gas accounted for 59% of electricity generated in 2009, with coal and peat accounting for a combined share of 24%. Oil accounted for just 3% of the total in 2009 and is expected to virtually disappear as a power-gen fuel over the forecast period. In contrast, **renewables** are expected to increase significantly – in line with government targets – and account for **approximately a third of electricity generation by 2020**.

Table 11.7: Electricity Generation Output by Fuel 2009-2020 (NEEAP/NREAP Forecast)

Fuel	Fuel Inputs (kTOE)			Growth %	Average Annual Growth			Fuel Shares %		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Coal	4005	4506	3881	-3.1	-0.3	1.7	-3.7	14	14	11
Oil	916	1	1	-99.9	-47.2	-63.3	0.0	3	0	0
Gas	16299	16050	18788	15.3	1.3	-0.2	4.0	59	50	52
Peat	2629	2340	1488	-43.4	-5.0	-1.7	-10.7	10	7	4
Renewables	3857	9168	12014	211.1	10.9	13.2	7.0	14	29	33
Elec. Imports (net)	764	-1785	-5537	-825.0	0.0	0.0	0.0	3	-6	-15
Total	**27705**	**32064**	**36172**	**30.5**	**2.5**	**2.1**	**3.0**	**100**	**100**	**100**

Source: SEAI Energy Forecasts for Ireland to 2020

According to the SEAI's Renewable Energy in Ireland (2010 Update)[9], the share of electricity generated from renewable energy sources (RES-E) in 2009 was 14.4%, exceeding the interim EU target of 13.2% RES-E by 2010 and placing Ireland firmly on

[9] http://www.seai.ie/Publications/Statistics_Publications/SEI_Renewable_Energy_2010_Update/RE_in_Ire_2010update.pdf

track to meet the Government target of 15% of all electricity generation to be from renewable energy sources by 2010.

Table 11.8: Renewable Electricity Generation (NEEAP/NREAP Forecast)

Sector	Output (GWh)			Growth%	Average Annual Growth			Shares %		
	2009	2016	2020	09-20	09-20	09-16	16-20	2009	2016	2020
Biomass	183	546	549	200.9	10.5	17.0	0.1	5	6	5
Hydro	754	668	620	-17.8	-1.8	-1.7	-1.9	19	7	5
Ocean			244							2
Wind	2936	7955	10601	261.0	12.4	15.3	7.4	76	87	88
Total Renewables	**3873**	**9170**	**12014**	**210.2**	**10.8**	**13.1**	**7.0**	**100**	**100**	**100**

Source: SEAI Energy Forecasts for Ireland to 2020

Wind energy accounted for over 10% of all electricity generation in 2009 and is expected to remain the primary source of renewable energy used for power-generation over the forecast period, with ocean energy beginning to emerge by 2020.[10]

11.4 Key issues for the long-term

As indicated there are a number of EU and national policy initiatives which are already having a major impact on the energy sector and this impact is likely to intensify in coming years. These are summarised below[11].

The Policy Environment

Climate change and the need to reduce greenhouse gas emissions (GHG) has become a key driver of change across almost all areas of policy in recent years. Following on from the commitments made under the Kyoto Protocol[12], in March 2007 EU leaders committed to transforming Europe into a highly energy-efficient, low-carbon economy. They underlined their determination to see the EU gain a 'first mover advantage' by committing the EU to cut emissions by at least 20% of 1990 levels by 2020, regardless of what action other countries take.

[10] As of 12 January 2010 the installed wind capacity was 1,264 MW. Wind farms with an additional combined capacity of 219 MW for onshore wind and 52 MW offshore wind were due to be connected during 2010. In addition a further 155 MW was contracted and a further 3,900 MW is proposed within the Gate 3 planning process. The vast majority of current capacity is from on-shore farms. However, within the first 8 years of the Gate 3 ITC programme (2010 - 2017) 601.5 MW of offshore wind is due to be connected to the grid. The new connections are on the east coast of Ireland at Carrickmines (364 MW) and Oriel (237.5 MW). Source: SEAI Renewable Energy in Ireland (2010 Update).

[11] A more detailed discussion of the key issues is included in Annex 1.

12 Under the Kyoto Protocol the EU agreed to reduce overall emission levels by 8% below 1990 levels. However, it also adopted a burden sharing agreement to recognise the different economic circumstances of each member state. Ireland's target is to limit the increase in its greenhouse gas emissions under the Kyoto Protocol to 13% above 1990 levels by 2008-2012.

While the package of measures to achieve these targets contains measures to significantly reduce emissions from large energy consumers covered by the EU Emissions Trading Scheme (ETS) [13], emissions from sectors not covered by the ETS – such as transport - will also be subject to national emission targets for 2020.

Transport Emissions

The EU's climate and energy package also contains specific measures aimed at addressing emissions from transport. This reflects the fact that transport is responsible for around a quarter of all EU greenhouse gas emissions, making it the second biggest greenhouse gas emitting sector after power generation. Road transport alone contributes about one-fifth of the EU's total emissions of carbon dioxide (CO2), and while emissions from other sectors are generally falling, those from transport have increased 36% since 1990.[14]

In addition to the legally binding target of 10% for renewable transport fuels in each member state contained in the climate and energy package, the EU has also put in place a range of policy instruments that are aimed at reducing GHG emissions from the road transport sector in recent years. This includes targets to improve the fuel efficiency of vehicles, targets to reduce the GHG intensity of transport fuels and the CO2 labelling of cars[15, 16, 17, 18, 19, 20].

Against this background, it is clear that the growing pressure to reduce GHG emissions from road transport vehicles will make it increasingly difficult for traditional fossil fuels to "compete" unless they are modified to reduce their emissions profile or blended with bio-fuels to help to enhance the renewable element.[21]

Irish Government Policy Initiatives

Climate change has also become a primary driver of policy in Ireland. The National Climate Change Strategy 2007-2012, for example, contains a target to reduce greenhouse gases by 3% per year in an effort to meet Ireland's commitments under the Kyoto Protocol[22], and of course, Ireland is now legally obliged to meet the more stringent targets contained in the EU's climate and renewable package.

Recent estimates from the EPA[23] indicate that after several years of very significant growth, Ireland's emissions actually declined in the last two years. However, it is also evident that the majority of this decline is due to the economic downturn and it is expected that once economic activity picks-up again, emissions will once again start

[13] The EU ETS covers power generation companies and large energy users, such as steel producers, cement producers, large manufacturers etc.
[14] http://ec.europa.eu/clima/policies/transport/index_en.htm
15 Regulation (EC) No 443/2009
16 Directive 2009/33/EC
[17] http://ec.europa.eu/transport/urban/vehicles/directive/directive_en.htm
18 COM(2009)593
[19] http://ec.europa.eu/clima/policies/transport/vehicles/vans_en.htm
20 Directive 2009/30/EC
[21] Ibid, page 12
[22] Ireland National Climate Change Strategy 2007-2012.
[23] http://www.epa.ie/downloads/pubs/air/airemissions/GHG_1990-2009_Provisional_2011.pdf

rising[24]. For this reason, it is clear that concerted action will continue to be needed to "de-carbonise" the economy if Ireland is to meet its international commitments.

In March 2007, the **Government's Energy White Paper**[25] was published. It sets out the energy policy directions and targets for Ireland to 2020. It sets a target to achieve 20% savings in energy end use across the electricity, transport and heating sectors by 2020, in line with EU targets, and an indicative target of 30% by 2020 to surpass the EU ambition. It also sets a target for the penetration of renewable energy in transport – to account for 5.75% of road transport by 2010 and 10% by 2020.

In June 2009, the EU adopted Directive 2009/28/EC on the promotion of the use of energy from renewable sources, which establishes the basis for the achievement of the EU's 20% renewable energy target by 2020. Under the terms of the Directive, each Member State is set an individually binding renewable energy target, which will contribute to the achievement of the overall EU goal. Ireland's targets are:

- A Renewable Energy Share (RES) of 16% of total energy consumption in 2020
- 10% of road and rail transport consumption from renewable sources in 2020

The National Renewable Energy Action Plan[26] (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under the Directive. In addition, the Government's *National Energy Efficiency Action Plan 2009-2020 – Maximising Ireland's Energy Efficiency*[27] details Ireland's energy efficiency strategy – across a range of areas from planning to transport.

The Transport Sector – Irish Policy Initiatives

The transport sector will be expected to make a significant contribution to meeting EU and national emission reduction targets. In 2009, the sector was responsible for over 21% of Ireland's total emissions and until recently, had seen amongst the fastest increase in emissions of all sectors.

The *National Climate Change Strategy 2007-2012* committed to changing the basis for assessing Vehicle Registration Tax (VRT) and Motor Tax from 2008 so that they would be more closely aligned with CO2 emissions and send the right "signals" to drivers. As a result, both taxes are now levied on the basis of the C02 emission rating of the car rather than engine size as was the case in the past. VRT reliefs are also available for electric, hybrid-electric and flexi-fuel vehicles (i.e. vehicles capable of operating on an E85 bioethanol mix).

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[24] http://www.esri.ie/UserFiles/publications/RS19.pdf
[25] http://www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf
[26] http://www.dcenr.gov.ie/NR/rdonlyres/03DBA6CF-AD04-4ED3-B443-B9F63DF7FC07/0/IrelandNREAPv11Oct2010.pdf
[27] http://www.dcenr.gov.ie/Energy/Energy+Efficiency+and+Affordability+Division/National+Energy+Efficiency+Action+Plan.htmhttp://www.dcenr.gov.ie/NR/rdonlyres/FC3D76AF-7FF1-483F-81CD-52DCB0C73097/0/NEEAP_full_launch_report.pdf

In line with the general shift in policy to ensure that motor taxes tax greater account of CO2 emissions, in Budget 2010 the Government also announced the introduction of a carbon levy on fossil fuels to change the relative price of fuels based on CO2 emissions in order to change consumption patterns, encourage fuel efficiency and lead to an improvement in environment quality. It is anticipated that the levy, which was introduced in December 2009 at a rate of €15 per tonne of carbon, will steadily increase in the coming years.

The Government's *Smarter Travel* policy document, *Smarter Travel: A Sustainable Transport Future*,[28] was published in February 2009, which covers the period 2009-2020, highlights a number of key steps to ensure that people choose more sustainable transport modes, to minimize the impact of transport on the environment and to improve Ireland's security of energy supply by reducing dependency on imported fossil fuels.

Within this policy document, the Government again sets out its commitment to a number of important actions and measures. These include:

- Ensuring that **10% of energy used in transport by 2020 is sourced from renewable resources**, which are sustainable, reduce fossil fuel dependency and significantly reduce greenhouse gas emissions over the full life cycle.
- The introduction of a **Biofuels Obligation** which will require that a certain percentage (4.166%) of the road transport fuel sold in Ireland from 2010 will be biofuel and a commitment to allow this target to be changed in the medium term to ensure that Ireland meets its renewable energy target for the transport sector by 2020.
- **Measures to support** other potential alternative technologies for motor vehicles, which are likely to have a significant impact beyond 2020 as technology is developed. These include **plug-in electric and hydrogen fuelled vehicles**. In the policy document, the Government signalled its commitment to these alternatives and to promote such technologies as they become commercially feasible and develop market penetration. Moreover, it will also **provide further incentives to encourage a switch to electric vehicle technology with the aim of achieving 10% market penetration by 2020.**
- The Government has committed to require every public sector organisation and public transport provider to prepare a plan for fleet replacement based on the most sustainable vehicle and fuel type. The document goes on to state that "*we will encourage the conversion of the taxi fleet and private bus/coach fleets to alternative vehicles/fuels. We will also change existing corporate tax schemes to discourage the purchase of less fuel-efficient vehicles and to encourage a change to more sustainable fleets*".

Electric Vehicles

Another important dimension to the Government's transport policy is the promotion of electric vehicles (EVs), and indeed, the Government has already set a target to ensure

[28] http://www.smartertravel.ie/download/1/NS1264_Smarter_Travel_english_PN_WEB.pdf

that electric vehicles make up 10% of the transport fleet by 2020[29] (though others argue for an even more ambitious target[30]). Based on the current size of the national fleet, this would equate to around 230,000 vehicles by 2020.

The market for electric vehicles appears to be gaining significant "traction" both in the EU and globally, with many countries now introducing incentives to increase their uptake and more and more mainstream vehicle manufacturers launching new electric or hybrid electric vehicles.

The Government has ambitions to make Ireland a testing ground for more widespread deployment. Indeed in announcing the target for electric vehicle in November 2008, Eamonn Ryan, Minister for Communications, Energy and Natural Resources stated that "*The Irish Government is signalling its intentions to national and international players that Ireland is 'open for business'. We are positioning ourselves as a centre for electric vehicles. The Government expects considerable international investment to emanate from this plan.*"[31]

As outlined in SmarterTravel, it is considered that a number of factors make Ireland ideal for the deployment of electric vehicles, such as the relatively limited distances travelled by motorists, and the availability of electricity generated from renewable sources.

"*For these reasons, electric vehicles offer a real opportunity to dramatically reduce the Greenhouse Gas Emissions from the transport sector …. Moreover, they also offer the opportunity to reduce imports of fossil fuels, improving our security of supply situation. Finally, this dynamic and rapidly growing sector also offers a range of new enterprise and employment possibilities, both in terms of research and development and industrial production.*"

11.5 Summary and implications for Dublin Port

As indicated above, energy products are an important element in Dublin Port's overall traffic volumes and have been an area of strong growth over the last decade and more. However the **sector is undergoing significant change** and these changes are likely to accelerate as efforts to reduce greenhouse gas emissions and address concerns about Ireland's reliance on imported fossil fuels intensify both in the period to 2020 and beyond.

29 In the Carbon Budget presented by Minister for the Environment, Heritage and Local Government in October 2008, a target of 10% of the national road transport fleet to be powered by electricity by the year 2020 was announced. This was followed in November 2008 by an announcement by the Minister for Communications, Energy and Natural Resources and the Minister for Transport of further detail of how this target will be met

30 See for example the report on electric vehicles published by the Oireachtas Joint Committee on Climate Change and Energy Security, 2010.

31 http://www.dcenr.gov.ie/Press+Releases/2008/Government+announces+plans+for+the+electrification+of+Irish+motoring.htm

It is also clear that the **traditional link between economic activity and energy demand is being weakened** as a result of EU and national measures to encourage energy efficiency and promote the use of renewable energy sources. Therefore, while the economy is expected to a growth path in the medium and long term, **the energy intensity of economic activity is expected to decline.**

The SEAI is predicting that by 2020 total energy demand will be 2.4% lower than 2009 levels and that **demand for oil products**, which is the category that will most directly impact on Port traffic**, will be 7.4% lower**.

However, even within this category there are expected to be significant variations, with **demand for heating oil** for use in households and office buildings expected to record the **most significant downturn**, while fuels used by the transport sector are expected to increase on 2009 levels. Nevertheless, it is also clear that even within the **transport sector**, the **pace of growth will be relatively modest** as measures to improve the fuel efficiency of vehicles and promote the use of alternative fuels being to impact on overall fuel consumption levels. Moreover, given the EU's long term goal of reducing GHG emissions by between 80% and 95% by 2050 and the accelerated deployment of electric and other alternatively powered vehicles, that **imports of virtually all types of fossil fuels are likely to decline substantially in the period from 2020 to 2040**.

The SEAI forecasts are based on the assumption that EU and national policy measures aimed at tackling climate change and reducing reliance on fossil fuels will be implemented in full. They are also based on assumptions for relatively modest growth in the Irish economy over the period to 2020. Clearly, there are many factors that could result in significant "under or over-shooting" in any given year. Nevertheless, it is also clear that the **underlying trend in the consumption of fossil fuels is likely to be downwards** and that, in the absence of any fundamental shift in policy, this downward trend will only accelerate in coming years.

While these changes in the energy sector will obviously threaten a traditionally very important area of trade through Dublin Port, **the changes could also offer new opportunities for the Port** – as much of the equipment needed to achieve the Government's targets will lead to increased demand for products such as insulation materials, more fuel efficient boilers, capital equipment for wind farms etc. - the majority of which will need to be imported.

In addition, ports on the Irish Sea are also well placed to take advantage of the **major investment that is due to take place in UK off-shore wind capacity**. The Crown Estate's Round 3 off-shore wind programme[32] will involve an investment of approximately £100 billion in the development of 25 GW (gigawatts) of additional UK offshore wind energy generation capacity by 2020. Because of the scale of future demand, a number of international equipment manufacturers are actively looking at manufacturing bases closer to this market.

[32] http://www.thecrownestate.co.uk/round3

Indeed, the Offshore Valuation Group[33] highlights the scale of development that is possible in the UK and the demands that this will place on industry. It states that "*The infrastructure deployment required is similar in scale to that of oil and gas in recent decades*."

This could also present huge opportunities for Irish businesses as much of the planned investment will involve locations in the Irish Sea and west of Scotland that are more readily accessed from locations in Ireland. A number of major manufacturers are already actively looking for bases to exploit this UK market growth and recent announcements from Gamesa are representative of the opportunities Ireland may be able to exploit.[34] Moreover, recent press reports[35] suggest that Belfast is actively taking steps to exploit this opportunity and become a "renewable energy hub".[36] Given its location, **Dublin Port too could become an important centre in the rapidly expanding offshore wind sector**.

[33] http://www.offshorevaluation.org/
[34] LONDON, Oct 7 (Reuters) – "*Spain's Gamesa is committed to building an offshore wind turbine factory in Britain and expects to announce concrete plans before the end of the year, the company's chief executive told Reuters*".
http://af.reuters.com/article/energyOilNews/idAFLDE69620V20101007
[35] http://www.independent.ie/breaking-news/national-news/harbour-plans-may-create-450-jobs-2520530.html
[36] http://www.belfast-harbour.co.uk/news/article40/belfast-harbour-aims-to-become-leading-uk-renewables-hub

12. Medium-term prospects for construction commodities

This section provides:

- ✓ A review of the main construction commodities handled by commercial ports and Dublin Port.
- ✓ A review of the construction industry cycle and the key drivers of construction.
- ✓ A discussion on the prospects for construction output and the cement industry (production, imports, exports) over the long term.
- ✓ A discussion on long term issues likely to impact on construction

12.1 Statistics on port traffic[37]

Port traffic at Irish ports

Separate data is collected in regard to activity at Irish ports and records the total tonnage of goods handled at Irish ports. The most recent data relates to 2009 and showed that the total traffic handled at Irish Ports amounted to 41.9 million tonnes in 2009. Dublin Port accounted for 44.4% of the total (18.6 million tonnes).

Over the period since 2000, Dublin Port has accounted for 38% of the total goods handled at Irish ports.

Table 12.1: Total cargo handled at Irish Ports 2000-2009

000s tonnes	**All Ports**	*of which* **Dublin Port**	**Dublin as % of Total**
Total cargo	**482,392**	**183,399**	**38%**
made up of			
Roll-on/roll-off traffic	107,362	80,829	75%
Lift-on/lift-off traffic	71,263	43,952	62%
Liquid bulk	136,513	37,944	28%
Dry bulk	**148,638**	**18,253**	**12%**
Break bulk and all other goods	18,616	2,421	13%

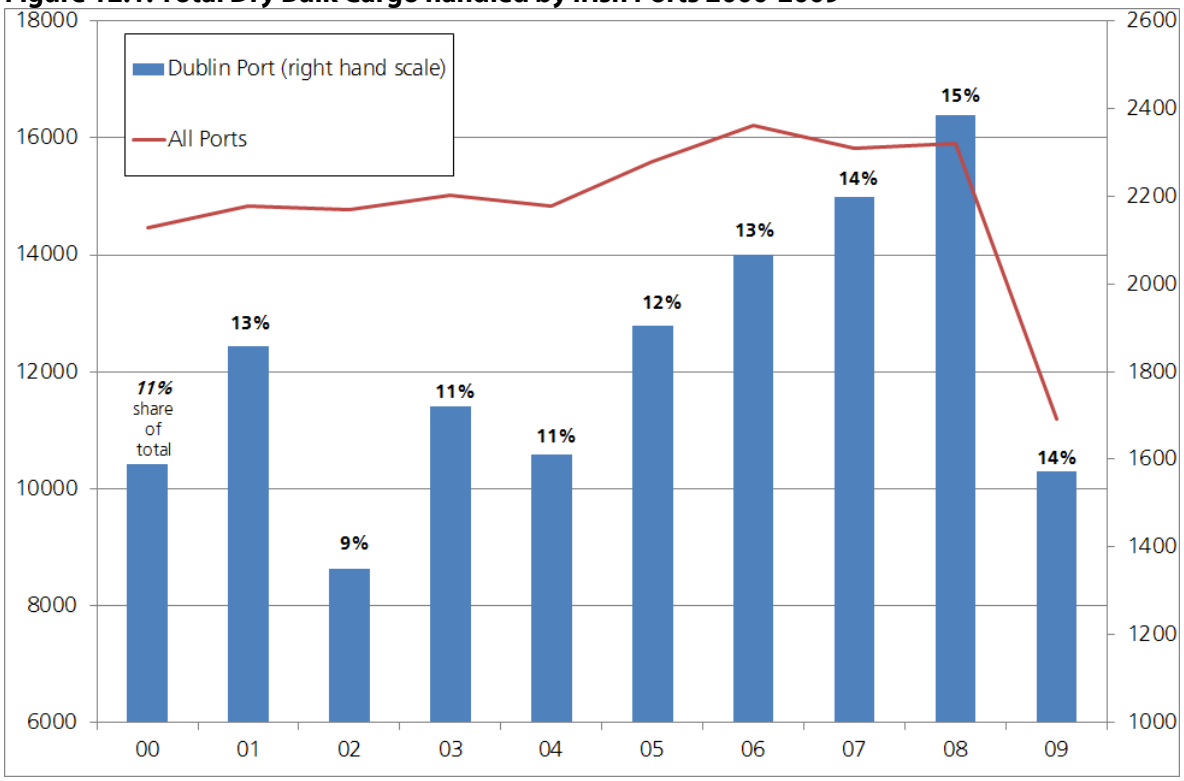
Source: CSO

As this section is dealing solely with construction commodities, it concentrates on the Dry Bulk volumes[38] which are categorised as Bulk Solid cargo by Dublin Port. Dublin handled an average of 12% of the total Dry Bulk cargo through Irish ports over the

[37] The main data sources referenced in this section are the Central Statistics Office in respect of the trade data and port activity data and Dublin Port in respect of its own throughout.
[38] Dry Bulk commodities include crude fertilisers, animal feedstuffs, cereals and cereal preparation, oil seeds, mineral ores, cement clinker and inorganic chemicals. The agricultural based products are covered in the Agricultural section.

period 2000-2009. That share peak at 15% in 2008 or close to 2.4 million tonnes. However when the substantial imports of coal (Moneypoint) and bauxite (Aughinish Alumina) handled by the Shannon Foynes Port are excluded, Dublin Port's share is estimated at closer to 20%.[39] Dublin Port handles the second largest volume of Dry Bulk trade in the country after Shannon Foynes Port.

Figure 12.1: Total Dry Bulk Cargo handled by Irish Ports 2000-2009



Source CSO (including Shannon Foynes).

Over the period 2000-2008, total Dry Bulk volumes nationally increased by an average of just 1.2% per annum while the corresponding increase at Dublin Port was 5.2%.

The economic recession is reflected in the downturn in volumes in 2009 with total Dry Bulk volumes down by 30% nationally in 2009 to 11.2 million tonnes.

Trade in construction materials – national

Focusing on construction materials, there are three broad categories of construction materials which are captured in the trade data by the CSO. The vast majority of this trade is handled at Irish ports apart from any product that comes across the Border. The main products handled at Dublin Port are also provided.

[39] This figure is derived by excluding imports of coal and metals/ores from the Dry Bulk product handled at Shannon Foynes.

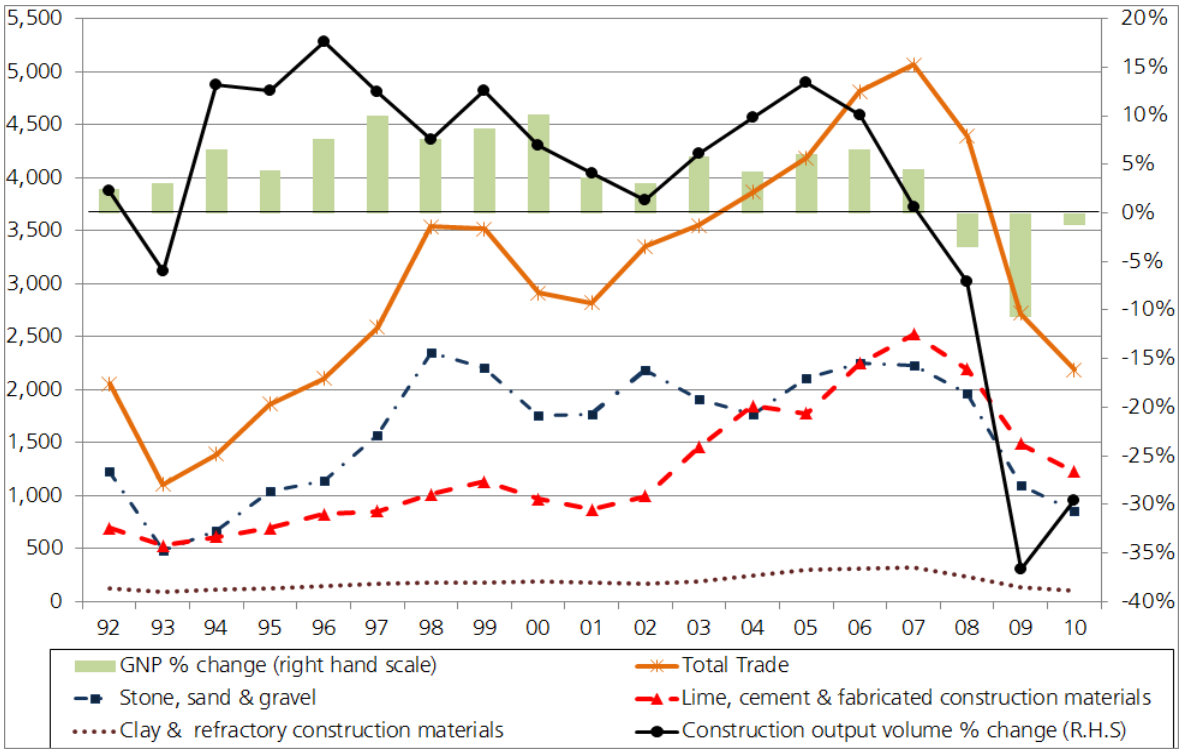
Table 12.2: Construction materials traded in Ireland

All Trade in Construction and related materials	Main Bulk Solid commodities handled at Dublin Port
Stone, Sand and Gravel,	
- Building or monumental stone	- Marble, Granite
- Gypsum, plasters, limestone flux	
- Natural sands of all kinds	- Silica Sand
Lime, Cement and Fabricated Construction Materials,	
- Portland cement, Cement clinkers and Aluminous cement	- Cement additives fines, Slag Cement, Clinkers
- Monumental or building stone	
- Asphalt, Petroleum Bitumen,	- Petroleum Bitumen
- Panels, Boards, Tiles, Blocks	- Panels, boards
- Construction materials of asbestos-cement, fibre-cement	
Clay, Construction materials	- Construction materials
- Bricks, Blocks, Tiles, Ceramic building bricks, Roofing tiles, unglazed/glazed ceramic flags and paving.	

Source CSO Trade Section and Dublin Port.

The total national trade (imports and exports) recorded over the period 1992-2010 is shown in the next Chart alongside the volume change in GNP and construction output.

Figure 12.2: Total Trade in construction materials in Republic of Ireland 1992-2010



Source: CSO

2010 data is just for ten months.

There is a reasonable correlation between the volume of construction materials handled, GNP and construction output over the period. The chart shows that total volume of materials handled nationally reached a low of 1.1 million tonnes in 1993, after which the volume of materials handled increased by an annual average rate of 21% by 1999. A temporary setback in 2000 and 2001 was quickly followed by a resumption in trade until 2007 when total volumes peaked at 5.1 million tonnes. This corresponded to an annual average rate of growth of 10.3% between 2001 and 2007. As the recession emerged, total volumes handled dropped sharply. Based on an estimate for the full year 2010, trade volumes look set to decline by almost 20% on average from the peak (2007).

There were two main periods of strong growth: 1993 to 1999 and 2001 to 2007, during which the volume of trade in construction materials, GNP and the volume of construction output each expanded strongly. Conversely, the most recent severe recession led to a double digit decline in construction output and materials traded through the ports.

Table 12.3: GNP, construction output and traded in construction materials
Annual average % growth 1993-2010

	GNP	Construction Output	Trade in Construction Materials
1993-1999	7.7%	12.6%	21.3%
1999-2001	6.8%	5.5%	-10.5%
2001-2007	5.0%	6.8%	10.3%
2007-2010	-5.2%	-25.2%	-19.5%

Source: CSO

Construction commodities handled at Dublin Port

Focusing in on the main construction related products handled by Dublin Port, these are classified under the heading 'Bulk Solid'. There are in addition some construction related products which are defined under 'Break Bulk', but in volume term these are relatively small.

- Cement, Additive Fines (mostly granulated slag cement – see below)
- Ores, Concentrates
- Cement and construction materials
- Concrete sleepers (for railways) – classified as 'Break Bulk'
- Liner Board (used in buildings) - classified as 'Break Bulk'
- Plasterboard (used in buildings) - classified as 'Break Bulk'

The total volume of cement additive fines and construction materials represented 20% of the total Bulk Solid cargo at Dublin Port[40]. Taking both groups of commodities together, they increased at an average annual rate of 22.6% during

[40] Animal feed (Section 14) accounted for the highest proportion at 28% followed by Metal Scrap at 22% of the total.

the boom period 1994-2007 but subsequently declined by an annual average rate of 36.5% by 2010.

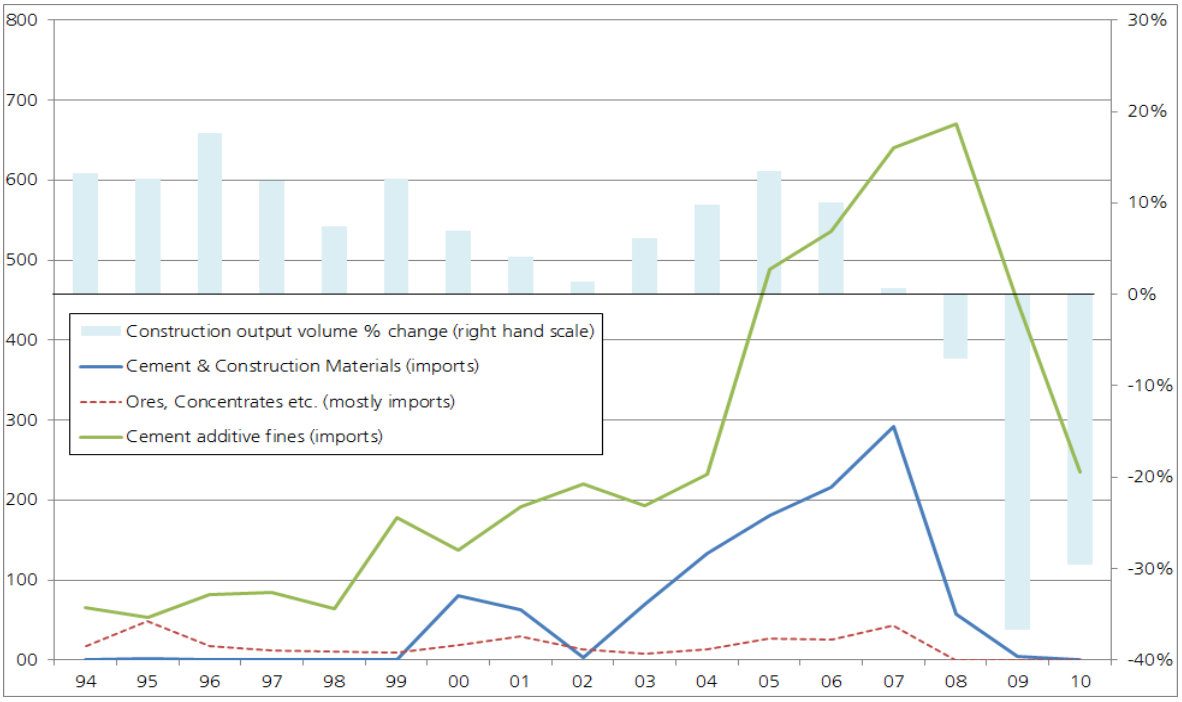
Table 12.4: Construction materials and cement handled by Dublin Port

	1994-2010 *(000 tonnes)*	% of Total Bulk Solid cargo
Cement & Construction Materials (imports)	1,103	*4%*
Cement Additive Fines (imports)	4,520	*16%*
Total above	**5,623**	***20%***
Total 'Bulk Solid' cargo Dublin Port	**28,798**	
Total 'Dry Bulk' cargo nationally	233,380	
Dublin as % of Total		***12%***

Source: Dublin Port

The next chart show trends in total volumes for the first three commodities above against the trend in construction output since 1994.

Figure 12.3: Total Trade in construction materials handled by Dublin Port 1994-2010



Source: Dublin Port

The period since 1994 illustrates the substantial growth in cement additive fines[41], equivalent to an average of 18% per annum until 2008. By 2010 volumes had dropped back to 2004 levels, an annual average decline of almost 41% since 2008. These trends mirror trends in the output of the construction industry.[42] Volumes of cement and construction materials are more volatile, comprising mostly imports. These were substantial during the construction boom, reaching 1 million tonnes over the period 2000-2007.

In regard to the combined figure of 5.6 million tonnes (Table 12.4) for construction materials through the port since 1994, total volumes declined to 55,000 tonnes in 1995. By 1997, total volumes had increased by an average of 24.2% per annum. Thereafter total volumes declined to 64,000 tonnes in 1998 but subsequently increased threefold in 1999. There followed an exceptionally long period of growth until the peak in 2007, during which the average annual growth over the period was 23%. By 2010 total volumes had declined to 235,000 tonnes, a decline of 36.5% from the peak year.

The peak volumes reflect periods of shortages of cement and cement products during the boom as cement companies imported cement additives, mostly slag cement but some cement clinkers (unground cement), both of which are used in the manufacture of concrete.

12.2 Construction industry – review of performance

While the Dublin Port Master Plan is looking at prospects for the port over the longer term, it is important to understand the factors which influence the construction sector over time. These same factors will continue to influence construction and the demands for its products and materials in the future. Other new issues may arise over the longer term.

Construction industries, just like the economy, generally tend to be subject to fluctuations in activity levels. These fluctuations do not follow any predictable periodic pattern but will be influenced at any point in time by a number of factors, including **Government policy, the state of the public finances, public capital investment provisions, trends in interest rates, income and employment, demographics, the level of public and private sector investment and the level of confidence in an**

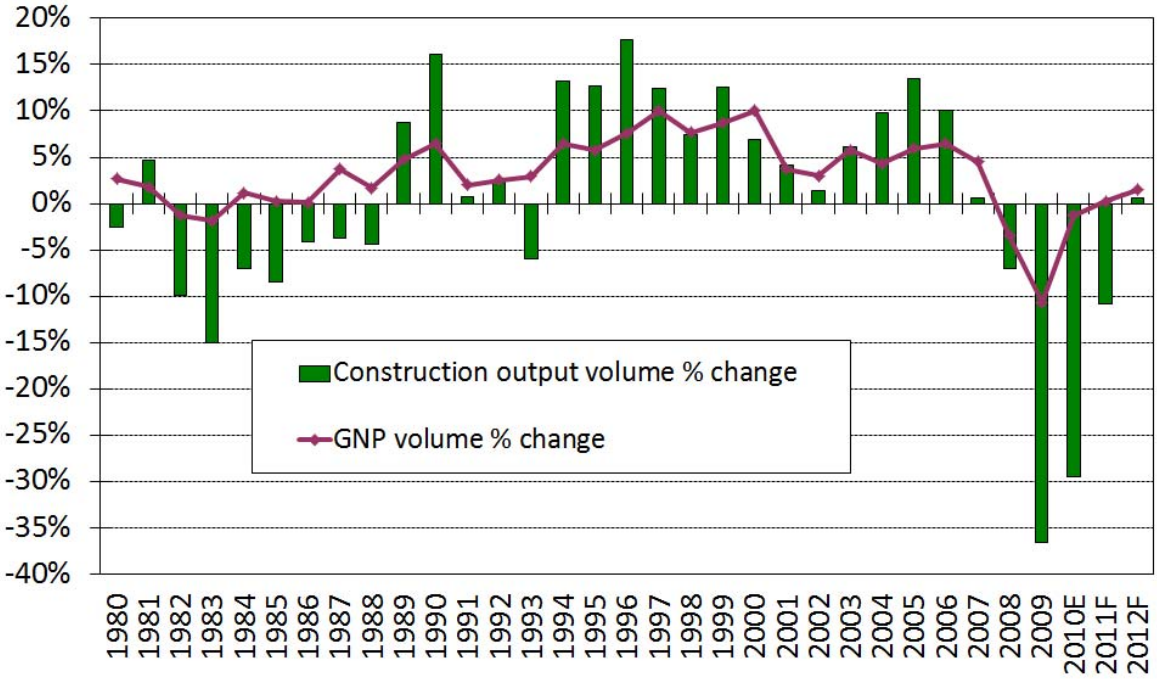
[41] Cement additive fines generally cover Slag cement or GGBS (ground granulated blastfurnace slag) which is increasingly being used as an ingredient in the manufacture of blended portland cement. Using slag cement to replace a portion of portland cement in a concrete mixture is an efficient way to make concrete more consistent and more environmentally friendly. There may also have been some cement clinkers – used in the production of traditional cement - imported during the boom years. Clinkers are formed by the heat processing of cement elements in a kiln. Limestone, clay, bauxite, and iron ore sand in specific proportions are heated in a rotating kiln at 2,770Â° Fahrenheit (1,400Â° Celsius) until they begin to form cinder lumps, known as cement clinkers. Cement clinkers are usually ground with gypsum to produce the fine powder later mixed with liquid to produce cement, although some manufacturers ship cement clinkers in their lump form to cut down on dust. Cement is heavily relied upon to produce mortar, grouts, and concrete, and cement clinkers are the first stage, post firing, in making cement.
[42] The construction industry cycle is discussed in Section 12.2.

economy. As the construction cycle fluctuates, the demand for products, materials and services supplying the construction sector will adjust to the changes in output levels.

Review of the construction cycle – where we have come from

The cyclical nature of the Irish construction industry is evident from the next chart which shows construction output and real economic growth (GNP) over a thirty-year period.

Figure 12.3: The Construction and GNP Cycle 1980 to 2012F



Source: CSO National Accounts, DEHLG Annual Construction Review and Outlook, October 2010

The construction sector is made up of three main sub-sectors: residential, general contracting and civil engineering. The cyclical nature of the industry over time reflects the contributions from each sub-sector, which are determined by the scale of investment by the public and private sectors. During the period 1994 to 2006 activity levels across all sub-sectors of the industry increased at exceptional rates, making it the longest boom phase over the last thirty years and probably the longest on record. The demands for construction commodities, products and services similarly reached unprecedented levels during that time.

Looking briefly at the phases of the construction cycles:

During 1980 to 1981, the construction industry peaked in value terms in 1981 with output up by 5%. The industry benefited from **an expansion in the Public Capital Programme** in 1981.

Over the next six year period, 1982 – 1988, the industry experienced an average decline of 7.5% per annum in construction output due to low levels of economic growth. Average GNP grew by less than 1% per annum. Interest rates were high in both nominal and real terms over this period, thereby adversely impacting on private sector investment in particular. Housing demand also declined sharply due to high emigration and relatively static population levels.

In contrast to the previous period, this was followed by a much improved economic growth performance in the two years 1989-1990 (+5% and +7% respectively) which led to a short recovery in construction industry output in each year, equivalent to volume growth of 10% and 15% respectively in each year.

During the period 1991 - 1993, the industry recorded an average output decline of just over 2% per annum, despite growth in the Public Capital Programme in real terms over this three-year period - partly due to the **provision of generous EU funding over the period 1989 to 1993** - but there was a decline in total construction output due to a **fall off in private sector investment.**

The next five year period 1994 – 1999 was marked by spectacular growth in construction output, with industry volumes expanding by 13% per annum on average culminating in the most vigorous growth period in the history of the State. This period was unique in that all of the broad categories of work consistently contributed to the industry's strong performance since 1994, with housebuilding leading the upturn in 1994. This period was associated with **a positive climate for construction investment. Low and stable interest rates generated a high level of consumer and business confidence**. This was accompanied by a very strong increase in employment of around 5% on average per annum since 1994. All of these factors contributed to the recovery in private sector construction investment, particularly in the housing and non-housing sectors. The **strong growth in foreign direct investment** also boosted private non-residential construction, while the continued availability of EU financial support for public sector investments until 1999 continued to sustain public investment activity.

Post 1999, the period 2000-2002 was characterised by a deceleration in output growth, due to the slowdown in economic growth as the Irish economy began to lose competitiveness and our exports weakened. The construction industry problems of the excesses of the late 1990s, in terms of the **sharp increase in building cost inflation and lack of competitive tendering**, led to a weakness in demand from the private sector in the early years of the decade.

However the industry witnessed a phenomenal acceleration in construction output growth again over the period 2003 - 2007 as **private sector building activity expanded at an unprecedented rate up to 2006 as interest rates fell to historically low levels and the easy availability of credit became a worldwide phenomenon.** The economy and construction sector went out of control as lax lending policies exacerbated an already unsustainable situation. Meanwhile the public sector benefitted from the **substantial funds allocated each year to infrastructure projects in Public Capital Programmes (PCPs)**. The total PCP had doubled in value terms, which was equivalent to an average annual increase of 10% in nominal terms. As employment and

disposable incomes continued to increase across the economy, the demand for housing and credit seemed to be unrelenting at least until 2006. Although the volume of construction output continued to rise modestly in 2007, a substantial correction in the housing market began around the end of 2006, and the volume of residential investment subsequently declined in 2007.

The latter years of this period witnessed **a substantial investment in agricultural buildings**, which continued into 2008. Approximately €2 billion was invested in farm buildings in 2007 and 2008 following the introduction of the Nitrates Directive, cross compliance, an increased participation in the Rural Environment Protection Scheme (REPS) and the closure of the Farm Waste Management Scheme at the end of December 2006, - all of which required farmers to keep their farms in a good environmental and agricultural condition. As a major user of cement materials, the boom in agricultural investment contributed to a record demand for cement.

However, by the end of this period, it was clear that the Irish economy had become too dependent on construction as the value of output reached a record level of close to €39 billion in 2007 or 24% of GNP. Meanwhile the sector was responsible for employing one in every 5 persons working in the economy, either directly or indirectly in construction.

Construction peaked at 25% of GNP in 2006 and total investment in the economy, including building and construction, peaked at around 31%[43]. Both had become unsustainable and an adjustment was inevitable.

Over the most recent period 2008-2010 **the industry experienced its most severe contraction** in the past thirty years and probably since the foundation of the State.

Where we are now - construction sector in crisis

The Irish construction sector is in crisis as the volume of construction activity adjusts to well below normal levels, following an unprecedented boom over the period 1994 to 2007. Having peaked at close to **€39 billion in 2006** (25% of GNP), the ensuing crisis led to the value of output falling to **below €12 billion in 2010**, or 9.2% of GNP[44]. The current projection expects a further contraction of 10.8% in volume terms this year, with total construction output forecast to fall to **around €10.5 billion**, just over 8% of GNP[45].

Every sector of the construction industry, without exception, has been affected by the collapse of the housing and construction bubble and by the challenging economic environment. Private sector residential and non-residential construction have been

[43] Total investment in the economy captures all capital investment in building and construction plus investment in machinery and equipment.
[44] Review of the Construction Industry 2009 and Outlook 2010-2012, prepared for the Department of the Environment, Heritage and Local Government by DKM Economic Consultants, October 2010, available at http://www.environ.ie/en/Publications/StatisticsandRegularPublications/ConstructionIndustryStatistics/FileDownLoad,24473,en.pdf
[45] This forecast was prepared before publication of the National Recovery Plan which contained further capital investment adjustments of the order of €3 billion over the period 2011-2014.

particularly affected by a range of issues, including a decline in construction confidence, a lack of new orders, the overhang of property, continuing high debt levels and difficulties securing finance. As a result the numbers directly employed in construction were down 58% from the peak to 113,800 in Q3 2010. As a result, the demands from the industry for products, materials and services have similarly declined at an unprecedented rate.

The one positive development of the crisis has been the substantial reduction in construction tender prices which has resulted in better value for money for all clients, including the public sector. By the end of 2010, it is estimated that construction tender prices had declined by close to 30% since the peak in 2007. However, in the two years 2008-2010, construction material prices only declined by 4% while construction labour prices declined by almost 12% between Q4 2008 and Q3 2010.

The focus for the next four years will be the National Recovery Plan

Government has announced a total fiscal adjustment of €15 billion in the 2011-2014 period in the National Recovery Plan 2011-2014[46], of which **€3 billion in cuts is projected for capital investment**. Implementing such a sizable austerity package will undoubtedly slow the pace of recovery in the Irish economy over the next four years. Specifically, the fiscal adjustment with respect to the public capital programme is likely to have a very negative impact on construction prospects over the medium-term. It is likely that given the scale of the adjustment, a number of public sector projects may not proceed to construction. With limited prospects for private sector investment over the same period, the medium term prognosis for construction and the suppliers of products and services to the construction industry are disappointing.

The austerity measures are also likely to impact on the capital spending plans of local authorities and semi-state agencies, implying that non-direct Exchequer capital investment levels are also likely to be lower than they would otherwise be in the absence of austerity.

Medium-term prospects for construction

It is clear that the construction sector is currently in crisis and has been contracting sharply for three years. The total volume of construction output declined by almost 30% in 2010, resulting in a total contraction of 56% since the peak (2007).

The projection for 2011 is for a further contraction in construction output of 10.7%, and will leave overall output in the sector almost 61% below the peak in 2007, which is equivalent to an annual average decline of 21% per annum over the four years.

Construction output volumes may stabilise in 2012 and 2013 although the risks are very much on the downside over the next four years.

Longer term the optimum size suggests output at €20 billion

Over the long term, the issue is what is the optimum size of the construction industry likely to be? In a 2009 submission to Government by the Construction Industry Council

[46] The National Recovery Plan 2011-2014, Department of Finance, November 2010.

(CIC)[47], the view was expressed that Ireland should have a construction industry which is larger than the EU15 (c.12% of GDP) because of its continuing infrastructure deficit. The 2010 *Annual Construction Review and Outlook* suggested that an industry of around 12 to 15% of GNP is sustainable. This figure would correspond to an industry worth between €15 billion and €20 billion over the long term.

Thus it would appear that the optimum size of the Irish construction industry over the long-term will be substantially below where it was at the peak in 2007 (€38.5 billion), with the obvious consequences for suppliers to the industry and construction employment. It will also be **substantially above the perilous levels to which the industry will descend to over the next two years, estimated at close to €10bn or 50% below its optimum level.** But the industry will recover to more normal levels of activity over the long term.

12.3 Construction activity levels – implications for the cement industry

Cement production capacity

Reflecting the current crisis in construction there is substantial overcapacity in the cement industry at present. In the absence of official data on cement production in the Republic of Ireland we reviewed reports from the major cement producers.

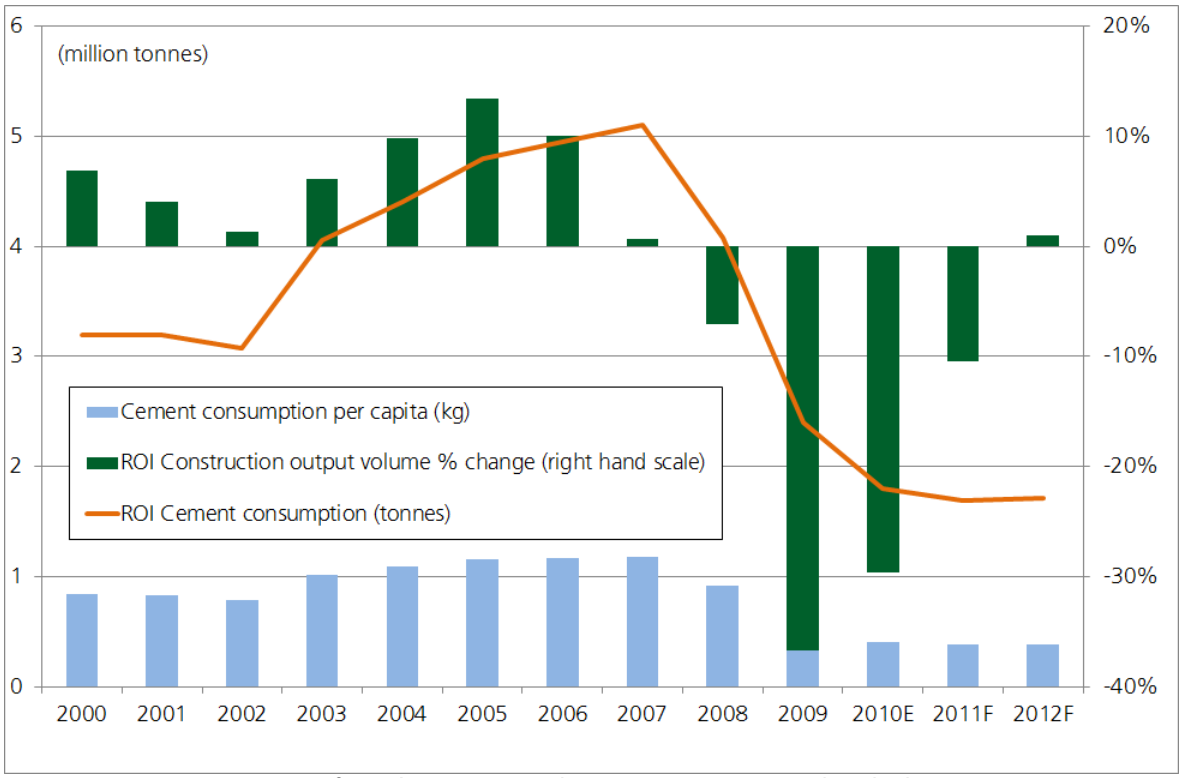
We are aware that **Ecocem Ireland** is a major importer of granulated slag cement used in its purpose built GGBS (Ground Granulated Blastfurnace Slag) grinding plant in Dublin Port, which opened in 2003. The company manufactures green cement from a by-product of iron making called granulated slag which is imported through Dublin Port. Capacity at the plant is around 300,000 tonnes. A number of the other main cement producers were also importing ground cement during the boom period. We are aware of one firm who exported small volumes of cement materials in the most recent period 2009/2010.

Based on the information collected in regard to the main cement producers, **the total domestic production is estimated at around 6 million tonnes** in the Republic or around 6.8 million on the island as a whole. In the current climate with cement demand in the Republic in 2010 estimated at less than 2 million tomes this year, total consumption in the ROI is well below the total production capacity. There has not been a significant increase in exports to make up the difference[48].

Based on the above figures the total consumption per capita in the Republic is estimated at around 400 kilograms (kg) compared with 1,200 kg at the peak. The current figure compares with an estimated installed production capacity of around 1,275 kg per capita, over three times current consumption levels.

[47] http://www.dkm.ie/uploads/pdf/reports/CIC%20Submission%20to%20Government.pdf
[48] There is generally little import and export of cement, mainly as a result of the high cost of road transport. According to research done by the EPA, the rate of consumption equals the rate of production for many EU member states, with the exception of Greece and Denmark, which exports approximately 50% of their cement production.

Figure 12.4: Cement consumption and construction output 2000-2012F



Sources: Construction output from the *2010 Annual Construction Review and Outlook*
Cement consumption*: DKM and Euroconstruct*
Population: *CSO.*

Based on the previous analysis of the optimum size of the construction industry, and assuming the peak cement consumption of 1,200 kg per capita corresponds with the peak output of around €40 billion, an industry of €20 billion would require a consumption of 500 to 600 kg per capita, depending on the mix of projects and their cement intensities. **On this basis the existing capacity of 1,275 kg per capita is far in excess of what will be required to meet the demands of the construction industry over the long term.** Even if some of the existing capacity were to shut down over the long term as it reaches the end of its useful life, the capacity is likely to be sufficient to serve the market.

Thus the prospect for imports of cement additive fines are such that they are unlikely to reach the levels achieved at the peak over the long term. With average imports of around 265,000 tonnes over the period 1994-2010 and almost 1 million at the peak, it is questionable whether the average level over the long term will reach these levels again. However, an increased demand for 'green cement' due to its environmental advantages and its higher quality compared with 'ordinary' (or Portland) cement could support imports of granulated slag over the long term. There is also an increased drive towards a green procurement policy at a national level, based on EU policy, which could see the proportion of slag cement used in the production of cement increase to more in line

with its usage in more mature cement markets. There is an opportunity for significant growth in the use of slag cement considering that typical proportions of between 25% and 50% or more are used in more mature markets[49]. The estimated proportion of slag cement currently used in Ireland is around 10 to 15% used in concrete compared with around 20 to 25% in Germany and closer to 30% in Holland. In France some 20% of cement produced consists of 'non-traditional' greener materials (e.g. fly ash), including 10% granulated slag.

However there may be factors in the long term which impact on the level of imports and these are addressed in the next section.

12.4 Key issues for the long-term

Construction materials and cement based products are an important element in Dublin Port's overall traffic volumes and have been an area of strong growth over the last decade and more, accounting for 20% of the Port's total Bulk Solid cargo over the period 1994-2010.

There are a number of issues which will influence the volume of construction related cargo handled by Dublin Port over the long term.

Increasing attention to key challenges over the long-term

However, like the energy industry, the cement industry is undergoing change. The global cement industry has been proactive in meeting **environmental challenges,** through **investment in energy-saving technologies, alternative fuels and recycled raw materials.** The use of waste products as fuel in European cement plants is already saving the equivalent of 3 million tonnes of coal per year. The use of blended cements, incorporating recycled products such as pulverised fuel ash or granulated blast furnace slag, is also growing steadily. The Irish cement industry is also proactive in this regard and is likely to pay increasing attention to these challenges over the long-term.

A reduction in cement production capacity is likely

The cement sector is the second largest source of industrial CO_2 emission in Ireland – each tonne of cement generates direct emissions of 0.8 tonnes of CO_2. This raises an issue about whether some cement production may move overseas in the long term to countries where the environmental regulations are less stringent or absent altogether. Significant investment has been put in place by the cement industry in production capacity to date but it is likely that some production capacity will close in Ireland over the next twenty-years.

A report commissioned by CEMBUREAU in 2008[50] concluded that "clinker and cement production in the EU will be seriously affected by carbon leakage. As a consequence,

[49] Slag Cement Association www.slagcement.org
[50] http://www.cembureau.be/newsroom/carbon-leakage-european-cement-industry-risk

the relocation of clinker production to countries with no carbon constraints was projected to accelerate from 2013 and to continue in the following years.

The review of GHG emission allowances in the National Allocations Plan 2008-2012 under the EU Emission Trading Scheme will take place at an EU level in 2013. The cement industry will be a key player in these negotiations. The possibility of lower allocations than at present, reflecting the much lower levels of construction activity in the period 2008-2012, might lead to some reduction in capacity but it is too early to speculate at this stage on the outcome of the review in 2013.

Environmental and energy challenges will support the use of slag cement

The **increasing focus on the better qualities of 'green cement'** manufactured using granulated slag is likely to increase the proportion of GGBS used in the production of cement over the longer term towards the higher levels achieved in more mature markets.

The cement industry is an energy intensive industry with energy typically accounting for 30-40% of production costs (i.e. excluding capital costs). Traditionally, the primary fuel used is coal. A wide range of other fuels are also used, including petroleum coke, natural gas and oil. The use of slag cement requires nearly 90% less energy to produce than an equivalent amount of traditional (Portland) cement. This generates **a significant opportunity to reduce the energy intensity and energy cost of each cubic metre of concrete.**

Green Public Procurement

Related to the whole climate change agenda is the **Green Public Procurement**[51] policy from the EU which includes ambitious targets for green public procurement and sustainable consumption and production. The aim is to foster a voluntary framework to ensure the procurement of goods and services that have the least impact on the environment throughout their whole life cycle. The construction sector is top of the Commission's list. The policy proposes that, by 2010, 50% of all tendering procedures should be 'green'.

The Office of Public Works (OPW) was the first Government body to introduce Green Procurement. Under EC directive 2004/18/EC environmental performance is permitted to be used as a contract awarding criteria. Specifically the OPW have included the following statement in their tendering documents:

"The OPW require the specification and use of more environmentally friendly cements in publicly funded construction projects, in compliance with EU procurement and environmental policies. This will involve the partial replacement

[51] Information on Green Public Procurement can be found at http://ec.europa.eu/environment/gpp/index_en.htm
.

of Portland Cement by existing waste products to yield significant improvement in the environmental performance of concrete"

Government's commitment to public capital investment in infrastructure

The demand for cement responds to the demand for construction which in turn reflects the commitment by Government to investment in construction but also the demand for housing and non-residential buildings by the private sector. While both will be determined by the level economic activity, the Government's commitment to public sector infrastructure is much reduced over the next four years and is likely to remain below the levels achieved during the boom period over the long-term. That said Ireland continues to have an infrastructural deficit in regard to key social infrastructure (e.g. schools, hospitals) and as the public finances are restored over the medium-term, the hope would be that this deficit is addressed.

Housebuilding

Ireland is likely to return to morel normal housebuilding levels over time when the current housing crisis ends. However the rate of housebuilding over the long term, which peaked at 20 per 1,000 of the population in 2007, is likely to fall closer to European norms of around 3 to 5 dwellings per 1,000 of the population.

14 Medium-term prospects for agriculture

14.1 Introduction

Agriculture has traditionally been a key component of the Irish economy and this trend is set to continue indefinitely over the coming decades. This sector relies heavily on Dublin Port for external trade, with imports accounting for the vast majority of agricultural goods that pass through. Approximately 640,000 tonnes of cereal and animal feed pass through Dublin Port each year, which equates to roughly 3% of the total cargo handled by the Port.[52]

Recent Performance of the Irish Agri-Food Sector

The Irish agri-food sector has proven to be relatively resilient to the global recession. The value of food and drink exports increased by more than €800 million in 2010 and stood at €7.88 billion for the year. This sector has benefited from the improved relative competitiveness of Irish manufacturers, more favourable exchange rates and higher global prices for most agriculture and as of 2010, exports were almost 8% higher than the 2000-2009 average.[53] Increased export revenue was recorded by each major category within this industry, while the dairy sector was one of the strongest performers.

According to Bord Bia, the short term prospects for food and drink exports remain broadly positive, with additional growth expected in most major categories. The future performance of the sector will depend heavily on demand from the United Kingdom, which remains the principle destination of agri-food exports. More than one-third of food and drink exports are destined to other EU markets while international markets such as the Middle East, Russia, Asia and Australia required approximately 22.3% of total exports in 2010.[54]

14.2 Agricultural Bulk Traffic at Irish Ports

14.2.1 Cargo volumes at main Irish Ports[55]

The total volume of agricultural products handled by Irish Ports experienced a gradual decline in recent years before stabilising somewhat in 2009 – it stood at approximately 2.76 million tonnes in 2006 but had fallen to 2.53 million tonnes in 2009. This translates

[52] Figures based on 1994-2010, 17 year averages.
[53] Performance and Prospects: Irish Food Drink and Horticulture 2010-2011
[54] Performance and Prospects: Irish Food Drink and Horticulture 2010-2011
[55] The main Irish Ports include Dublin, Cork, Waterford, Bantry Bay, New Ross, Galway, Drogheda and Limerick.

to a fall in the cargo of agricultural products handled of approximately 213,000 tonnes over the period 2006-2009.

However, while agricultural cargo has fallen in recent years, it has actually increased as a proportion of overall cargo passing through the main Irish Ports – from 8.9% in 2006 to 11.0% in 2009. In fact, total cargo handled by the main Irish Ports has fallen by 25% over the period 2006-2009 due to a decline in volume of 7.7 million tonnes since 2006.

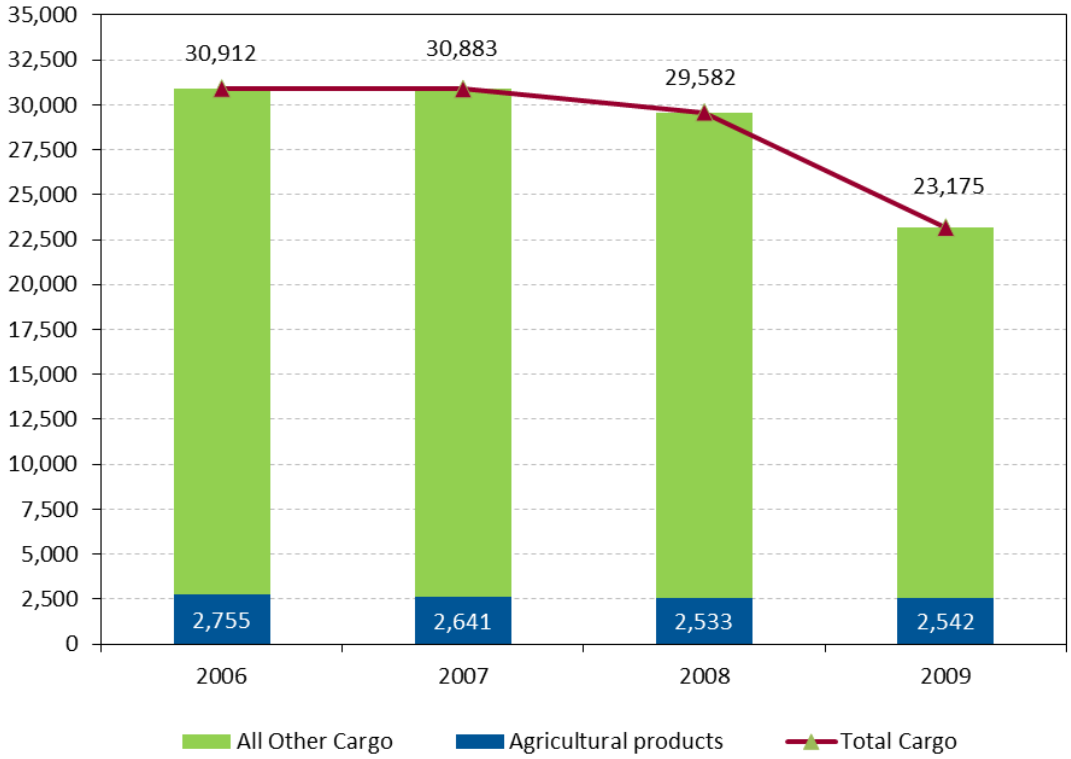
Table 14.1 Goods tonnage handled by main Irish ports* by direction, year and cargo type

Cargo Type	Goods Tonnage ('000s)			
	2006	2007	2008	2009
Goods Inwards				
Agricultural products	2,700	2,608	2,498	2,534
Annual % change		-3.4%	-4.2%	1.4%
All Cargo	**24,168**	**24,149**	**22,864**	**18,279**
As a % of All Cargo	11.2%	10.8%	10.9%	13.9%
Goods Outwards				
Agricultural products	55	33	35	8
Annual % change		-40.0%	6.1%	-77.1%
All Cargo	**6,744**	**6,734**	**6,718**	**4,896**
As a % of All Cargo	0.8%	0.5%	0.5%	0.2%
All Goods				
Agricultural products	2,755	2,641	2,533	2,542
Annual % change		-4.1%	-4.1%	0.4%
All Cargo	**30,912**	**30,883**	**29,582**	**23,175**
As a % of All Cargo	8.9%	8.6%	8.6%	11.0%

*Main Irish Ports: Dublin, Cork, Waterford, Bantry Bay, New Ross, Galway, Drogheda and Limerick.
Source: CSO – National Trade

It is evident from the above table that the vast majority of cargo for agricultural products at the main Irish Ports falls under the 'goods inwards' category; this stood at 2.5 million tonnes or 99.7% of all agricultural products in 2009. Outwards cargo volumes are quite miniscule in comparison having totalled just 8,000 tonnes in 2009 – an 85% decline on 2006 levels.

Figure 14.1 Cargo Goods handled by the main Irish Ports (tonnes)



*Main Irish Ports: Dublin, Cork, Waterford, Bantry Bay, New Ross, Galway, Drogheda and Limerick.
Source: CSO – National Trade

14.2.2 Dry Bulk at main Irish Ports

Dry bulk has accounted for considerable proportion of overall cargo that passed through Irish Ports in recent years. Almost half (48.7%) of the overall volume of cargo was dry bulk in 2008, while this proportion fell slightly to 45.5% in 2009.

Table 14.2 Agricultural Products as a % of Total Dry Bulk Activity at main Irish Ports

	2006	2007	2008	2009
Goods Inwards	23.8%	23.0%	22.4%	30.6%
Goods Outwards	1.5%	1.0%	0.9%	0.3%
Total Goods	**18.3%**	**17.9%**	**16.9%**	**23.8%**

*Main Irish Ports: Dublin, Cork, Waterford, Bantry Bay, New Ross, Galway, Drogheda and Limerick.
Source: CSO – National Trade

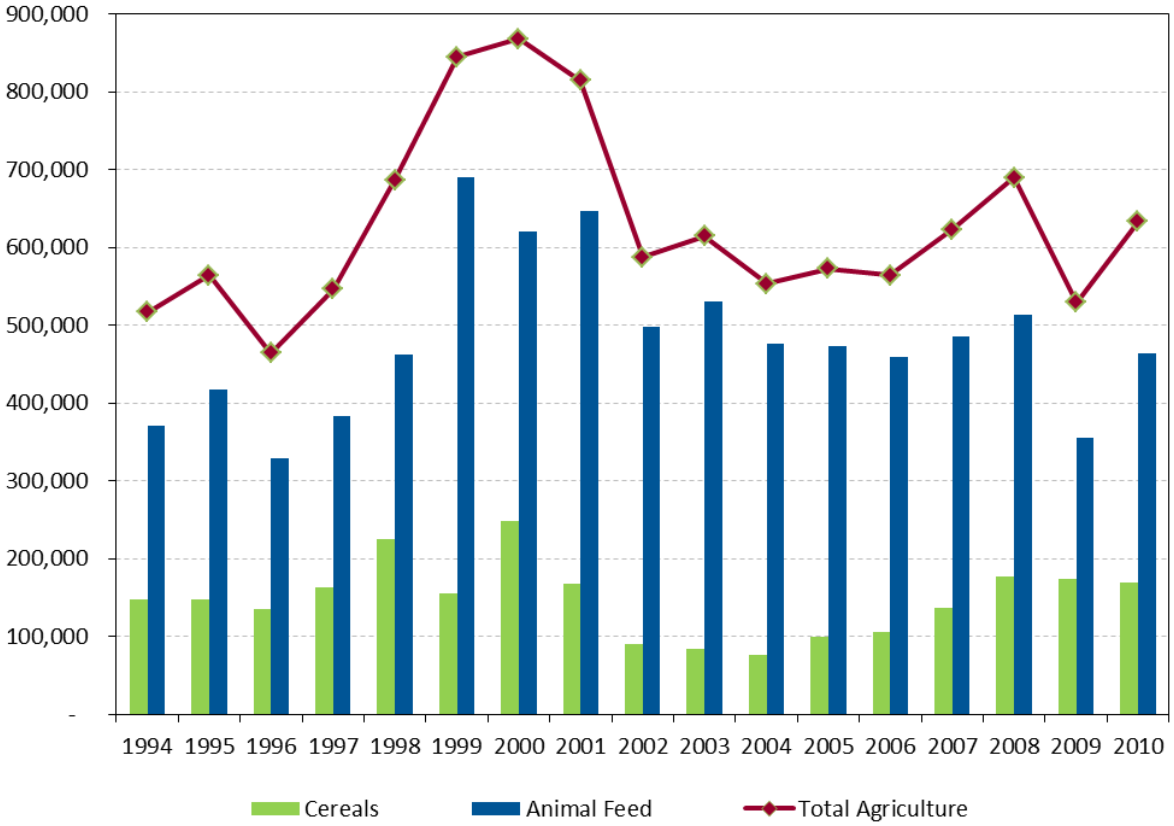
Agricultural products are a major component of dry bulk cargo at Irish Ports, having accounted for 23.8% of the total volume in 2009. With regard to goods inwards, agricultural cargo comprises of more than 30% of total dry bulk goods.

14.3 Agricultural Traffic at Dublin Port

The volume of agricultural break bulk that passed through Dublin Port since 1994 is illustrated in Fig. 14.2 below. It is evident that the vast majority of Agricultural Goods handled by Dublin Port consists of Cereals and Animal Feed.

Total agricultural cargo peaked in 2000 with 845,000 tonnes passing through Dublin Port that year. It has since declined by one-quarter to 633,000 tonnes in 2010, which is 1.1% lower than the average tonnage of 641,000 per year in that decade.

Figure 14.2 Agricultural Cargo handled by Dublin Port 1994-2010 (tonnes)



Source: Dublin Port

Animal Feed is the more common cargo type having accounted for more than three-quarters of agricultural cargo over the period 1994-2010. Having reached almost 700,000 tonnes in 1999, 464,000 tonnes of animal feed was handled by Dublin Port in 2010. Notwithstanding this, 2010 levels were up considerably from 2009 – an increase of 110,000 tonnes.

Cereals are also an important element of agricultural traffic at Dublin Port, despite falling to annual levels of 76,000 tonnes in 2004. Almost 250,000 tonnes of cereals passed through Dublin Port in 2000, while this has levelled off somewhat in recent years close to the 170,000 tonne mark.

Over the period 1994-2010, agricultural cargo that passed through Dublin Port accounted for 37% of bulk solid goods and 3% of total cargo handled by the Port.

Agricultural cargo, which comprises of cereals and animal feed, accounted for 43.4% of all bulk solid goods handled by Dublin Port in 2010 – thus implying that agriculture had increased its proportion of bulk solid goods by more than 6% when compared with the 1994-2010 average. **Cereals and Animal Feed accounted for 2.3% of total cargo passing through Dublin Port in 2010**, indicating a decline of 0.7% when compared to the previous 16-year average.

14.4 The Future of Irish Agriculture

14.4.1 Issus facing Irish Agriculture

There are several factors that will be immensely influential in determining the future of Irish agriculture. Of particular relevance from an international perspective will be EU policy developments, WTO negotiations and climate change. World demographics will also play a key role.

14.4.2 Future Potential of Agriculture in Ireland

After more than two decades of relative stability, which was then followed by the more recent protracted recession, Ireland is now faced with a period of sustained economic uncertainty. In the past, economic development in Ireland has relied very heavily on attracting foreign direct investment but the country is now faced with severe competition from developing countries in this regard. It is generally accepted that new strategies are required if Ireland is to compete successfully on an international basis and the **knowledge based bioeconomy** has since emerged as a frontrunner – a rapidly growing sector in which Ireland is well positioned to exploit in the form on energy crops.

14.4.3 Cereals

Cereals have long been the world's most important sources of food, both for direct human consumption and indirectly. Approximately one third of world cereal use is used for livestock each year.

The annual growth rate of world demand for cereals has declined from 2.5% a year in the 1970's and 1.9% in the 1980's to only 1% in the 1990's. Notwithstanding this decline in growth, which resulted from slower population growth and shifts in diet, the average cereal consumption per person in developing has risen steadily throughout the past four decades. **According to the UN FAO, growth in the demand for cereals is going to average approximately 1.2% out to 2030**.[56]

There is likely to be a sustained demand for Irish exports of cereals with developing countries set to become more dependent on agricultural imports and substantially increase their net imports of cereals. Also, growth in cereals used as feeds is projected to be higher than years gone by. This is particularly positive for the Irish agri-food sector, as more than two-thirds of grain produced in Ireland is used for animal feed

[56] UN FAO: World Agriculture, towards 2015/2030

purposes – the remainder is a valuable raw material for Ireland's brewing and flour industries.[57]

14.4.4 Wheat

The Irish agri-food sector can benefit immensely from the projected surge in demand for wheat out to 2030. It is expected that wheat will offset the declining rice consumption in many rice eating countries, while wheat is being increasingly used for animal feed in the industrial countries – 45% of wheat in EU is used for animal feed and this proportion is growing.[58]

The FAO predicts that **net wheat imports will more than double from approximately 72 million tonnes per year at the beginning of the century to 160 million tonnes in 2030.** Irish farmers can also improve on yields over this timeframe with global growth in wheat yields is projected to increase by 1.1% per year out to 2030.

14.4.5 Coarse Grains

The agri-food sector has benefitted from the surge in global consumption of coarse grains in recent years. This trend in an increased demand for coarse grains – which includes maize, barley, rye and oats – is expected to continue over the coming decades, particularly amongst developing countries.[59]

14.4.6 Cereals in Ireland

In Ireland, tillage crops are dominated by a relatively small number of large growers farming 0.5 million hectares of land. The focus is on wheat, barley and oats mainly for animal feed, while oil seed crops for energy and feedstock crops for the food and pharmaceutical industries are also important.[60]

Domestic demand for cereals is likely to increase in line with the predicted increase in numbers in the livestock, dairy and pig sectors to 2020. Given that Ireland is only 80% self sufficient, this could lead to significantly higher imports, unless there is a notable increase in domestic production.

14.4.7 The Future Demand for Cereals

The FAO expect the world demand for cereals to increase to 1.4% per year to 2015 and further increases of 1.2% per year thereafter. Of the cereals used for food, the growth rate over this timeframe is expected to be 0.9% while cereals used for animal feed is expected to increase by 1.5% per year globally from 2015-2030. In developing countries, cereal production will not be able to sufficiently meet the demand projected out to 2030.[61] The net cereal deficits of these countries, which amounted to 9% of consumption near 2000, could rise to 14% of consumption by 2030. Surpluses of this magnitude can only be bridged by traditional gain exporters, from which Ireland can harness its potential.

[57] Food Harvest 2020, Department of Agriculture
[58] UN FAO: World Agriculture, towards 2015/2030
[59] UN FAO: World Agriculture, towards 2015/2030
[60] Teagasc 2020
[61] UN FAO

Regardless of the outcome of the Doha negotiations, the FAO expect that the EU will remain a significant net exporter of cereals, due to a well balanced cereal market. Irish exports stand to gain but are at a disadvantage when compared to competitors due to high input prices and a high cost of renting[62]. Ireland will also face competition from the plentiful supply of spare land in parts of Eastern Europe and Russia where the scope for increasing productivity is high.

By 2030, an extra billion tonnes of cereals will be needed globally each year.[63] Ireland's 12,000 cereal growers face significant pressures due to price volatility and issues associated with climate change[64]. Such unforeseen events would of course alter effective demand over short periods, but should not greatly adjust the long term picture. It is important that this sector prioritises new knowledge and technologies in order to maintain its international advantage.

14.5 Common Agricultural Policy

14.5.1 CAP and Ireland

Policy developments at EU level will play a key role in shaping the future performance of agriculture in Ireland. The impending reform of the Common Agricultural Programme (CAP), which Ireland has benefitted immensely from in years gone by, is one such instance whereby decisions at EU level will have serious implications on domestic proceedings.

The objectives of the European Common Agricultural Policy are as follows:

- To ensure a fair standard of living for farmers
- To stabilise markets
- To assure the availability of supplies
- To ensure reasonable price for consumers
- To increase agricultural productivity by promoting technical progress and ensuring optimum use of labour.

However, in an ever changing environment, CAP is faced with a number of challenges with regard to agriculture in Europe. These three main challenges consist of the following:

- Food security
- Environment
- Territorial balance

In addition to the above challenges, the EU is operating under stringent budgetary pressures, which will have no doubt increased the priority of reform. Consequently, CAP is currently under review and Member States are facing another set of reforms, set to be implemented in 2014.

[62] Food Harvest 2020, Department of Agriculture
[63] UN FAO
[64] Food Harvest 2020, Department of Agriculture

14.5.2 The CAP Reform Agenda

Much of the debate leading up to these reforms has centred on the contribution of the CAP to farm incomes in the context of ensuring food security. The European Commission have already made it clear that direct payments to farmers in old member states will be cut in 2013, with Ireland guaranteed to lose out. At present, the Irish Government is strongly focused on protecting Ireland's share of EU funding in the upcoming negotiations.

Environmental aspects have also been at the forefront of the agenda despite concerns from farming organisations. In addition, market supports are likely to achieve much attention in the forthcoming reforms. The issue of what CAP will offer in terms of support for agriculture markets during times of volatility will be prioritised.

14.5.3 Will Ireland benefit from CAP Reform?

National receipts of CAP subsidies were traditionally determined indirectly as member states profited differently from EU-wide intervention prices and production support. However, CAP payments have being increasingly distributed through national envelopes in such a manner that member states can then spend their entitlements to CAP funds with some discretion.

Zahrnt (2009)[65] points out that several traditional defenders of the CAP are likely to loose from reform, but other countries that defend the status quo would surprisingly gain from reform. Ireland however would fall under the former category and seems almost certain to be worse off by 2014 when the reforms come into practice.

The European Centre for International Political Economy (ECIPE) has estimated the future distribution of CAP subsidies under three scenarios for the post-2013 CAP. Noting that this was a 2009 paper, their second and third scenarios have emerged as being most relevant having taken into account the November 2010 European Commission release.

In the "area-focused" scenario, more money is earmarked for environmental protection and agricultural area plays a key role in the distribution. The "multifunctional" scenario also assumes a strong emphasis on environmental protection and assigns a particular weight to organic farming areas.

Under the "area focused" scenario, Ireland loses a lot of its overall percentage share – down from 2.82% to 2.24% (change -21%) – and is one of the worst affected member behind that of Greece (-40%), Netherlands (-30%) and Belgium (-29%). Under the "multifunctional" scenario, Ireland fares worst off amongst the EU-27, alongside Netherlands. Its share of CAP falls from 2.82% in 2013 to 1.80% thereafter (change -36%).

14.5.4 Future Payments to Irish Farmers

[65] Zahrnt V., 2009. Winners and losers of the next CAP reform, European Centre for International Political Economy.

Almost €2 billion was paid to Irish farmers and businesses under the EU CAP in 2009, according to the Department of Agriculture. The net amount paid out under the Cap payments for 2009 was €1,931 million with 137,736 beneficiaries.[66] [67]

Based on the above analysis, direct payments to Irish farmers could fall by between 21% and 36% post reform. The Department of Agriculture showed that the average payment during 2009 was €14,019.[68]

Under the ECIPE multifunctional scenario, the average payment by CAP to farmers would be reduced to approximately €8,972 from 2014 onwards – a reduction of €5,047 on the average payment per year. Under the less severe "area focused" scenario, the average payment to farmers would fall by approximately €2,944 to €11,075 per year. However, we know that the overall contribution of CAP is going to be a fraction of packages in recent years so in practice, actual payments will be reduced even further. Such a move is almost certain despite recognition from the European Commission of low farm incomes whereby agricultural income dropped significantly in 2009 adding to an already fragile situation in which agricultural income is significantly lower than the rest of the economy.

14.5.5 Overall impact of CAP Reform

The Common Agricultural policy will provide the main policy framework for development of the primary agriculture and agri-food industries for the next decade and beyond[69]. Certainly in the short term, the agri-sector as a whole would be negatively affected by the impending CAP reform particularly with respect to direct payments being made to farmers.

The reforms are likely however to create a territorially and environmentally balanced EU agriculture within an open economic environment from which the Irish agri sector could benefit from. A more sustainable, balanced and better targeted CAP, that makes efficient use of taxpayer resources and effective public policy with regard to food security should be welcomed from a long term perspective.[70]

In fact, such reforms are essential to preserve the food production potential throughout the EU, which can guarantee long-term food security for European citizens and contribute to growing world food demand, expected by FAO to increase by 70% by 2050. The export prospects for Ireland from such growth would be quite significant provided the country remains competitive and positions itself to take advantage of such demand.

14.6 EU Milk Quotas

14.6.1 Background

[66] http://ec.europa.eu/agriculture/funding/index_en.htm
[67] http://www.examiner.ie/ireland/snauqlidoj/rss2/
[68] http://ec.europa.eu/agriculture/funding/index_en.htm
[69] Food Harvest 2020, Department of Agriculture
[70] The Common Agricultural Policy towards 2020

The EU introduced a milk quota system in 1984, in an attempt to control milk production and stabilise milk prices as well as the agricultural income of milk producers. More recently, the milk sector has come through a deep crisis following exceptionally high prices in 2007, which saw a shift in demand away from dairy products.[71] Under the current framework, farmers often do not know what price they will receive for their milk when delivering and this can lead to a serious lack of adaption of supply to demand.

This highlighted shortcomings in the market orientation of the milk sector and led to the creation of a High Level Experts' Group on Milk bring stability to the sector by improving the regulatory framework. Within the Health Check of the CAP, the European Commission endorsed the proposal of milk quota abolition and suggested an end to quotas in 2015. In order to insulate the sector from extreme volatility, the Commission decided to increase the quota by 1% annually from 2009 to 2013 before complete abolition in 2015.

14.6.2 Proposed Measures

The European Commission's legislative proposal on the milk product sector, presented on 9 December 2010, aims to boost the position of the dairy producer in the dairy supply chain and prepare the sector for a more market oriented and sustainable future. The present and most recent proposal addresses each element of the dairy chain to better take into account market signals and adapt supply to demand. These include optional written contracts to be drawn up in advance for deliveries of raw milk by a farmer to a dairy which would include the key aspects of price, the timing and volume of deliveries. It is expected that these proposed measures will be valid until 2020.[72]

Subsequent to these proposals, Ireland's largest milk processor Glanbia has since offered its suppliers a fixed price of 28 cent per litre for a percentage of the milk they supply over the next three years.[73]

14.6.3 Implications for Production/Growth within Dairy Industry

The decision at EU level to phase out milk quotas completely will result in seismic shifts to the economics of the Irish dairy industry with farmers no longer limited to the amount of milk they produce.

According to *Food Harvest 2020*, a recent strategy document produced by the Department of Agriculture, milk output could increase by 50% by 2020. Milk production in Ireland is likely to grow through increases in cow numbers (replacing beef animals on dairy farms with dairy cattle), improved milk yield per cow and by adopting modern technology.

14.6.4 Implications for Ireland from a European Perspective

It has been estimated that cow milk production in the EU-27 would increase considerably, mainly due to a projected 4.2% increase in dairy cow herds. At Member

[71] Proposal for a regulation of the European Parliament and of the Council Dec 9, 2010.
[72] http://ec.europa.eu/agriculture/milk/index_en.htm
[73] http://www.irishtimes.com/newspaper/finance/2010/1217/1224285738541.html

State level, it has been found that there would be an increase in dairy herds of between 11% and 20% for **Ireland**, Netherlands, Austria, Belgium and Spain.[74]

Conversely, the same study found that agricultural income is likely to decrease due to declines in income from cow milk and meat and to rising non-fodder feed costs – with income losses from the dairy cattle sector (-14% for the EU-27) being the main driver of overall losses in agricultural income. The largest decreases in agricultural income are projected for Sweden (-5.2%) **Ireland (-4.5%),** Finland (-4.5%), Lithuania (-3.8%) and Germany (-3.6%).

14.6.5 The Future of the Irish Dairy Sector

Ireland has natural advantages over competitors in the dairy sector due to its low-cost, grass-based seasonal system of production. The impending abolition of milk quotas has duly brought great excitement to the dairy sector as a result. Increased production will invariably result in a surge in exports as surplus domestic demand is channelled abroad. Irish dairy exports should also benefit from the research that is focusing on finding new ways to use milk in less commoditised products. By developing more value-added products from milk and using the constituent parts of milk as ingredients in other products, Ireland can harness its export potential in the dairy sector.

14.7 World Trade Organisation Negotiations

14.7.1 Negotiations yet to be finalised

The current World Trade Organisation (WTO) negotiations are yet another issue that will impact on domestic agriculture. Also known as the Doha Development Round, these negotiations commenced in November 2001 with the objective of lowering trade barriers around the world, thus enabling countries to increase trade globally.

14.7.2 Implications of conclusion to Doha Round

EU agriculture finds itself today in a considerably more competitive environment, as the world economy is increasingly integrated and the trading system more liberalised. This trend is expected to continue in coming years, in view of the possible conclusion of the Doha Development Round negotiations and of bilateral and regional arrangements at present under negotiation.[75] If the Doha negotiations were to end with an agreement on changes to the rules governing market access (tariffs) and export competition (export subsidies), then this would have a negative impact on Irish agriculture when compared to the counterfactual of no change being made.[76]

Notwithstanding this, a liberalised trade environment opens new opportunities to increase Ireland's share of the large markets in emerging countries such as China and India, where burgeoning middle classes with rising disposable incomes want a greater range of value added products. These countries are likely to increase their demand for imported foods over traditional, domestic foods, meaning that **Ireland can**

[74] Economic Impact of the Abolition of the Milk Quota Regime – Regional Analysis
[75] The CAP Towards 2020
[76] WTO Reforms

substantially increase exports from the food processing industry and have a globally competitive commodity food production sector over coming decades.

This represents a challenge for Irish farmers, but also offers an opportunity for food exporters. Irish exports can achieve considerable gains if the sector continues to enhance the competitiveness and productivity of domestic agriculture. So while conditions are favourable in the medium-term, the perspectives for Irish agriculture are expected to be nonetheless characterised by greater uncertainty and increased volatility.

14.8 Climate Change

Climate change is a cause for uncertainty in Irish agriculture output going forward. It has the potential to bring new pests and diseases to our shores. For example, an insect-borne disease has already spread to Britain due in part to milder winters with the first case detected in 2008. Furthermore, changes in seasonal temperature variation and rainfall patterns could result in flooding, drought, higher sea levels and more frequent extreme weather.[77]

14.9 Bioeconomy

The long term future of Ireland's agri-food sector lies in a knowledge-based bioeconomy and the emerging energy and bio-processing sector. This bioeconomy encompasses the traditional agri-food sector and a wide range of novel activities that can now be generated from our natural resources. The potential for new business development in the sector is immense.

World demand for energy will increase in the period to 2030, while fossil fuel reserves will decline, bringing increased demand for alternative, renewable sources of energy which would include sustainably-produced biofuels.[78] Furthermore, the EU has proposed new 2020 emission targets following the recent adoption of the Bali road map. For Ireland's emerging bioeconomy, these proposals mean a 20% reduction in emissions with stringent limits on the use of carbon offsetting and carbon credits.

14.10 Demographics

Future demographics, both at domestically and globally, will have implications for the future of agriculture and particularly external trade. Population, in particular, will be a major determinant of agricultural demand and with the global population set to increase considerably over the period to 2040[79]; this would offer significant export potential for Ireland. Depending on the future composition of domestic agriculture, a surge in external demand might also lead to an increase in imports due to a higher demand for animal feed, for example. This in turn would lead to higher volumes of agricultural cargo passing through Dublin Port.

[77] Teagasc Foresight 2030
[78] Teagasc Foresight 2030
[79] http://www.census.gov/ipc/www/idb/worldpopgraph.php

14.15 Summary and implications for Dublin Port

The future of agriculture in Ireland

The dominant sector for Irish farmers is grass based dairying and innovations such as automated robotic milking systems and various other technological advances characterise the industry and contribute to international competitiveness. The abolition of the quota system will lead to a further expansion of the dairy sector, which is set to become even more important in future years. Looking ahead, the Irish economy is well positioned to benefit from scientific and market developments, which are creating exciting new uses for natural resources.

It is expected that Ireland will look increasingly towards its natural resources for energy and fibre needs over the coming decades, while many products that are at present heavily dependent on fossil fuels are likely to be provided from the land's plentiful renewable bio-resources. **While this would inevitably diminish future imports of fossil fuels, there is also the potential to drive exports from surplus renewable resources.**

It is important to emphasise however that **significant agricultural advancements in Ireland would not necessarily lead to increased volumes of external trade. This is because higher domestic yields, while offering important export potential, could simultaneously displace imports and thus have a neutral effect on activity at Dublin Port.**

External Affects

Having looked at the range of dependent variables which are by nature quite unpredictable, it is clear that the future of Irish agriculture is characterised by great uncertainty. Growth prospects in the dairy sector derived from the abolition of EU milk quotas could for example be offset by climate change policies and emission targets which would serve to limit such an opportunity. Notwithstanding this, a trend of higher output with lower margins in the agricultural sector is likely to prevail.

The Department of Agriculture project an increase in the value-added in the combined agri-food, fisheries and wood products sector by €3 billion in the decade to 2020, which would represent a 40% increase compared to levels in recent years. It is also envisaged that Ireland will achieve an export target of €12 billion for the combined sector, representing a 42% increase compared with the 2007-2009 average.[80]

Future handling agricultural cargo at Dublin Port will be largely dependent on the demand for cereals and animal feeds. At, present much of the throughput of cargo is dominated by imports, which could grow in line with the projected increase in livestock following the abolishment of milk quotas. A surge in Ireland's agri food exports is expected and Dublin Port should be in a position to benefit from this trade when it materialises.

[80] Food Harvest 2020, Department of Agriculture

Annex 1: Energy Products – Policy Drivers

Introduction

Chapter 11 considered future trends in the energy sector in Ireland and how these are likely to impact on traffic through Dublin Port. As indicated there, EU and national policy initiatives are already having a major impact on the sector and this impact is likely to intensify in coming years.

The Policy Environment

Climate change and the need to reduce greenhouse gas emissions (GHG) has become a key driver of change across almost all areas of policy in recent years. Following on from the commitments made under the Kyoto Protocol[81], in March 2007 EU heads of state and government agreed that the EU will cut its emissions to 30% below 1990 levels by 2020 in the context of a global and comprehensive international agreement, provided other developed countries commit to making comparable reductions.[82] At the same time, EU leaders committed to transforming Europe into a highly energy-efficient, low-carbon economy. They underlined their determination to see the EU gain a 'first mover advantage' by committing the EU to cut emissions by at least 20% of 1990 levels by 2020, regardless of what action other countries take.

These emissions targets are underpinned by three energy-related objectives, which are also to be met by 2020:

- a 20% reduction in energy consumption through improved energy efficiency;
- an increase in renewable energy's share of the market to 20%; and
- as part of the renewable energy effort, a 10% share for sustainably produced bio-fuels and other renewable fuels, such as electricity and hydrogen, in transport in each Member State.

In January 2008 the European Commission put forward a package of legislative measures to implement these targets (the so called Climate and Energy Package or the 20-20-20 targets). The binding measures were agreed by EU leaders and the European Parliament in December 2008 and were signed into law in April 2009.[83]

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81 Under the Kyoto Protocol the EU agreed to reduce overall emission levels by 8% below 1990 levels. However, it also adopted a burden sharing agreement to recognise the different economic circumstances of each member state. Ireland's target is to limit the increase in its greenhouse gas emissions under the Kyoto Protocol to 13% above 1990 levels by 2008-2012.

82 The EU has also set longer term objectives of reducing GHG emissions by between 80% and 95% by 2050 compared to 1990 levels.

83 European Commission: Leading global action to 2020 and beyond: EU action against climate change, 2009.

While the package contains measures to significantly reduce emissions from large energy consumers covered by the EU Emissions Trading Scheme (ETS) [84], emissions from sectors not covered by the ETS – such as transport - will also be subject to national emission targets for 2020.

Transport Emissions

The EU's climate and energy package also contains specific measures aimed at addressing emissions from transport. This reflects the fact that transport is responsible for around a quarter of all EU greenhouse gas emissions, making it the second biggest greenhouse gas emitting sector after power generation. Road transport alone contributes about one-fifth of the EU's total emissions of carbon dioxide (CO2), and while emissions from other sectors are generally falling, those from transport have increased 36% since 1990.[85]

While air transport has shown particularly strong growth and will now be covered by the EU ETS from January 2012[86], the Commission has also introduced a range of measures aimed at reducing emissions from the road transport sector.

In addition to the legally binding target of 10% for renewable transport fuels in each member state contained in the climate and energy package, the EU has also put in place a range of policy instruments that are aimed at reducing GHG emissions from the road transport sector in recent years. This includes targets to improve the fuel efficiency of vehicles; targets to reduced the GHG intensity of transport fuels and CO2 labelling of cars.[87, 88, 89, 90, 91, 92.]

Further measures are likely to be needed, however, if the EU is to achieve its long-term goals of reducing GHG emissions by between 80% and 95% by 2050 compared to 1990 levels. In a 2010 Commission report, "*Towards the De-carbonisation of the EU's Transport Sector by 2050*"[93] - it was stressed that further regulation to improve the energy efficiency of all vehicles is needed, coupled with parallel legislation to reduce the GHG intensity of the fuels and energy used by all transport modes. The report notes that "*Further significant reductions towards the levels potentially required to meet 2050 targets will have to come from the application of alternative propulsion systems and/or the use of*

[84] The EU ETS covers power generation companies and large energy users, such as steel producers, cement producers, large manufacturers etc.
[85] http://ec.europa.eu/clima/policies/transport/index_en.htm
86 Directive 2008/101/EC, This means that airlines operating flights to and from EU airports will be required to obtain emission allowances to offset their emissions. The European Commission is also considering ways to address emissions from shipping.
87 Regulation (EC) No 443/2009
88 Directive 2009/33/EC
[89] http://ec.europa.eu/transport/urban/vehicles/directive/directive_en.htm
90 COM(2009)593
[91] http://ec.europa.eu/clima/policies/transport/vehicles/vans_en.htm
92 Directive 2009/30/EC
93 http://www.eutransportghg2050.eu/cms/assets/EU-Transport-GHG-2050-Final-Report-22-06-10.pdf

alternative, less carbon-intensive energy carriers and fuels. In this respect, electric vehicles or fuel cell electric vehicles using hydrogen are possible alternatives"[94]

However, the report points out that "*delivering virtually carbon-neutral electricity and hydrogen will also require action in sectors other than transport. Hence, regulations need to be designed so that they act together to foster the co-evolution of the transport and energy systems that are needed for a virtually carbon-neutral transport system.*"

Against this background, it is clear that the growing pressure to reduced GHG emissions from road transport vehicles will make it increasingly difficult for traditional fossil fuels to "compete" unless they are modified to reduce their emissions profile or blended with bio-fuels to help to enhance the renewable element.[95]

Improving energy efficiency and security

While the primary focus of EU policy, and the key driver of change, in the transport sector is the need to reduce C02 emissions to help combat climate change, the range of policy measures adopted by the Commission is also expected to contribute to the achievement of other EU policy objectives.

Security of supply is a growing concern as the European Union becomes increasingly dependent on imported energy. The Commission estimate that with 'business as usual', energy import dependence will jump from 50% of total EU energy consumption in 2009 to 65% in 2030. Reliance on imports of gas is expected to increase from 57% to 84% by 2030, and of oil from 82% to 93%.

According to the Commission, there is therefore a very strong economic case for making more efficient use of resources, as a contribution towards improving EU competitiveness, even before the associated benefits of cutting emissions are taken into consideration.

Domestically-sourced energy like renewable energy are seen as offering major benefits in terms of reduced reliance on imports and a potential hedge against rising oil prices.[96]

Irish Government Policy Initiatives

Climate change has also become a primary driver of policy in Ireland. **The National Climate Change Strategy 2007-2012**, for example, contains a target to reduce green house gases by 3% per year in an effort to meet Ireland's commitments under the Kyoto Protocol[97], and of course, Ireland is now legally obliged to meet the more stringent targets contained in the EU's climate and renewable package.

Recent estimates from the EPA[98] indicate that after several years of very significant growth, Ireland's emissions actually declined in the last two years. However, it is also

[94] Ibid, page 11
[95] Ibid, page 12
[96] Ibid, page 6
[97] Ireland National Climate Change Strategy 2007-2012.
[98] http://www.epa.ie/downloads/pubs/air/airemissions/GHG_1990-2009_Provisional_2011.pdf

evident that the majority of this decline is due to the economic downturn and it is expected that once economic activity picks-up again, emissions will once again start rising[99]. For this reason, it is clear that concerted action will continue to be needed to "de-carbonise" the economy if Ireland is to meet its international commitments.

The **Government's Energy White Paper**[100], published in 2007, sets out the energy policy directions and targets for Ireland to 2020. This includes a target to achieve 20% savings in energy end-use across the electricity, transport and heating sectors by 2020, in line with EU targets, and an indicative target of 30% by 2020 to surpass the EU ambition. It also sets a target for the penetration of renewable energy in transport – to account for 5.75% of road transport by 2010 and 10% by 2020.

The White Paper also lists a number of programmes and measures, which will assist in achieving these targets, including:

- CIE has been instructed by the Minister for Transport to move its existing fleet to a 5% biodiesel blend so as to achieve a higher blend of 30% in all new buses in as short a time as possible. It has also been asked to assess the feasibility of using hybrid electric buses as part of future fleet replacement.

- A Sustainable Transport Action Plan.

- Changes to both vehicle registration tax (VRT) and motor tax to provide incentives for choosing fuel efficient cars with lower CO2 emissions. These were introduced in July 2008.
- Better integration of transport infrastructure and land-use planning.

- Fiscal measures to reduce transport demand, including road pricing or congestion charges once sufficient infrastructure has been provided and public transport alternatives are in place.

- Support measures that aim to achieve greater energy efficiency in the transport sector and influence behavioural change, including car-sharing schemes and workplace travel plans.

- Public-awareness campaigns on issues such as eco-driving, which aims to achieve up to a 20% improvement in fuel efficiency among private transport users.

- Support for EU-level agreements with motor manufacturers' associations to reduce CO2 emissions of new passenger cars to an average level of 130 g/km by 2012.

- A mandatory comparative labelling system for new cars based on CO2 emission levels and continued support for the mandatory provision of consumer information on fuel economy and CO2 emissions in order to influence behavioural change.

[99] http://www.esri.ie/UserFiles/publications/RS19.pdf
[100] http://www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf

- A national biofuels obligation on fuel suppliers of 5% in 2010 (subsequently revised to 3%), which will provide market certainty and encourage projects of scale.

- 10% of Ireland's transport energy requirements from renewable sources by 2020.

- The use of 100% pure plant oil (PPO) in captive fleets maintained by local authorities and public bodies, and support for measures to include the aviation and maritime sectors in the EU Emissions Trading Scheme (ETS), as part of a multilateral commitment by Member States.

The Irish government also set individual targets for renewable energy in electricity generation (RES-E), transport (RES-T) and thermal energy (RES-H). These targets are as follows:

- Renewables contribution to gross electricity consumption of 15% by 2010 and 40%12 by 2020.
- Renewables contribution to road transport energy (biofuels penetration) of 3% by 2010 and 10% by 2020.
- Renewables contribution to heat (thermal requirement - heating & cooling) of 5% by 2010 and 12% by 2020.

The White Paper also included the following specific targets:

- At least 500 MW installed wave energy capacity by 2020.
- 30% biomass co-firing at three state-owned peat power generation stations by 2015.
- 400 MW of CHP, with particular emphasis on biomass CHP, by 2010 and a 2020 target of 800 MW.

The Energy White Paper was followed by the adoption of the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources in June 2009. This establishes the basis for the achievement of the EU's 20% renewable energy target by 2020. Under the terms of the Directive, each Member State is set an individually binding renewable energy target, which will contribute to the achievement of the overall EU goal. Ireland's targets are:

- a Renewable Energy Share (RES) of 16% of total energy consumption in 2020
- 10% of road and rail transport consumption from renewable sources in 2020

The National Renewable Energy Action Plan[101] (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under the Directive. In addition, the Government's *National Energy Efficiency Action Plan 2009-*

[101] http://www.dcenr.gov.ie/NR/rdonlyres/03DBA6CF-AD04-4ED3-B443-B9F63DF7FC07/0/IrelandNREAPv11Oct2010.pdf

2020 – Maximising Ireland's Energy Efficiency[102] details Ireland's energy efficiency strategy – across a range of areas from planning to transport.

The Transport Sector

The transport sector will be expected to make a significant contribution to meeting EU and national emission reduction targets. In 2009, the sector was responsible for over 21% of Ireland's total emissions and until recently, had seen amongst the fastest increase in emissions of all sectors.

The *National Climate Change Strategy 2007-2012* committed to changing the basis for assessing Vehicle Registration Tax (VRT) and Motor Tax from 2008 so that they would be more
closely aligned with CO2 emissions and send the right "signals" to drivers. As a result, both taxes are now levied on the basis of the C02 emission rating of the car rather than engine size as was the case in the past.

VRT reliefs are also available for electric, hybrid-electric and flexi-fuel vehicles (i.e. vehicles capable of operating on an E85 bioethanol mix).

In line with the general shift in policy to ensure that motor taxes tax greater account of CO2 emissions, in Budget 2010 the Government also announced the introduction of a carbon levy on fossil fuels to change the relative price of fuels based on CO2 emissions in order to change consumption patterns, encourage fuel efficiency and lead to an improvement in environment quality. It is anticipated that the levy, which was introduced in December 2009 at a rate of €15 per tonne of carbon, will steadily increase in coming years.

Other policy initiatives that are likely to impact on future demand for energy products include the Government's *Smarter Travel* policy. *Smarter Travel: A Sustainable Transport Future*[103] was published in February 2009 to address what are deemed to be unsustainable trends in vehicle ownership and use in Ireland. This new transport policy framework, which covers the period 2009-2020, highlights a number of key steps to ensure that people choose more sustainable transport modes, to minimize the impact of transport on the environment and to improve Ireland's security of energy supply by reducing dependency on imported fossil fuels.

Within this policy document, the Government again sets out its commitment to a number of important actions and measures. These include:

- Ensuring that 10% of energy used in transport by 2020 is sourced from renewable resources, which are sustainable, reduce fossil fuel dependency and significantly reduce greenhouse gas emissions over the full life cycle.

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[102] http://www.dcenr.gov.ie/Energy/Energy+Efficiency+and+Affordability+Division/National+Energy+Efficiency+Action+Plan.htmhttp://www.dcenr.gov.ie/NR/rdonlyres/FC3D76AF-7FF1-483F-81CD-52DCB0C73097/0/NEEAP_full_launch_report.pdf

[103] http://www.smartertravel.ie/download/1/NS1264_Smarter_Travel_english_PN_WEB.pdf

- The introduction of a Biofuels Obligation which will require that a certain percentage of the road transport fuel sold in Ireland from 2010 will be biofuel and a commitment to allow this target to be changed in the medium term to ensure that Ireland meets its renewable energy target for the transport sector by 2020.

- Measures to support other potential alternative technologies for motor vehicles, which are likely to have a significant impact beyond 2020 as technology is developed. These include plug-in electric and hydrogen fuelled vehicles. In the policy document, the Government signalled its commitment to these alternatives and to promote such technologies as they become commercially feasible and develop market penetration. Moreover, it will also provide further incentives to encourage a switch to electric vehicle technology with the aim of achieving 10% market penetration by 2020.

- Efforts to provide leadership through the use of alternative technologies in the public vehicle fleets. The Government has committed to require every public sector organisation and public transport provider to prepare a plan for fleet replacement based on the most sustainable vehicle and fuel type. The document goes on to state that "*we will encourage the conversion of the taxi fleet and private bus/coach fleets to alternative vehicles/fuels. We will also change existing corporate tax schemes to discourage the purchase of less fuel-efficient vehicles and to encourage a change to more sustainable fleets*".

A number of these measures are considered in more detail below.

Biofuels: Biofuels are seen as offering the potential to reduce the GHG emissions associated with the transport sector, reduce Ireland's reliance on imported fossil fuels and, at the same time, help to stimulate the agricultural sector which can provide the raw materials for biofuels production.

The Biofuel Obligation Scheme (BOS), administered by the National Oil Reserves Agency (NORA) was introduced on 1 July 2010, to ensure that a certain percentage of the transport fuel used in the state consists of biofuels. The BOS is seen as a key component in achieving a 10% penetration of renewable energy in transport by 2020, to which the Government has committed under the proposed new EU climate and energy packages.

While other forms of renewable energy will play an important role in transport by 2020, it is expected that biofuels will retain a substantial role, and that successively higher obligations rates will be required to deliver that overarching 10% target. (Under the current obligation rules, suppliers of road transport fuel must ensure that not less than 4 litres in every 100 litres of road transport fuel is biofuel (i.e. 4.166%).) [104]

[104] http://www.nora.ie/biofuels/biofuels_obligation_scheme.476.476.html. Some oil consumers who are required to pay the NORA levy are also captured by the BOS.

Electric Vehicles: Another important dimension to the Government's transport policy is the promotion of electric vehicles (EVs), and indeed, the Government has already set a target to ensure that electric vehicles make up 10% of the transport fleet by 2020[105] (though others argue for an even more ambitious target[106]). Based on the current size of the national fleet, this would equate to around 230,000 vehicles by 2020.

The market for electric vehicles appears to be gaining significant "traction" both in the EU and globally, with many countries now introducing incentives to increase their uptake and more and more mainstream vehicle manufacturers launching new electric or hybrid electric vehicles.

The Government has ambitions to make Ireland a testing ground for more widespread deployment. Indeed in announcing the target for electric vehicle in November 2008, Eamonn Ryan, Minister for Communications, Energy and Natural Resources stated that "*The Irish Government is signalling its intentions to national and international players that Ireland is 'open for business'. We are positioning ourselves as a centre for electric vehicles. The Government expects considerable international investment to emanate from this plan.*"[107]

As outlined in Smarter Travel, it is considered that a number of factors make Ireland ideal for the deployment of electric vehicles, such as the relatively limited distances travelled by motorists, and the availability of electricity generated from renewable sources.

"*For these reasons, electric vehicles offer a real opportunity to dramatically reduce the Greenhouse Gas Emissions from the transport sector …. Moreover, they also offer the opportunity to reduce imports of fossil fuels, improving our security of supply situation. Finally, this dynamic and rapidly growing sector also offers a range of new enterprise and employment possibilities, both in terms of research and development and industrial production.*"
The Government has already signed Memoranda of Understanding (MOU) with several EV manufacturers[108] to ensure that Ireland is amongst the first markets to receive new electric vehicle models as they become available. These MOU will also help to ensure that the Irish electricity suppliers and Government are fully appraised of the latest developments in EV technology so that investments in re-charging infrastructure is more precise and appropriate. In return, the Government has agreed to assist in providing the necessary infrastructure and incentives to promote and encourage

105 In the Carbon Budget presented by Minister for the Environment, Heritage and Local Government in October 2008, a target of 10% of the national road transport fleet to be powered by electricity by the year 2020 was announced. This was followed in November 2008 by an announcement by the Minister for Communications, Energy and Natural Resources and the Minister for Transport of further detail of how this target will be met

106 See for example the report on electric vehicles published by the Oireachtas Joint Committee on Climate Change and Energy Security, 2010.

107 http://www.dcenr.gov.ie/Press+Releases/2008/Government+announces+plans+for+the+electrification+of+Irish+motoring.htm

108 To date, memoranda have been signed with Renault-Nissan, Mitsubishi Motors, Toyota and PSA Peugeot Citroen.

demand for EVs, and the ESB has committed to providing the re-charging infrastructure necessary to support the daily use of EVs in Ireland.

As part of the Agreement, the Government announced the introduction of a €5,000 grant towards the purchase of an electric car. The aim is to ensure that there are at least 2,000 cars on Irish roads by 2011 and 6,000 by the end of 2012.

Under the agreement, ESB has committed to rolling out 1,500 publicly accessible charging stations, 2,000 domestic charging points and 30 fast charging units on a nationwide basis throughout Ireland by the end of 2011.[109] The rollout has already begun in Dublin and charging points are also being installed in Cork, Galway, Waterford and Limerick. Ireland will be one of the first countries in the world to have a nationwide electric charging network.

In addition to ensuring that EVs are offered on the Irish market as soon as they become available, the Government (though SEAI) is also supporting pilot projects with fleet operators. One such project is a €529,600 project to support the deployment of electric vehicles in Eircom's commercial fleet, and the provision of fast charging facilities in some Topaz garages.[110]

[109] http://www.dcenr.gov.ie/Press+Releases/Electric+vehicle+charge+points+launched.htm
[110] http://www.smartertravel.ie/smarter-travel-project-fund/funded-projects