REVIEW OF NATIONAL CLIMATE POLICY

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Comhshaol, Pobal agus Rialtas Áitiúil
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National Climate Policy Review 2011
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1. Introduction

Climate policy in Ireland has developed in the context of national and EU commitment to the 1992 United Nations Framework Convention on Climate Change (UNFCCC). Article 2 of the Convention sets out the fundamental objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system. It goes on to state that such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

National policy has heretofore been laid out in the National Climate Change Strategies (NCCS) published in 2000 and 2007. The most recent NCCS focussed particularly on the measures required to achieve compliance with the first commitment period of the Kyoto Protocol, and on research and development of the measures necessary for anticipated 2020 targets.

Greenhouse gas mitigation is central to climate protection policy and there are currently two 'commitment periods' in range for Ireland. The first is the 2008-2012 period governed by the Kyoto Protocol, for the purposes of which Ireland has committed to limit average greenhouse gas emissions over the five-year period to 13% above 1990 levels. Ireland is on course to meet this target through a combination of domestic emission reductions, supplemented by the use of carbon units, including units acquired through the Protocol's flexible mechanisms. The impact of the economic downturn will also be a factor in the outcome, as already reflected in a significant drop in emissions in 2009.

The second commitment period in range covers the eight years 2013-2020. It arises from a decision by the European Council to progress the EU climate protection agenda unilaterally, notwithstanding the uncertainty surrounding the future of the wider-international process under the 1992 Convention and the Kyoto Protocol.

The Climate and Energy Package, which the European Council adopted in December 2008, provides the legislative foundation for the 2013-2020 EU agenda. Under the terms of the package, Ireland faces a significant greenhouse gas mitigation challenge, particularly in relation to emissions from those areas of the economy not covered by the EU Emissions Trading Scheme (ETS). In summary, in the sectors of the economy not covered by the ETS, Ireland is required to progress down an annual emissions reduction trajectory from 2013, reaching a point in 2020 where emissions are equivalent to 20% below their level in 2005.

When greenhouse gas emissions from Irish installations participating in the ETS are excluded from the national profile, the mitigation agenda is dominated by emissions from the agriculture and transport sectors. Recent greenhouse gas emission projections from the Environmental Protection Agency (EPA) show that, even under the most optimistic scenario, Ireland cannot meet its 2020 mitigation target on the basis of existing policies and measures, and a further deepening of these measures would be required to achieve compliance domestically.

A critical consideration in reviewing national climate policy is the fact that the current mitigation target for 2020, which is binding under EU law, is almost certain to increase in ambition in the context of ongoing EU policy development. This reflects the need for deep emission cuts across developed countries in the post-2012 period and the reality that mitigation progress achieved within the EU in the period to 2020 will constitute a key milestone in the longer-term objective of transition to a competitive, low-carbon economy by 2050. It bears out the need to not only look at compliance over the period to 2020 but also to look beyond it so that investment and other decisions taken in the years immediately ahead have a focus on both the challenge and opportunity of embracing a low-carbon future.

2. Objective of Review

With the ending of the Kyoto Protocol commitment period in December 2012, international climate policy is approaching a crossroads. In spite of welcome progress at the Cancun Conference of the Parties in December 2010, the final shape of the post-2012 international agenda under the 1992 UNFCCC remains undecided.

EU policy is clearer, in terms of both the immediate period to 2020 and the longer term to 2050. In response to the scientific advice from the InterGovernmental Panel on Climate Change (IPCC), the European Council has concluded that greenhouse gas emissions from developed countries as a whole must be reduced by 80-95% by 2050, compared to 1990 levels. EU commitment to an effective, long-term global response to climate change is evident in the Climate and Energy Package adopted in December 2008 and the more recent Communication from the Commission on "*A Roadmap for moving to a competitive low-carbon economy in 2050"*. Ireland has consistently supported EU pro-activity and leadership on climate policy, both in relation to framing the internal agenda and to the positive influence which the EU seeks to bring to the wider international agenda under the UNFCCC.

The purpose of this review is to examine the effectiveness of Irish climate policy to date, both in terms of meeting the national greenhouse gas mitigation commitment for the purposes of the Kyoto Protocol and in preparing for deeper emission reductions to which the EU is already committed in the medium and longer term. A more recent but increasingly important priority is the extent to which Ireland is well placed to contribute and engage effectively in the emerging global green economy.

The most recent greenhouse gas emission projections from the EPA point to the inadequacy of existing/planned policies and measures for the purposes of delivering on the post-2012 climate mitigation agenda, even in the immediate 2013 to 2020 period. A simple compliance-targeted initiative would close existing short-term gaps but would not address either the longer-term EU mitigation objective or the opportunities for economic growth which a low-carbon global economy will open up for progressive countries. This review represents the starting point in re-focussing and strengthening national climate policy around key long-term challenges and opportunities. It also seeks to provide the context against which progress must be achieved in the short, medium and longer term.

3. National Greenhouse Gas Emissions Profile

Ireland has a somewhat unusual emissions profile in a European context. There are a number of contributory factors, including a very high level of agriculture emissions; a relatively low proportion of emissions falling within the scope of the ETS where abatement options tend to be cheaper; and a low population density coupled with a tendency for dispersed settlement that inhibits the cost-effectiveness of mass transport systems and encourages car ownership.

The six greenhouse gases[1] on which the profile is based are - carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro fluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

In looking at the national profile, emission levels in 1990 provide the general baseline against which targets are set, and mitigation achievements are verified and reported. Figure 1 shows how the profile has evolved over the period 1990 to 2009, based on final inventory data provided by the Environmental Protection Agency (EPA).

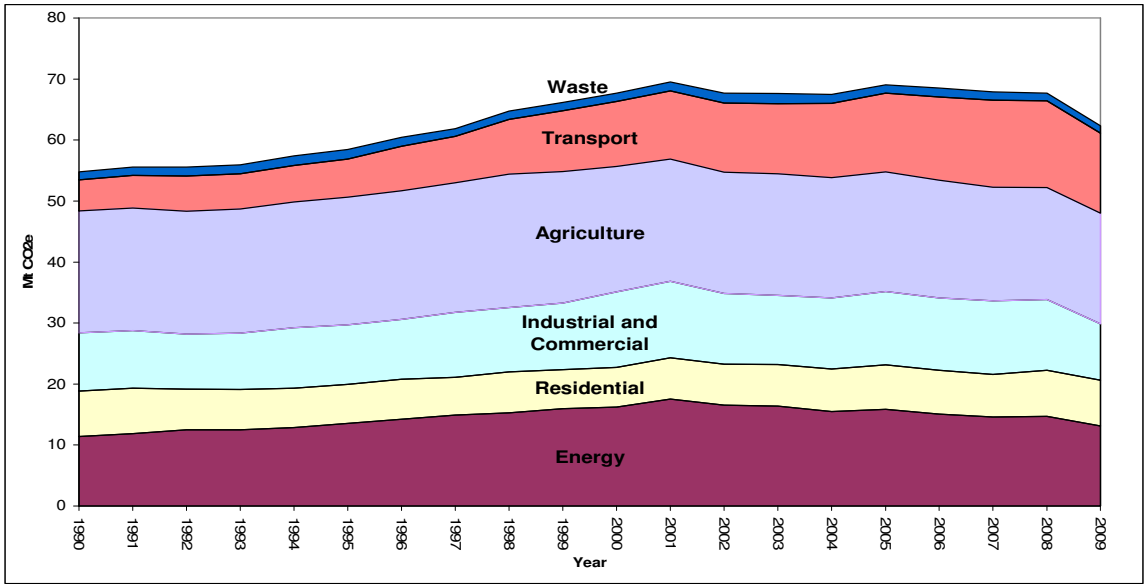


Figure 1: Greenhouse Gas Emissions 1990-2009

Emissions peaked in 2001 as the energy, and industrial and commercial sectors reached their maxima. The levelling out of energy emissions since then is largely attributable to fuel switching away from coal and oil towards gas and, more recently, renewables.

[1] Strictly speaking 4 gases and 2 categories of gases (HFCs and PFCs)

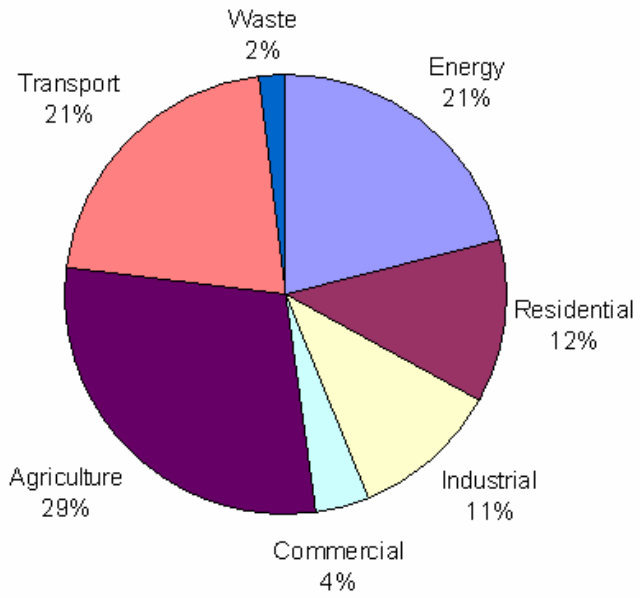


Figure 2: Emissions profile by sector in 2009[2]

At 71% of the national profile in 2009, the cumulative emissions of the agriculture, transport and energy sectors constitute the substantive greenhouse gas emission challenge in Ireland. Each of the three sectors is unique and demands a dedicated set of responses. The combined effect of these responses will largely determine the overall effectiveness of national policy on decarbonisation and transition to a competitive, low-carbon economy.

Emissions covered by the EU ETS

A key feature of Ireland's national profile is the fact that emissions from 100+ of the highest-emitting installations (covering approximately 28% of total Irish emissions) fall within the scope of the ETS. The scheme, which works on a 'cap and trade' basis, covers some 11,000 installations across the EU. It is the cornerstone of the EU response to climate change and the key policy instrument to drive low-carbon investment in a cost-efficient manner. The scheme is administered in Ireland by the EPA, based on a strict regime set down in EU law.

Emissions not covered by the EU ETS

While installations falling within the scope of the ETS are regulated on an EU-wide basis, mitigation policy in relation to the remaining emissions that make up the national profile (i.e. the non-ETS emissions) must be addressed at national level in accordance

[2] National Inventory Report 2011, EPA

with the EU Effort Sharing Decision[3]. Emissions from the following sectors fall outside the ETS – agriculture, transport, waste, light industry, commercial and residential; these account for approximately 72% of total Irish emissions. While harmonisation is being pursued in a number of areas at EU level, particularly in relation to transport emissions[4], implementation and responsibility overall for non-ETS emissions rests with individual Member States.

For convenience, the simple distinction 'ETS' and 'non-ETS' emissions is used throughout this report.

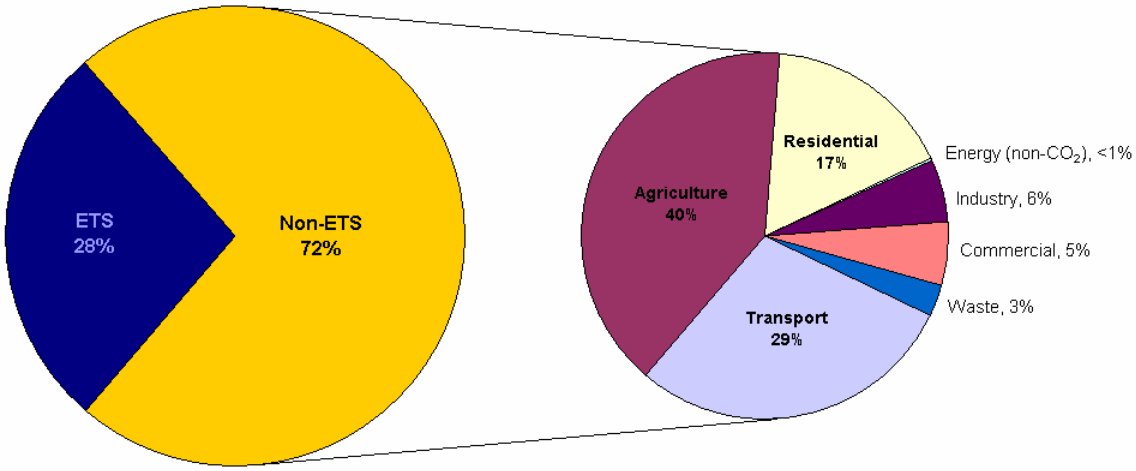


Figure 3: 2009 breakdown showing ETS and non-ETS emissions

When the emissions covered by the ETS are excluded from the overall profile, the extent of the national policy challenge can be clearly seen, particularly in relation to emissions from the agriculture and transport sectors. While emissions from those two sectors accounted for 50% of total national emissions in 2009, that figure increases to almost 70% when ETS emissions (which are dealt with in the EU-wide trading system) are excluded and the national non-ETS emissions profile is considered.

[3] Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.
[4] Initiatives including in relation to:
- Setting emission performance standards for new passenger cars (Regulation (EC) No. 443/2009);
- Emission performance standards for new light commercial vehicles (Regulation (EC) No. 510/2011; and
- the Fuel Quality Directive (Directive 2009/30/EC)

4. Kyoto Protocol Compliance 2008-2012

4.1 Kyoto Protocol Target

For the purposes of the Kyoto Protocol, Ireland is committed (under EU law) to limiting average greenhouse gas emissions in the period 2008-2012 to 13% above 1990 levels[5]. This equates to an average of 62.8 million tonnes of carbon dioxide equivalent (CO_2e) per annum over the five year period. In accordance with the NCCS, Ireland is on course to meet this target through domestic emission reductions supplemented, on cost-effectiveness grounds, by carbon units, including units acquired through the flexible mechanisms provided for in the Protocol. The economic downturn is also a contributing factor, as evidenced in the significant drop in emissions in 2009.

4.2 Meeting Ireland's Kyoto Target

Table 1 sets out a selection of the measures that have been taken since 1990 to reduce national greenhouse gas emissions and the originally anticipated impact of the measures on average during the five-year Kyoto Protocol commitment period.

Table 1: Anticipated impact of selected measures (Source: *Ireland's Pathway to Kyoto Compliance,* DEHLG, 2006[6])

Measure	Average annual Reduction 2008-2012 (Mt CO_2e)[7]
CAP Reform – full decoupling	2.40
Afforestation	2.08
Renewable Energy Directive	1.30
Landfill Gas power generation or flaring	0.70
EU/ carmakers voluntary agreement	0.48
Building Regulations Part L & Energy Performance of Buildings Directive (EPBD)	0.30
Dublin traffic measures (e.g. Port Tunnel)	0.27
Biofuel excise relief	0.25
Implementation of Landfill Directive	0.06
Modernisation of natural gas network	0.06
Motor taxation / fuel labelling	0.05
Carbon Tax (introduced 2010)	0.15

[5] 1995 is the base period for Industrial Gases (HFCs, PFCs)

[6] This table is taken verbatim from the 2006 report, but the anticipated impact of the carbon tax, introduced in 2010, has been added – again with an estimate of its anticipated impacted at that time.

[7] Megatonnes (million tonnes) of Carbon Dioxide (CO_2) equivalent

The 'distance to target' for the purposes of Kyoto Protocol compliance is monitored on an ongoing basis on foot of annual inventory and projection data published by the EPA. The projections published by the Agency in April 2011 show that, as a result of mitigation measures adopted and the impact of the economic downturn, the overall distance to target for the Kyoto Protocol commitment period currently stands in the range 6.3m to 8.1 mega tonnes of carbon dioxide equivalent (Mt CO_2e).

While the national mitigation target for the purposes of the Kyoto Protocol is an average of 62.8Mt CO_2e per annum, compliance monitoring is complicated by the fact that it includes emissions that fall within the scope of the ETS. In order to arrive at the actual distance to target to be addressed on foot of domestic policy and action, the target must be adjusted by netting out the ETS emissions. This results in an adjusted annual target of 40.6Mt CO_2e, and the annualised projections for relevant emissions, based on the latest EPA data, are 42.2Mt CO_2e in the 'With Measures' (WM) scenario and 41.8Mt CO_2e in the 'With Additional Measures' (WAM) scenario[8], respectively. This gives rise to a distance to target of between 1.3Mt CO_2e and 1.6Mt CO_2e per annum which, when scaled up for the five year commitment period, implies a requirement for carbon purchasing of between 6.3 and 8.1m units for compliance purposes. Table 2 below provides a breakdown of the 2008-2012 outcome under the WM and WAM scenarios.

Table 2: Summary of Projections for Kyoto Protocol compliance (Mt CO2e)

Sector	**With Measures**	**With Additional Measures**
	Mt CO_2e	Mt CO_2e
Agriculture	18.14	18.14
Transport	13.04	12.93
Energy	13.89	13.89
Residential	7.34	7.20
Commercial/Institutional	2.45	2.37
Industrial	6.73	6.68
Waste	1.22	1.22
Gross Emissions	**62.82**	**62.42**
Art 3.3 Forest Sinks	-2.83	-2.83
Net Emissions	59.98	59.60
Emissions after ETS Adjustment	**42.2**	**41.8**
Target	**40.6**	**40.6**
Avg Annual Distance to Target	1.6*	1.3*

*Numbers do not sum exactly due to rounding

[8] WM and WAM refer to two scenarios used to project levels of emissions. WM or 'With Measures' is a scenario based only on measures already in place and implemented, while WAM or 'With Additional Measures' is a scenario that also takes planned measures into account.

At the time the NCCS was published in April 2007, it was envisaged that domestic emission reductions would have to be supplemented with the purchase of up to 3.6 million carbon units (allowances or credits) on average each year in the five-year Kyoto Protocol commitment 2008-2012 period, or 18m units in total. However, in the light of recent projections from the EPA, the purchasing requirement for compliance purposes will be between 35% and 45% of the level originally envisaged (in the range 6.3m to 8.1m units).

The policy framework for the national carbon purchasing programme is set out in Annex 3 to the NCCS. It includes, *inter alia*, the basis for the role of the National Treasury Management Agency as purchasing agent for the State, a role subsequently underpinned by the provisions of the Carbon Fund Act 2007. On foot of the combined efforts of the Department of the Environment, Community and Local Government and the National Treasury Management Agency, purchasing arrangements have been put in place to ensure an adequate volume of carbon units will be available for compliance purposes at the end of the 2008-2012 commitment period.

Article 3.3 of the Kyoto Protocol, which relates to post-1990 afforestation, reforestation and deforestation, sets out how these sources and sinks are to be included in the accounting system of the Protocol. This is the only mandatory element of Land Use Land Use Change and Forestry in the accounting system of the Kyoto Protocol, and negotiations are currently ongoing on extending the rules to other sectors and incorporating changes to pre-existing land uses. Ireland has been subject to significant afforestation since 1990 and this plays a significant role in demonstrating compliance. The most recent EPA emissions projections suggest that an annual average of 2.8Mt CO_2e is realisable through this sector for the period 2008-2012. Whilst this contribution is expected to increase substantially by 2020, it is not currently clear how this will be incorporated into EU law.

4.3 Conclusion

Compliance with international obligations for the purposes of the Kyoto Protocol is being delivered. A range of domestic policies put in place across the economy are contributing strongly in this regard. These range from fiscal instruments, such as the carbon tax, and rebalancing of vehicle registration tax and motor tax, to measures such as the new building regulations, information campaigns, a range of subsidies to householders to upgrade the heating and insulation in their homes and the national afforestation programme. Ongoing efficiency gains in the agriculture sector are also contributing to meeting the target. Policy responses to climate change must address a range of market

failures in seeking to incentivise cost-effective mitigation, and a wide range of policy instruments has been brought to bear in this regard.

International project credits and other offsets will also be used for compliance. These flexibilities contribute substantially to the delivery of cost-effective mitigation on a global scale and allow developed countries to achieve a higher level of mitigation ambition. Article 3.3 of the Kyoto Protocol, which relates to post-1990 forestry, is also an important element of the national response as it is the means by which the impact of afforestation as a carbon sink is recognised in the 2008-2012 period.

In terms of the overall progress for the purposes of Kyoto Protocol compliance, however, a real concern is the fact that the mitigation generated by the end of 2012 will be dwarfed by the need for much deeper mitigation in the future. The recent 2050 roadmap communication from the European Commission clearly signals that the EU and its Member States need to plan for ever decreasing domestic emissions, and points to the critical importance of policy development being assessed with a longer-term perspective rather than on a 2020 horizon.

Notwithstanding this case for a longer-term vision, a focus on the 2013-2020 period is necessary in the short term at least. Certain policy targets that will play a significant role in delivering mitigation to 2020 are already in place, e.g. renewables and energy efficiency targets. Any deviation from these policy targets will have implications, not least the requirement for alternative cost-effective measures or greater use of the flexibilities provided for within the Effort Sharing Decision. Among the other unknowns in policy development for the period to 2020 is whether, and the means by which, forestry and other land use will be included in the targets and the extent and timing of any step up beyond the existing 20% EU greenhouse gas mitigation target for 2020. A wide range of influences are pressing the case for political support to achieve a higher level of mitigation ambition by 2020, both in the context of cost-effective transition to a competitive, low-carbon economy, and potential for green economic growth. The next section will deal with the scale of the challenge as it is currently understood, and identify and quantify some of the key risks in delivering what has been projected.

5. Post-2012 agenda

5.1 Introduction

A question mark hangs over the future shape of the international climate change process when the binding five-year period of mitigation action under the Kyoto Protocol expires at the end of 2012. While negotiations under the UNFCCC are ongoing and more optimistic following the positive outcome to the 16th Conference of the Parties in 2010, possible failure to agree on adequate and binding post-2012 mitigation action by all major greenhouse gas emitting countries threatens to undermine coherence and certainty in mobilising an effective long-term global response to climate change.

In conclusions adopted in October 2009, the European Council –

- emphasised the need for a legally-binding post-2012 international agreement that builds on the Kyoto Protocol and incorporates all of its essential elements, and
- called on Parties to the Convention to agree to global emission reductions of at least 50% and aggregate developed-country emission reductions of at least 80-95%, as part of such global emission reductions, by 2050 compared to 1990 levels.

The EU has already adopted a unilateral 20% greenhouse gas emission reduction target for 2020 (compared to 1990) and has signalled its willingness to move to a 30% target as part of a global and comprehensive international agreement for the period beyond 2012. Ireland has consistently supported EU ambition in developing progressive climate protection policy and providing leadership in the international climate change process under the UNFCCC.

The cumulative effect of the 2020 greenhouse gas mitigation pledges which a majority of Parties to the Convention have made under the 2009 Copenhagen Accord represent an advancement on the level of action reflected in Annex B commitments in the Kyoto Protocol. In spite of the step forward in overall ambition, however, the effect of the 2020 mitigation pledges falls significantly short of a response commensurate with the longer-term global objective of limiting the increase in average global temperature to no more than 2˚C above pre-industrial levels. Studies show that global emission levels of approximately 44 gigatonnes of carbon dioxide equivalent ($GtCO_2e$) in 2020 would be consistent with a 'likely' chance of staying within the 2ºC limit. On the basis of the pledges made, however, global emissions are projected to reach between 49 and 53 $GtCO_2e$ in 2020. Also, unlike the commitments under Annex B of the Kyoto Protocol, pledges under the Copenhagen Accord are not binding.

The 16th Conference of the Parties (COP 16) took place in Cancun, Mexico, at the end of 2010. The *Cancun Agreements* were the key outcome and comprise a set of decisions under the two tracks of the ongoing negotiations – one track under the Kyoto Protocol and the other under the Convention.

The main outcomes from Cancun included:

- reconfirmation of the strength of the multilateral process to find global solutions to global problems;
- a shared long-term vision, including a goal to limit average global temperature increase to below 2˚C in comparison to pre-industrial levels and recognition of the need to strengthen this goal, based on scientific advancements, and to consider a 1.5˚C goal at a future date;
- the anchoring of pledges made under the Copenhagen Accord;
- formalising the commitment made by developed countries in Copenhagen to mobilise $100 billion a year by 2020 to address the mitigation and adaptation needs of developing countries and establishment of a Green Climate Fund to manage this support;
- agreement to progress on developing modalities and rules for the REDD+[9] process; and
- an overall agreement to continue working on the modalities for the inclusion of land use, land-use change and forestry (LULUCF) activities in the period post 2012.

The Cancun Agreements represent an important incremental step forward in the ongoing negotiations under the UNFCCC.

At the 17th Conference of the Parties to the Convention in December 2011, the European Union will continue to press for early agreement on a global and comprehensive post-2012 legally-binding framework including, *inter alia*, provisions to ensure that –

- global greenhouse gas emissions peak by 2020 at the latest, reducing to 50% of 1990 levels by 2050 and continue to decline thereafter;
- developed countries as a group, in accordance with the scientific advice from the IPCC, reduce their greenhouse gas emissions by 25-40% by 2020 and by 80-95% by 2050, compared to 1990;
- developing countries as a group achieve a substantial deviation below the currently predicted emissions growth rate, in the order of 15 to 30% by 2020; and

[9] REDD refers to Reducing Emissions from Deforestation and forest Degradation. REDD+ goes beyond that and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

- a robust accounting framework to govern the treatment of LULUCF in the post-2012 period.

An increasingly urgent priority for the EU is the avoidance of a gap in the international response to climate change when the five-year commitment period under the Kyoto Protocol expires in December 2012. In this regard, conclusions adopted by Environment Ministers in March 2011 confirm, *inter alia*, a "*willingness to consider a second commitment period under the Kyoto Protocol, as part of a wider outcome including the perspective of the global and comprehensive framework engaging all major economies, while reiterating, in this regard, its preference for a single legally-binging instrument that would include the essential elements of the Kyoto Protocol, reflecting the ambition and effectiveness of international action and responding to the urgent need for environmental integrity*".

Through the EU, Ireland is –

- continuing to support urgent and constructive engagement by all Parties in pursuit of a comprehensive global response to climate change consistent with the ultimate objective, as set out in Article 2 of the Convention, of stabilising greenhouse gas concentrations in the atmosphere at a safe level; and
- leading by example, by committing to achieve a demanding and binding (under EU law) greenhouse gas mitigation target for 2020.

5.2 EU Climate and Energy Package

The policy package which the European Council adopted in December 2008 set out a series of demanding climate and energy targets to be met by 2020, commonly known as the "20-20-20" targets. With a focus on the immediate post-Kyoto period 2013-2020, the high-level objectives of the package are to –

- reduce greenhouse gas emissions by at least 20% compared to 1990 levels;
- reduce primary energy use by 20% compared with projected levels (to be achieved by improving energy efficiency); and
- achieve a 20% level of EU energy consumption from renewable sources.

Launching the package, Commission President Barroso described the initiative as '*part of the solution both to the climate crisis and to the current economic and financial crisis. It represents a green "new deal" which will enhance the competitiveness of EU industry in an increasingly carbon-constrained world. Moving to a low-carbon economy will encourage innovation, provide new business opportunities and create new green jobs*.'

The package of complementary legislation includes –

- A revision and strengthening of the Emissions Trading Scheme[10]. A single EU-wide cap on greenhouse gas emission allowances for the scheme will apply from 2013 and will decrease annually, reducing the number of allowances available to businesses to 21% below the 2005 level in 2020. The free allocation of allowances will be progressively reduced and replaced by auctioning, and the sectors and gases covered by the scheme will be expanded.

  There are no Member State-specific caps or targets under the revised ETS – the revised scheme is based on a single EU-wide cap. Emissions from international aviation are included in the ETS from 2012 onwards.

- An 'Effort-Sharing Decision'[11] covering greenhouse gas emissions from sectors of the economy that do not fall within the scope of the ETS, such as agriculture, transport, housing and waste. Under the Decision, each Member State has agreed to a binding emission trajectory for the years 2013 to 2020, based on per capita income when the decision was finalised; in Ireland's case, the trajectory begins in 2013 at the average emissions from 2008-2010 and this decreases annually until at 2020 emissions are 20% lower than 2005.

- Binding national targets for renewable energy[12] which collectively will lift the average renewable share across the EU to 20% by 2020 – more than double the 2006 level of 9.2%. Under the Directive on Renewable Energy, Ireland must achieve a renewables target of 16% of gross final consumption of energy by 2020.

- A non-binding EU target is also in place for energy efficiency measures[13], which should deliver a 20% reduction in primary energy consumption relative to projected levels in 2020. The European Council reiterated its commitment to the pursuit of this target in its February 2011 Conclusions. A non-binding national energy efficiency target of 20% relative to consumption in the years 2001-2005 is also in place[14].

A fundamental change compared to the Kyoto Protocol Commitment period (2008-2012) is the absence of any provision in the Package on emissions/removals from forests planted in the post-1990 period. This is an issue to which the Council will revert in the context of a communication which the European Commission is expected to bring

[10] Directive 2009/29/EC
[11] Decision No 406/2009
[12] Directive 2009/28/EC
[13] 7224/1/07 REV 1: Presidency Conclusions of the European Council of 8/9 March 2007. This objective was reconfirmed by the June 2010 European Council (17/6/2010 Nr: EUCO13/10).
[14] Delivering a Sustainable Energy Future for Ireland – White Paper, Department of Communications, Marine and Natural Resources (2007)

forward later in 2011 in accordance with the provisions of Article 9 of the Effort Sharing Decision. The Communication will address modalities for the inclusion of emissions/removals from activities related to land use, land use change and forestry (LULUCF). It should be noted that in bringing forward its proposal under Article 9, the Commission is required to "*consider if the distribution of individual Member States' efforts should be adjusted accordingly*".

5.2.1 Projected greenhouse gas emissions to 2020

Beyond 2009 (the latest year for which final inventory data is currently available), the national profile is monitored on the basis of annual greenhouse gas emission projections provided by the EPA.

The projections are based on two scenarios - "With Measures" (WM) and "With Additional Measures" (WAM).

- The WM scenario is prepared on the basis of policies and measures in place and implemented at the end of 2009. The *Baseline* energy forecast[15] produced by the Sustainable Energy Authority of Ireland is the primary input for the WM scenario.

- The WAM scenario includes the effect of policies which were planned but not implemented at the end of 2009, as well as the anticipated impacts of a number of policy targets in place but not yet fully defined in terms of measures. The *NEEAP/NREAP* energy forecast[16] is the main input; this scenario assumes full achievement of the targets in the National Energy Efficiency Action Plan and the National Renewable Energy Action Plan.

Both WM and WAM scenarios use the same agricultural activity projections provided by Teagasc, which is a scenario designed on the assumption that the targets in Food Harvest 2020[17] are delivered in full.

[15] Energy Forecasts for Ireland to 2020, Sustainable Energy Authority of Ireland (2010)
[16] Energy Forecasts for Ireland to 2020, Sustainable Energy Authority of Ireland (2010)
[17] Food Harvest 2020. A Vision for Irish agri-food and fisheries. Department of Agriculture Food and Forestry (2010).

Figure 4: Projected National Emissions 2010-2020, *WM* Scenario

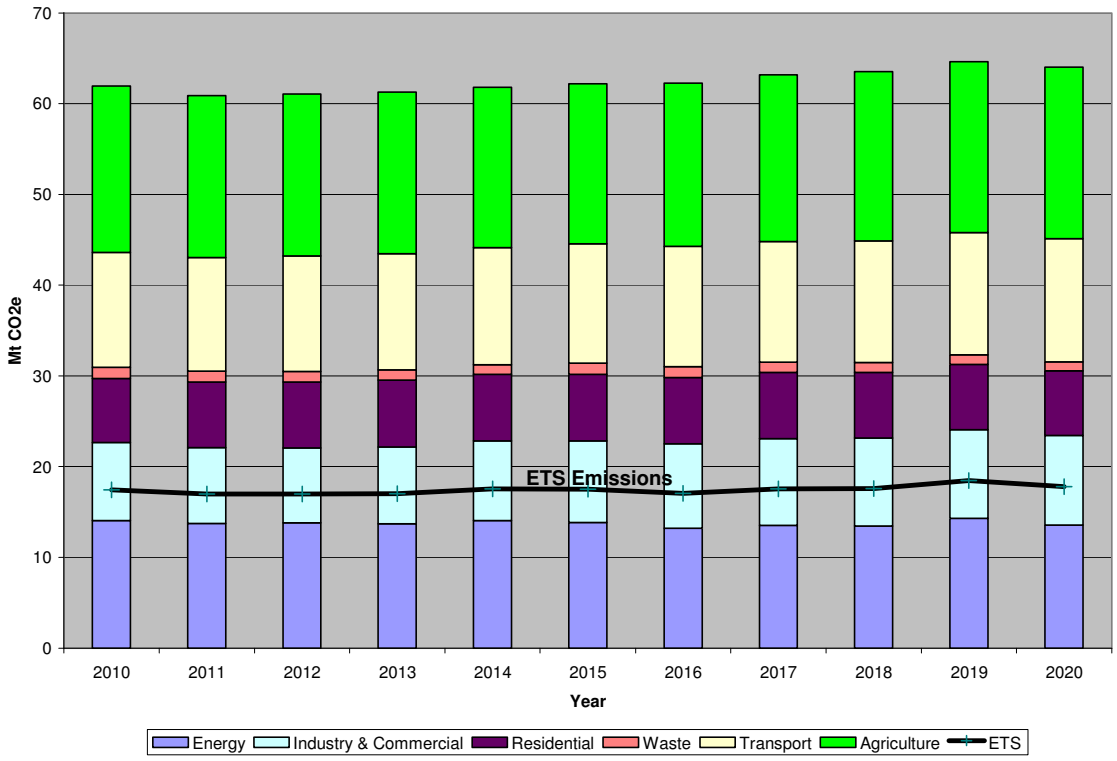
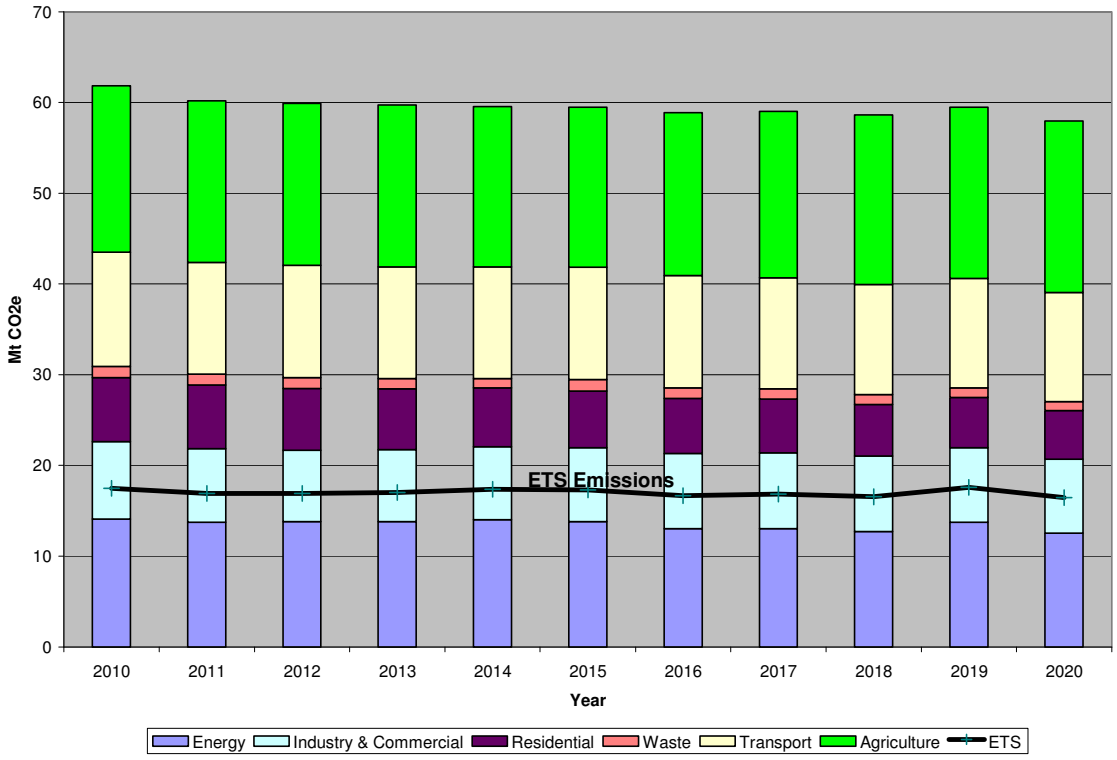


Figure 5: Projected National Emissions 2010-2020, *WAM* Scenario



Using data provided by the EPA in April 2011, Figures 4 and 5 show the WM and WAM scenarios for projected total national greenhouse gas emissions for the period 2010 to 2020. Considering emissions in a national context is losing its importance somewhat in the light of the fact that the ETS installations are subject to a cap at the EU level only but it is essential to illustrate the overall state of play and the importance of the ETS sector contribution to the overall mitigation agenda.

The difference in moving from Figure 4 to Figure 5 demonstrates the growing proportion of agriculture emissions in both scenarios but particularly in the WAM scenario where substantial mitigation is achieved in energy-related sectors.

It is clear that neither graph demonstrates a step change from the status quo. In order to align national policy with the stated level of European and global ambition in the medium to long term, a substantial downward deviation from these trends is urgently required.

5.2.2 Emissions Trading Sector (ETS)

Figure 6 shows the predicted emissions from this sector using the WM and WAM scenarios. The red line represents the total cap for Ireland as approved by the Commission under the National Allocation Plan 2008-2012. The yellow line represents the actual allocation to installations in the sector by the EPA in the years to date whilst the pink and blue lines represent historical values for 2008-2009 and projected values thereafter. The distance between the yellow and pink lines relates to unused allocation by installations although it is not clear whether the allowances concerned have been traded or will be banked for use in later years. The distance between the yellow and red lines represents the unused allocations in the New Entrants Reserves, primarily as a result of the economic downturn.

It is expected that the allocation to Irish installations will increase in 2011 and 2012, as provided for in the National Allocation Plan which was approved in 2006. From 2013 onwards the allocations will be determined at EU level and will vary by sector, but in aggregate the cap will drop at a rate of 1.74% per annum to 2020[18]. Irish installations will be allowed to operate below or above this EU-wide trajectory as long as they remain in compliance with the rules of the revised ETS Directive. Each installation will need to be able to present the necessary emissions certificates reflecting their emissions as normal by April of the following year to the national registry. Use of Clean Development Mechanism units (aka CERs) are subject to quantitative and qualitative constraints. Emissions allowances from the 2008-2012 period can be used in the 2013-2020 period

[18] The starting point for this annual decrease is 2010 so the total cap for 2013 will be about 5% lower than the average for the 2008-2012 period on a like for like basis

without quantitative restriction. Article 9 of the revised Directive provides for the trajectory to be reviewed after 2020.

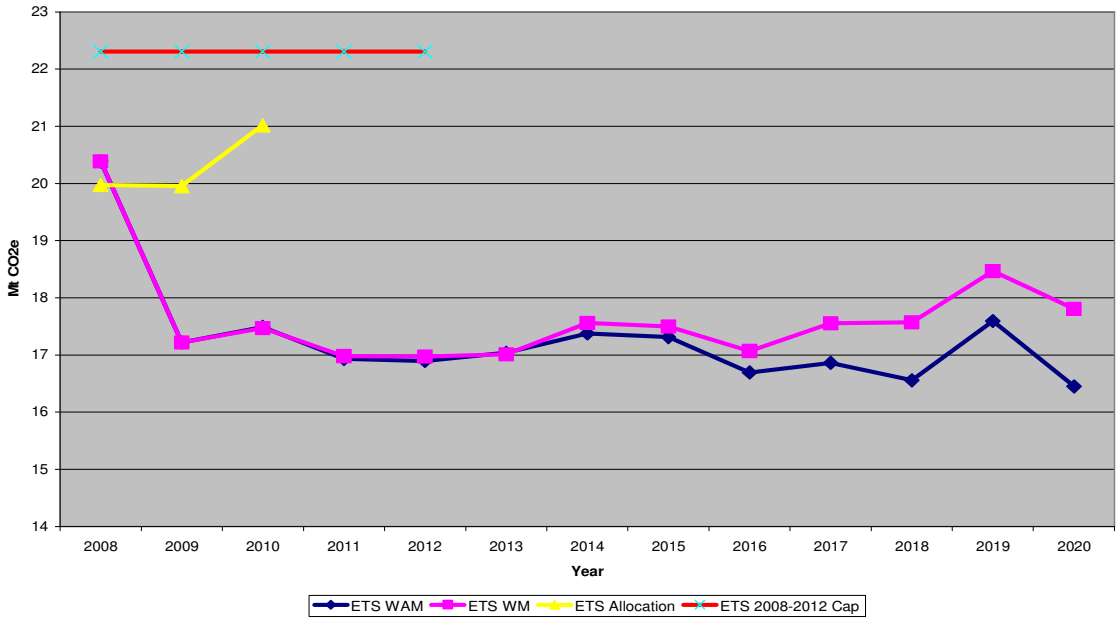


Figure 6: Emissions Trading Sector 2008-2020

Given the clarity of EU policy and legislation on the ETS in the period to 2020, notwithstanding the challenge of giving operational effect to its terms at Member State level, emissions from the Irish installations falling within the scope of the scheme are not addressed in a substantive way in this review. This does not imply that the Government has no role in this sector as clearly renewable energy and energy efficiency policies are crucial to power generation emissions in particular. On the other hand, given the price signal that exists within the ETS, and awareness of Government targets in relation to energy efficiency and renewables, Irish installations can use their own judgement about how best to achieve compliance.

5.2.3 Non-ETS Sector

In terms of national policy development, mitigation across the non-ETS side of the economy is an immediate priority given the unusual national emissions profile and an extremely challenging mitigation target for the sector under EU law – a 20% reduction on 2005 levels by 2020. Notwithstanding the fact that the economic downturn has led to a reduction in anticipated emissions, substantial mitigation policy actions are required in order to deliver compliance with this target. Figure 7 illustrates the non-ETS emissions

projections under both the WM and the WAM scenarios, and an indicative Effort Sharing Decision (ESD) trajectory.

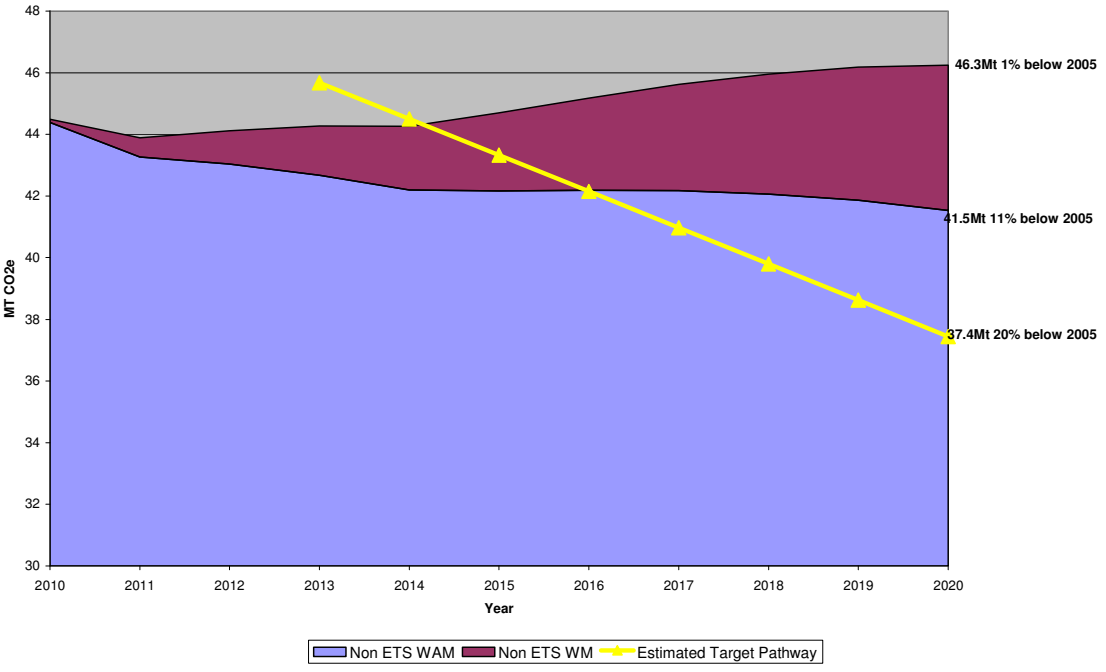


Figure 7: Non-ETS Emissions 2010-2020

Each point on this indicative non-ETS trajectory is a legal target in its own right. The first of eight annual targets occurs in 2013 and is currently estimated at 45.6Mt CO_2e. This target will be followed each year by a target about 1Mt CO_2e lower, ending in 2020 with the headline target of 20% below 2005. The starting point in 2013 is determined by the average of non-ETS emissions over the period 2008-2010. Had those emissions been lower, then a more gradual pathway to the 2020 target would have emerged.

In its April 2011 projections, the EPA warned that the difficulty in actually achieving the 2020 target under either scenario should not be underestimated. Even if the WM scenario is achieved in full, emissions would exceed the agreed target by 8.8Mt CO_2e in 2020 (1.2% below 2005), and the trajectory would be breached by 2015. Under the more ambitious WAM scenario, the distance to target in 2020 would be 4.1Mt CO_2e (11% below 2005 emissions) and projected emissions would exceed the trajectory for the first time in 2016. Both scenarios assume full achievement of the targets contained in the Food Harvest 2020 report, particularly in relation to beef and dairy output. While agriculture emissions fall gradually until 2015, they begin to rise again thereafter – in line

with the expansion in the agri-food sector envisaged following the expiry of the EU milk quota regime in 2015[19].

Apart from the urgency of reviewing policy from a compliance perspective, the level of mitigation achieved in 2020 will be a key factor in determining the extent of the national mitigation challenge in the immediate post-2020 period. Medium and long-term costs and benefits, as well as any co-benefits that may arise will need to be taken into account in the development of all policy options and cost-benefit analysis will be a useful tool in this regard. For example, least-cost options in the short term, such as an over-reliance on flexibilities in the EU Effort Sharing Decision, could prove costly in the medium and long term when viewed against broader objectives on transition to low-carbon growth and competitiveness in the global green economy.

5.2.4 Flexible Mechanisms

The Effort Sharing Decision in which the 2020 target and trajectory requirements are set down also provides for a number of flexibilities to assist Member States to achieve compliance on the basis of reasonable effort and cost. These flexibilities include the use of purchased CDM[20] credits, and intra-Member State trading of national allocations. With the availability of these flexibilities, it is likely that sanctions or infringement proceedings will be avoidable, though at a cost to the Exchequer. While not a specific feature of the climate and energy package as it applies to Member States, the principle of supplementarity, i.e. that flexibilities should only be used in addition to and not in place of domestic action, is set out in the Kyoto Protocol and should be considered in determining the scale of the use of flexibilities.

The Effort Sharing Decision also contains provisions for Member States to manage their trajectories by banking or bringing forward unused allocations from year to year. For example, under the WM scenario, a surplus from 2013 and 2014 could be used for compliance in 2015, whilst in the WAM scenario a carried forward surplus could be used up to and including 2019. Figure 8 illustrates the expected cumulative distance to target for the period 2013-2020. Theoretically, while the cumulative totals remain less than zero, further measures are not required.

Should mitigation action and use of the flexibilities already discussed still not lead to compliance, Article 7 of the Effort Sharing Decision provides that any breach of the

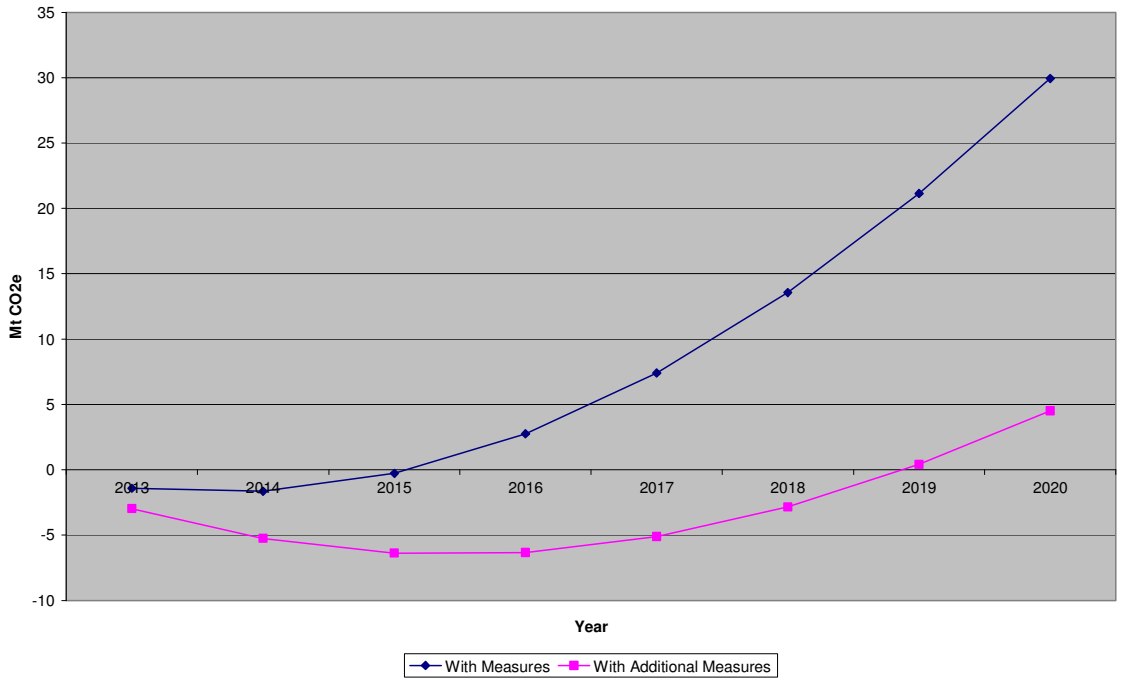
[19] In accordance with in accordance with Council Regulation (EC) No 1234/2007 of 22 October 2007 (OJ L 299, 16.11.2007, p. 1)

[20] Clean Development Mechanism (CDM) is one of the flexible mechanisms agreed as part of the Kyoto Protocol whereby developed countries can purchase credits arising from emission reduction projects in developing countries. The units generated from the CDM are known as Certified Emissions Reductions or CERs.

annual targets is made up for in the following year, multiplied by a factor of 1.08. [21] A corrective action plan must also be submitted to the Commission setting out the measures that will be taken to restore the trajectory, and both the Commission and the Climate Change Committee[22], made up of Member State representatives, can comment and make recommendations on the plan. In addition to this process, the Commission can also bring infringement proceedings against the Member State concerned.

Extreme caution must be exercised in considering these scenarios, however, and full attention must be paid to all the background assumptions. In particular, it is important to note that carrying forward any annual surplus in this way would be of only short-term assistance and does not reduce the need to identify new policies and measures that will be required to address the gap that will eventually arise. The scenarios also need to be placed within the context of the possible increase in the level of ambition to be achieved in 2020. A purely compliance-focused approach to the commitment period will result in an embedded and substantial requirement for very deep emission reductions and/or use of carbon credits in the period beyond 2020.

Figure 8: Cumulative Distance to Target 2013-2020



[21] For example if a Member State exceeds its target by 1Mt, then it would carry forward a deficit of 1.08Mt into the following year. Instead of a target of X Mt in the following year per the trajectory, the target would be (X-1.08)Mt.

[22] Established by Article 9 of Decision No 280/2004/EC

5.3 Assessing Uncertainty in the period to 2020

At a minimum, a reduction in non-ETS emissions of 20% on 2005 levels must be achieved by 2020. Even under the WAM scenario, it will be necessary to identify and implement further domestic measures and/or make some use of the flexibilities provided for in the Effort Sharing Decision. It must also be borne in mind that 20% is not necessarily the final target for 2020 – there is a real possibility that the EU will increase the overall level of ambition, with more demanding targets being set for individual Member States as a consequence.

In May 2010, the European Commission issued the Communication "*Analysis of options to move beyond 20% greenhouse gas emissions reductions and assessing the risk of carbon leakage*" which examined the possibility of stepping up EU ambition from a 20% emission reduction target for 2020 to a 30% reduction. The Council (in conclusions dated October 2010) invited the Commission further to elaborate on options contained in the Communication and conduct further analysis on the consequences at Member State level, as appropriate, with a view to presenting those as soon as possible. This analysis, which is expected to be available in early 2012, will provide the basis for the Council to revert to the step up issue.

It is difficult at this point to be explicit about the impacts of a step up. The elements that seem certain suggest that the ratio of action between ETS and non-ETS at EU level, currently 21% and 10% respectively, will be largely maintained. In the event of a 25% reduction for the EU, the level of ambition for the EU as a whole for each would increase to 26%[23] and 13% for ETS and non ETS respectively. In the case of a 30% step up, this ambition increases to 34% and 16% respectively. The implications of either of these scenarios for Ireland's non-ETS target trajectories for the period to 2020 remains to be seen. However, the Commission analysis on the step up seems to acknowledge implicitly the dearth of cost-effective domestic mitigation available to Ireland to meet its existing 20% target. It is also expected that Ireland's changed economic circumstances will be reflected in any new round of effort sharing for the purposes of stepping up EU mitigation ambition for 2020.

Other factors that could affect the national emission reduction target and the extent of the effort required to achieve it include:

- the expected proposal on the inclusion of LULUCF in the EU commitment[24];

[23] This rate includes the reduction from International Aviation emissions which is smaller than the expected reduction from Power Gen and Industry sectors.
[24] A Commission Communication on this issue is expected later this year.

- any delay or set-back in implementing the WAM scenario in full by 2020 – some of the measures to achieve the targets outlined have not yet been identified and/or some measures may not deliver reductions to the extent anticipated;
- increases in oil prices could make some measures cheaper and easier to achieve, with decreases having the opposite effect;
- increases in the carbon price could encourage innovation and result in some mitigation measures becoming more attractive; and
- increased economic growth will have a significant impact on emissions, emphasising the importance of ensuring that, in so far as is possible, growth takes place on a low-carbon trajectory.

The reason for the overall level of uncertainty and the need for caution relates to the fact that the projection scenarios are possible views of the future based on assumptions and, even though every care is taken in their preparation, any one of those assumptions may not turn out as expected. Some are more important than others and will impact the challenge differently.

5.4 Conclusions

As the emissions trading sector has ready access to a range of options for achieving compliance, it is sometimes overlooked in consideration of the 2020 targets. However, it is clear that the National Energy Efficiency Action Plan (NEEAP) and the National Renewable Energy Action Plan (NREAP) play a very important role for both ETS and non-ETS sectors. While the NREAP is backed by EU legislation, energy efficiency actions do not have this legal certainty at the current time although there are substantive EU reporting requirements. Despite the absence of a statutory underpinning, it is clear that actions under the heading of energy efficiency can make a substantial and cost-effective contribution to reducing energy consumption and increasing energy security in the period to 2020 and beyond.

A substantial challenge and some uncertainty still surround EU Effort Sharing Decision targets; for Ireland, a trajectory from 2013 resulting in a 20% reduction on 2005 emissions by 2020. Notwithstanding the increases in efficiency already captured in agricultural production, the expected rise in agriculture emissions in the period to 2020, given the scale of the target, confers a sizeable burden on the non-ETS sector to make more substantial contributions to mitigation efforts.

The Department of Agriculture, Fisheries and Food, in conjunction with Teagasc, has also carried out a very detailed analysis of the potential for, and costs of, emissions reductions in the agriculture sector. The analysis indicates that the sector can reduce emissions cost effectively by about 4% compared to business as usual. A number of

measures have been identified and are being implemented through the advisory services. These measures will reduce emissions over and above the normal efficiency gains in the sector. In general improving production efficiency per unit of food produced will make the most important contribution from the sector to meeting climate change ambitions.

The most cost-effective approach to the mitigation challenge is to identify the least-cost mitigation measures in a sector-neutral manner and implement all of those measures up to a certain marginal cost threshold after which flexibilities would be used. This approach would require mitigation policy to become fully mainstreamed and a primary criterion in decision-making in all sectors. However, broader considerations arise, such as social inclusion and rural development, against which a strict cost-effectiveness approach must be balanced. This inevitably leads to some cost-effective measures being ruled out or deferred, thereby increasing the overall cost of mitigation. The backdrop for determining appropriate criteria is the significance of the overall mitigation challenge, and importance of mobilising a substantive and proactive economy-wide response.

There is still some doubt about the total scale of the 2020 challenge and how the 2050 EU Roadmap output will be incorporated into EU policy over the months ahead. A wide range of influences are pressing the case for political support to achieve a higher level of mitigation ambition both in the short term to 2020 and in the longer-term context of low-carbon transition and green growth. It is in this rather uncertain context that policy must be developed. Determining the optimal mix of domestic mitigation and offsetting, which reflects short-term and longer-term needs, is a major policy priority.

The step up to a 30% EU target for 2020 is the main cause of uncertainty at the current time as its overall scale and the implementation effort required at Member State level are difficult to extrapolate. Changed economic circumstances, access to LULUCF sequestration and less restricted access to flexibilities are expected to be features of the increase in EU ambition but no clear elaboration of the effects of these elements is currently available.

The 2020 pathway will require the development and assessment of sectoral policy options, particularly in the areas of energy, transport and agriculture, to allow for decision-making based on the costs and benefits of each option, including the option of using carbon credits. As part of this process, it will be essential to identify the additional measures that may be required should the EU step up its 2020 emissions reduction target to 25%, 30% or higher.

Ultimately, the most critical consideration is the fact that a short-term compliance perspective would embed the need for a growing budget for offsets. Compliance

strategies for 2013-2020 that concentrate solely on the eight-year period will lead to high levels of demand for foreign offsets or costly steep trajectories being a persistent issue in climate policy and will inhibit the transition to a competitive green economy.

The 2050 Roadmap along with IPCC[25] analysis clearly point to a future where developed country emissions will reduce gradually over time to a very small proportion of their current size in a context where, by mid-century, international offsets will be increasingly scarce. Policy decisions must therefore consider the costs and benefits of implementation on (at least) a twenty year horizon and on the basis of a consistent methodology. A wide-ranging, inclusive and credible evidence-based approach to determining next steps will play a substantial role in identifying the optimal low-emission growth path.

[25] Intergovernmental Panel on Climate Change.

6. The longer term – towards a competitive, low-carbon economy

6.1 EUROPE 2020 Strategy

The EUROPE 2020 Strategy[26], adopted by the European Council in June 2010, set out a transformative vision for the period to 2020, building on the progress made under the Lisbon Strategy. It aims to show how Europe has the capability to deliver smart, sustainable and inclusive growth, to find a path to create new jobs and to offer a sense of direction to European societies.

The strategy puts forward three mutually reinforcing priorities:

- smart growth: developing an economy based on knowledge and innovation;
- sustainable growth: promoting a more resource-efficient, greener and more competitive economy; and
- inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

In seeking to assist the EU in defining a clear vision for 2020, the Commission proposed a number of headline targets in each of these priority areas. The sustainable growth objective is underpinned by the "20/20/20" climate/energy targets (with the built-in objective of increasing the EU greenhouse gas mitigation target for 2020 to 30% in the right conditions). Among seven flagship initiatives identified in the strategy, two in particular aim to boost sustainable growth: "*An industrial policy for the globalisation era*[27]*" and* "a *resource-efficient Europe"*[28].

The resource-efficient Europe initiative was published in January 2011 and will be followed by a resource efficiency roadmap later in 2011. It provides a long-term framework to help decouple economic growth from the use of resources, support the shift towards a low-carbon economy, increase the use of renewable energy sources, modernise the transport sector and promote energy efficiency. This framework will support a range of policy actions, including in relation to climate change. A key proposal under this flagship initiative is the Commission Communication: "*A Roadmap for moving to a competitive low-carbon economy in 2050"*[29] (March 2011).

[26] COM(2010) 2020 final. & EUCO 13/10
[27] COM(2010) 614
[28] COM(2011) 21
[29] COM(2011) 112 final

6.2 Roadmap for moving to a competitive low-carbon economy in 2050

Together with a White Paper on Transport[30], and an Energy Efficiency Plan[31], the 2050 Roadmap Communication is a key element of the overall resource efficiency flagship initiative.

The Roadmap focuses on establishing EU policy to cut total greenhouse gas emissions by 80-95% (compared to 1990 levels) by 2050[32]. It recommends that Europe should achieve this objective largely through domestic measures since, by mid-century, international carbon credits to offset emissions will be less widely available than today. Accordingly, by 2050, the EU should reduce its emissions by 80% compared to 1990 levels through domestic actions. Any carbon credits used at that point would contribute to increasing the overall emissions reduction beyond 80%. The challenge is significant and all sectors will have to contribute, including those sectors participating in the ETS.

The analysis also shows that the most cost-efficient EU pathway to the 2050 target requires a 25% emissions reduction target for 2020, to be achieved through internal measures alone, rather than the current target of a 20% reduction (which does not preclude the use of credits). The Roadmap shows that the 25% reduction can be reached if the EU (through the collective efforts of the Member States) meets its 20% energy efficiency improvement goal and fully implements the range of policy initiatives that make up the 2008 Climate and Energy Package.

In addition, the Roadmap indicates that reductions of the order of 40% and 60% below 1990 levels would have to be achieved by 2030 and 2040, respectively, so as to reach the 80% goal proposed for 2050 along the most cost-efficient trajectory. An additional estimated annual investment of 1.5% of EU GDP or €270 billion would be required to meet these targets. It is anticipated that much of this extra investment would be recovered through a reduction in the cost of oil and gas imports of between €175 and €320bn per annum. There would also be benefits in terms of air quality, health and energy security and potential net new job creation up to 1.5 million by 2020. The scale of the challenge should not be underestimated, and substantial work will be required by the Commission and the Member States to create the enabling conditions for such a transition.

The Commission intends the Roadmap to be used as a basis for sector specific policy initiatives and Roadmaps, such as the 2050 Energy Roadmap and the White Paper on

[30] COM(2011) 144 final
[31] COM(2011) 109.
[32] This reflects the advice from the IPCC that global emissions should be reduced by 50% by 2050 and in line with the concept of common but differentiated responsibilities, this target translates to a 80-95% reduction requirement for developed countries.

Transport. The Commission also intends to commence discussions with all relevant sectors on the development of sectoral roadmaps and envisages all Member States developing national low-carbon roadmaps for 2050.

In addition to further development of the 2050 Roadmap initiative, other EU climate policy developments which will influence national policy include:

- developments in relation to the EU flagship initiative on resource efficiency. The Commission is preparing proposals for long-term strategies to improve resource efficiency in areas such as energy, climate change, transport and the environment;
- the EU Budget Review agenda and the financial perspectives for the post 2013 period;
- the 'CAP towards 2020' agenda;
- the EU Green Paper on research and innovation funding;
- the Communication on a Roadmap towards a competitive and resource-efficient transport system issued by the Commission on 28 March 2011;
- the Energy Efficiency Action Plan issued by the Commission in parallel with the 2050 Roadmap Communication; and
- an anticipated communication and legislative proposal from the Commission on land use, land use change and forestry (LULUCF).

6.3 International level – "The Green Economy"

In parallel with developments in EU policy around the EUROPE 2020 Strategy and the longer-term perspective introduced in the 2050 Roadmap Communication, the context for the international agenda is increasingly focusing on the emerging global green economy. This broader agenda is being underpinned by a number of recent reports, including "*Towards Green Growth*" from the OECD[33] and "*Towards a Green Economy*" from the UN Environment Programme[34] (UNEP).

OECD – *Towards Green Growth*

In its report, the OECD points out that green growth provides a strong focus on fostering the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth – consistent with resilient ecosystems. In addressing a framework for green growth, the report advises that good economic policy lies at the heart of any strategy for green growth, noting that a green growth strategy –

- *is centred on mutually reinforcing aspects of economic and environmental policy; and*

[33] OECD (2011), Towards Green Growth, OECD Publishing. http://dx.doi.org/10.1787/9789264111318-en
[34] UNEP, 2011, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, www.unep.org/greeneconomy

- *recognises that focusing on GDP as a measure of economic progress overlooks the contribution of natural assets to wealth, health and well-being.*

In a stand-alone annex entitled *Tools for Delivering on Green Growth*, the report sets out a broad policy toolkit for green growth.

The OECD recommends that although national circumstances will differ, putting a price on pollution or on the over-exploitation of scarce natural resources through mechanisms such as taxes or tradable permit systems should be a central element of the policy mix. They further point out that a carbon tax should be helping to incentivise innovation to tackle climate change but that in reality current levels across the OECD are low, leaving a considerable gap[35].

According to the OECD, policies for green growth must in all cases:

(i) *integrate the natural resource base into the same dynamics and decisions that drive growth;*

(ii) *develop ways of creating economic payoffs which more fully reflect the value of the natural resources base of the economy; and*

(iii) *focus on mutually reinforcing aspects of economic and environmental policy.*

This will include changing payoffs through pricing pollution and resource use by removing perverse subsidies which encourage pollution or over-extraction of resources and drain the public purse, and ensuring that regulatory standards focus on outcomes. Policies will also need to encourage innovation, address inertia and the risks of technology lock-in, and the roles of infrastructure and institutions in delivering change.

UNEP - *Towards a Green Economy*

UNEP defines a green economy as one that results in "*improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"* or, even more simply, as one which is low-carbon, resource-efficient and socially inclusive. The report points to mounting evidence which suggests that transitioning to a green economy has sound economic and social justification, and an emerging strong case for a redoubling of effort by Governments as well as the private sector to engage in such an economic transformation.

In its key findings, the UNEP report points out that a green economy –

- *recognises the value of, and invests in, natural capital;*
- *is central to poverty alleviation;*

[35] The carbon tax in Ireland is currently €15/tonne which is close to the current market price of carbon within the EU Emissions Trading Scheme. A review of the carbon tax is scheduled under the EU/IMF agreement.

- *creates jobs and enhances social equity;*
- *substitutes renewable energy and low-carbon technologies for fossil fuels;*
- *promotes enhanced resource and energy efficiency;*
- *delivers more sustainable urban living and low-carbon mobility; and*
- *grows faster than a brown economy over time, while maintaining and restoring natural capital.*

The report, which also provides guidance on policies for change, demonstrates that the greening of economies is not a drag on growth but rather a new engine for growth and a net generator of decent jobs.

The OECD and UNEP reports provide important signals for national policy development. The ongoing evolution of the green economy paradigm and the ever-increasing pressure to maintain economic competitiveness and social development in the context of transition to a low-carbon world, constitute dimensions to our immediate and longer-term future that demand policy responses at a much broader level than greenhouse gas mitigation. In effect, greenhouse gas mitigation is no more than a subset, albeit a critically important one, of a global challenge both to combat climate change and protect the natural capital necessary to support the achievement of sustainable economic growth, and the wellbeing and prosperity of present and future generations.

6.4 **Low-carbon Development Plans** - A national roadmap for 2050

In adopting the 2010 Cancun agreements[36], the Parties to the UNFCCC decided that developed countries should produce low-carbon development strategies or plans and developing countries were encouraged to do the same in the context of sustainable development. Subsequently, and in line with the international position, the European Commission, in its '2050 Roadmap' Communication, points to the need for Member States to develop national low-carbon roadmaps.

The consistent EU and wider-international focus on the long term to 2050 provides the context in which national policy will have to be progressed in the post-2012 period. It is also clear that the largely compliance-based policy pursued to date will not be adequate. Transition to a low-carbon future is a much broader agenda and long-term planning will be key to its achievement, as well as building a solid foundation for effective engagement by Ireland in the emerging global green economy. In preparing a national 2050 roadmap, consistency with the European Commission's approach of an overarching policy supported by a series of long-term sectoral plans and policies will be a key consideration.

An initial effort to develop an emission scenario up to 2050 by researchers at UCC assumed that emissions from agriculture would remain constant from 2020, activity

[36] Decision1/CP.16

increases being counter-balanced by efficiency improvements. The EU Roadmap envisages a situation where agriculture emissions fall steadily by up to 49% relative to 1990 by 2030 and remain largely constant thereafter, and later iterations of the work at UCC has reflected upon this outcome. A more detailed analysis of the implications of these assumptions is needed, particularly in the light of the anticipated proposal on LULUCF under Article 9 of the Effort Sharing Decision.

The Commission also published a Transport White Paper in tandem with the 2050 Roadmap. The overall objective is to achieve a 60% reduction in emissions from transport relative to 1990. Europe will not reach this objective using today's technology and fuels. Evolutionary changes such as the complete eradication of conventionally fuelled vehicles from cities, and a 40% penetration rate for sustainable air transport fuels are required to deliver this vision. Whilst Ireland is a technology taker in the transport sector, addressing behaviour in terms of modal choice, purchasing and usage patterns will be key issues for consideration.

A national low-carbon roadmap will provide an opportunity to present a coherent vision for the period up to 2050 in which climate policy is mainstreamed across all policy areas. Consideration of the changes that are expected or envisaged in that period, and how Ireland can balance the use and protection of its resources, including its land and marine resources for food, energy and ecosystem services (including carbon sequestration), will be key policy challenges. A longer-term policy position will provide both clarity and certainty in relation to the framework within which policy will be developed across all sectors, ensuring a coherent and cohesive outcome.

6.5 Research

A targeted national programme of applied research will be central to ensuring successful and timely transition to a competitive, low-carbon economy. Achieving and demonstrating transition will require comprehensive and scientifically sound data on national greenhouse gas emissions and sinks to support policy decisions, and inform participation in the carbon market and wider investment choices. This must be underpinned by rigorous scientific analysis of international standard.

A thorough understanding of emissions and sinks, and the options to manage them in an effective and cost-efficient manner, is critical to a progressive national response that supports the priorities of climate protection and competitiveness. These must comply with internationally agreed reporting and accounting systems and be subject to range of robust verification systems from activity to national level. The national programme should be aligned with actions to meet EU and wider-international requirements (under the UNFCCC) for reporting and accounting, and to inform their future development.

The climate change challenge also provides unique opportunity for innovation and economic development. The essential transition to a low-emissions society will require a range of scientific, technological and socio-economic solutions. The potential market for these solutions will be global, multi-sectoral and will exhibit strong growth. The research programme should focus on solutions and act as a key stimulus for innovation.

The national research programme therefore needs to work within a strategic framework which encompasses policy and innovation goals, build on existing capacity and investments and be solutions-orientated. It must focus on mitigation within and across key sectors such as agriculture, energy, transport, residential, and industrial production, and should constitute a significant component in enabling an effective transition roadmap to 2050. Research is being funded by Science Foundation Ireland in the area of sustainable energy and energy efficiency technologies following the expansion of its remit in 2008. Further opportunities to advance national research capability include the establishment of a national platform or centre for analysis of greenhouse gas emissions and sinks both to provide advanced analyses, and to facilitate the required dialogue between policy and innovation. This would catalyse and enable the development and deployment of technological and socio-economic solutions in Ireland; it would further open up potential to pursue global market opportunities for such solutions.

Already, research funded by the EPA and SEAI has started to identify and set out possible long-term visions for the energy sector. The EPA and SEAI have initiated a process of examining plausible roadmaps for delivery of long-term goals, e.g. ongoing work under the "Energy Modelling – Irish TIMES" project being carried out in UCC, which helps to establish the likely structural changes implied by very ambitious long-term targets consistent with the EU 2050 Roadmap. For the purposes of informed and effective policy development, this hugely valuable work in the energy sector must be replicated in other sectors.

The EPA also works closely with the Department of Agriculture, Fisheries and Food and Teagasc on key climate change and agriculture research issues, including assessment of the impacts of land management on carbon uptake in soils, forests and other vegetation, measurement, reporting and verification systems for agriculture related greenhouse gas emissions and in identification of options to mitigate these emissions.

6.6 Conclusions

The situation after 2020 is by its nature less certain than the preceding period. Technically speaking, comprehensive long-term projections are only partially available.

In addition, the clarity that legal obligations bring to quantifying the scale of the challenge is not available. Despite these gaps, there is an increasing weight of evidence pointing towards an extremely challenging future, with the range of choices available likely to narrow with time.

Some clear and important messages emerge from the EU 2050 Roadmap Communication on transition to a competitive low-carbon economy. Scientific evidence points to a need for a certain level of ambition within the group of developed countries. Thorough analysis of how the EU could deliver its share of this effort points to a complete transformation. Even in the likely circumstances that other parties to the UNFCCC lag behind the EU in terms of ambition, a sound economic case can be made for early and comprehensive action. This transition will require a substantial investment in the European economy at all levels.

Other institutions of international repute back up the key messages coming from the Commission. The OECD and UNEP amongst others are calling for a new policy focus. This should signal to investors that capital should be allocated to green economy sectors and that this can lead to sustainable long-term growth. Given the importance of export markets such as Germany and the United Kingdom, national policy can influence growth in these markets by responding to policy aspiration and direction in those countries. The European Climate Forum, in association with the influential Potsdam Institute and others, in a recent report[37] commissioned by the German Government, makes a strong case for more ambition in the EU on economic grounds. The report highlights the benefits of a low-carbon growth path in terms of increasing GDP and job creation. Both Germany and the United Kingdom, among others, support a higher level of ambition in the EU, i.e. stepping up to a 30% greenhouse gas emission reduction target for 2020.

In terms of meeting the long-term challenge, a farsighted perspective is required. A rigorous approach to identifying long-term mitigation solutions is needed in combination with a review of all measures that seek to influence investors.

The success which Ireland has achieved in developing its economy, through openness to trade, reduction of Government intervention, a young well-educated and flexible work force, attracting foreign direct investment and making the most of its location, are all elements that could be successfully brought to bear on the issue of building a low-carbon future. In its green economy report, UNEP notes that to bring about transition to a green economy, Government actions include, "*levelling the playing field for greener products*

[37] Jaeger et al., (2011) "A New Growth Path for Europe: Generating Prosperity and Jobs in the Low-Carbon Economy. Synthesis Report", European Climate Forum, 2011, available at http://www.european-climate-forum.net/fileadmin/ecf-documents/Press/A_New_Growth_Path_for_Europe__Synthesis_Report.pdf

by phasing out antiquated subsidies; reforming policies and providing new incentives; strengthening market infrastructure and market-based mechanisms; redirecting public investment; and greening public procurement." The economic rebuilding that is taking place in Ireland is a real opportunity to identify areas where a more sustainable long-term orientation of the economy could begin. Policies that identify market failures and eliminate them one at a time will ensure that green growth on a low-carbon pathway is achieved.

An approach that signals this change well in advance will be more likely to achieve stakeholder buy-in and ultimately be successful. The first step along this road should be a commitment to develop a low-carbon vision for the period to 2050, an output that is expected of developed countries under the Cancun Agreements. The elaboration of this vision should help to identify the necessary inputs for the development of supporting legislation to ensure the delivery of its ambition.

7. Conclusions

The targets introduced as a result of the Kyoto Protocol were the first international commitments facing up to the issue of principles laid down in the 1992 UN Framework Convention on Climate Change. Recent inventory data combined with the most recent near-term projections suggest that Ireland will comply with its 2008-2012 obligations through domestic emission reductions supplemented, on cost-effectiveness grounds, by carbon units, including units acquired through the flexible mechanisms provided for in the Kyoto Protocol. The economic downturn is also a contributing factor, as evidenced by the significant drop in emissions in 2009. At this stage, only tactical considerations of how best to achieve compliance in the 2008-2012 period remain.

The strong growth in the economy over the 1994-2007 period meant that emissions grew strongly during that time. To ensure that future growth is sustainable, it must be more resource-efficient and decoupled from increases in emissions. The starting point of the 2020 challenge is based on average emissions in 2008-2010 and national obligations under the Effort Sharing Decision will be annual rather than multi-annual from 2013 onwards. The existing WAM projections suggest that compliance with these targets is not entirely out of reach, but making policy based on a relatively benign set of assumptions would be dangerous and could embed a long-term dependence on international permits at a significant cost to the Exchequer. In addition, the anticipated step up to a 25 or 30% target for 2020 could put these targets out of reach in the absence of a substantial effort above and beyond what is already difficult to achieve.

Looking further ahead the key messages coming from trading partners in Europe and Asia is that their economies are undergoing transition. The EU is continuing to lead the developed world in the fight against climate change and large developing countries are making significant strides towards more sustainable growth. The 2050 Roadmap Communication from the European Commission outlines an economically-sound vision for a revolution of the European economy. Maintaining pace with the front runners in this EU economic revolution is a critical policy challenge for Ireland.

In the wider-international context, there are also encouraging signs of a new 'green growth' paradigm which emphasises resource efficiency, the protection of natural resources and competitiveness along with the creation of new jobs. A long-term view of how Ireland aligns its economic development with the demands of the growth engines of global commerce should be at the core of a low-carbon development vision. In order to create enabling conditions for selling into these markets, many of which are already gearing up for the green economy, it will be necessary to ensure that the domestic

conditions are right to encourage innovation. This can be done by showing environmental ambition and using tools that allow the market to identify solutions. That will require a combination of taking the best of what is working in other countries as well as devising domestically appropriate policies that will place Ireland in the vanguard of countries making the most of the opportunities presented by the green economy.

In terms of a long-term national vision of a carbon-constrained world, Ireland is faced with both the challenge of addressing a unique greenhouse gas emissions profile and the opportunity to position itself as an enlightened society with an environmentally sustainable and competitive, low-carbon economy. Developing the policies to put Ireland on a clear and definite path to achieve that vision is the immediate priority.