An Roinn Iompair Turasóireachta agus Spóirt

Department of Transport, Tourism and Sport

Investing In Our Transport Future: A Strategic Framework for Investment in Land Transport

Background Paper Nineteen

Climate Change and Transport Policy

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Climate Change and Transport: Some Key Background Material and Context

Key Greenhouse Gas Emissions Reduction Targets

Kyoto Protocol (2008 – 2012)

Under the Kyoto Protocol, the 15 countries that were EU members before 2004 (EU-15) are committed to reducing their collective emissions to 8% below 1990 levels by the years **2008-2012**. Most Member States that have joined the EU since 2004 also have Kyoto reduction targets of 6% or 8%. Ireland is required to limit annual average national greenhouse gas emissions to 13% above Ireland's 1990 baseline value of 55.6 Mtonnes of CO^2 (62.8 Mtonnes) or 314.2 Mtonnes of CO^2 in total over the five year period 2008 – 2012.

2020 Targets

Ireland has demanding targets to meet by 2020 arising from commitments made under EU climate change policy. The '20-20-20' targets were agreed by European Council in 2008 and commit to, by 2020:

- A 20 per cent reduction in overall EU GHG emissions compared to 1990 levels;
- Energy savings of 20 per cent through improved energy efficiency (relative to a benchmark of existing trends); and
- Renewable energy sources to provide 20 per cent of the EU's total energy.

A key distinction in EU policy is between emissions covered by the EU's Emissions Trading Scheme (ETS) and other emissions (non-ETS emissions). The ETS covers the large energy users, including electricity, cement, and large food, drink and pharmaceutical plants. The target reduction in emissions for the ETS sector (to be achieved by participating companies) is 21% by 2020, calculated on the 2005 base.

All other sectors comprise the non-ETS sectors. These include transport, households, industry (excluding energy-intensive industry), agriculture, and private and public services. In the non-ETS sector (where it is the responsibility of member states to achieve the reduction in emissions) the total EU target is a reduction of 10% by 2020, compared to 2005.

This 10% EU target was allocated across member states through the Effort Sharing Decision which gave Ireland a target to achieve a 20% reduction in non-ETS emissions by 2020 relative to 2005 (joint highest target reduction among member states with Denmark and Luxembourg). There are also interim annual targets to be achieved over the 2013 to 2020 period.

Longer-term targets

For **2050**, EU leaders have endorsed the objective of reducing Europe's greenhouse gas emissions by 80-95% compared to 1990 levels. The Commission has published a roadmap for building the low-carbon European economy, setting out a proposed pathway for achieving these deeper emission cuts. The Roadmap suggests that, by 2050, the EU should cut its emissions to 80% below 1990 levels through domestic reductions alone. It sets out milestones to form a proposed cost-effective pathway to this goal - reductions of the order of 40% by 2030 and 60% by 2040.

The contention is that transition to a low-carbon society would boost Europe's economy thanks to increased innovation and investment in clean technologies and low- or zero-carbon energy. A low-carbon economy would have a much greater need for renewable sources of energy, energy-efficient building materials, hybrid and electric cars, 'smart grid' equipment, low-carbon power generation and carbon capture and storage technologies.

To make the transition the Commission project that the EU would need to invest an *additional* €270 billion or 1.5% of its GDP annually, on average, over the next four decades. The extra investment would take Europe back to the investment levels seen before the economic crisis, and would spur growth within a wide range of manufacturing sectors and environmental services.

Commission analysis shows that while deeper cuts can be achieved in other sectors of the economy, a reduction of at least 60% of GHGs by 2050 with respect to 1990 is required from the transport sector, which is a significant and still growing source of GHGs. By 2030, the goal for transport will be to reduce GHG emissions to around 20% below their 2008 level. Given the substantial increase in transport emissions over the past two decades, this would still put them 8% above the 1990 level.

Ireland's Emissions - Sectoral profile

The composition of Ireland's overall emissions is distinctive. Agriculture represented 32% of Ireland's total emissions in 2011, compared to an OECD average of just 8%, this very high relative share being due to Ireland's specialisation in beef and dairy farming. Emissions from the energy industries (essentially electricity in the case of Ireland) represented over one-fifth of Ireland's total emissions in 2011 (21%), while the OECD average was 35%. The share of emissions from industry was 14% in Ireland in 2011, compared to the OECD average of 19% reflecting the relative absence of heavy industry in Ireland and a relatively high share is generated by the residential sector (11.5% per cent in 2011), compared to an OECD average of 7%.

The ETS sector represented around 27% of Ireland's emissions in 2011, while the EU average was around 45%. In terms of emissions outside the ETS sector, the sectoral concentration is even more pronounced. Agriculture represented 44% of Ireland's non-ETS emissions in 2011, while over one-quarter of these emissions were from transport (27%). 16% of non-ETS emissions were from the residential sector. The high share of non-ETS emissions arising from agriculture and transport (71%) makes Ireland's 20% non-ETS emissions-reduction target very challenging.

Ireland's Performance to date

Kyoto Protocol (2008 – 2012)

Emissions monitoring and projections show that with regard to the reduction obligations under the Kyoto Protocol for the first commitment period 2008 to 2012, Ireland has achieved the necessary reductions in greenhouse gas emissions in recent years and is expected to comply with the targets set.

The latest EPA projections (April 2013) indicate that the distance to target for the Kyoto Protocol will be 0.2 – 0.7 Mtonnes, and it is likely that there will be a very low requirement for the use of credits to ensure compliance with the agreed limit. These emission estimates include the impact of forest sinks as allowed for under Article 3.3 of the Kyoto Protocol and the impact of the EU Emissions Trading Scheme (EU ETS).

Projected performance to 2020

The EPA publishes projections of Ireland's GHG emissions up to 2020 on an annual basis. These projections are based on a medium-term outlook for the economy provided by the ESRI. The outlook used in the EPA's 2013 projections envisages an average annual GNP growth rate of 3.3% for the second half of the decade, projections of agricultural emissions take account of the planned expansion of the sector as set out in Food Harvest 2020 and projections of energy-related emissions (i.e., emissions other than agricultural and industrial gases) are based on energy forecasts provided by the SEAI.

The EPA presents two scenarios:

- The With Measures (WM) scenario is based on a baseline energy forecast of the SEAI. It incorporates the estimated impact of all policies and measures in place (and legislatively provided for) by the end of 2011. This is essentially current policy, except that the impact of measures introduced since 2011 is not yet incorporated.
- The With Additional Measures (WAM) scenario is based on existing plus planned government policies. The difference between this projection and WM is that in the WAM projection it is assumed that all the targets set in the *National Energy Efficiency Action Plan* (NEEAP) and *National Renewable Energy Action Plan* (NREAP) are fully achieved. There are major challenges involved in achieving these targets and exchequer cost implications. Some measures have been put in place to achieve the targets but many of the measures are still to be developed. Reflecting the NEEAP and the NREAP, the key additional assumptions in the WAM scenario are that by 2020 Ireland will have achieved 20% savings in energy use through energy efficiency; 40% of electricity from renewable energy; 12% of heating from renewable sources; and *10% of transport fuels will come from renewables, including a 10% share for Electrical Vehicles (EVs)*.

Based on these sets of assumptions, the EPA projects that total emissions (excluding carbon sinks) will increase by 9% over the period 2012 to 2020 in the WM scenario, while, in the WAM scenario emissions would increase by 1%. Therefore, assuming that these two scenarios represent two possible pathways for greenhouse gas emissions in Ireland to 2020, emissions are projected to be 1-9% higher in 2020 when compared to current levels.

In terms of Ireland's national targets to reduce emissions as required by the Effort Sharing Decision, it is the projections of non-ETS emissions that are relevant. The target, as noted above, is to reduce non-ETS emissions by 20% by 2020 relative to a 2005 baseline. It is estimated that Ireland will exceed its 2020 limit by 5 – 8 Mtonnes of CO^2. This is 3% – 10% below 2005 levels falling well short of the target of a 20% reduction. In addition, the projections indicate that Ireland will exceed its binding annual limit in 2015-2016 and each year thereafter and will exceed its obligations over the 2013-2020 period, cumulatively, by 7 – 24 Mtonnes of CO^2.

Transport Sector Emissions

Transport emissions peaked in 2007 at 14.5 Mtonnes, declining to 13.7 Mtonnes in 2008, and to 12.5 Mtonnes in 2009, falling further to 11.6 Mtonnes and 11.3 Mtonnes in 2010 and 2011 respectively. Transport emissions are, however, projected to show strong growth over the period to 2020 with a 12- 22% increase on current levels depending on the level of policy implementation.

Under the With Measures scenario, transport emissions are projected to increase by 22% over the period 2011 – 2020 to almost 14 Mtonnes of CO^2. The With Measures scenario includes:

- the impact of VRT and motor tax changes (introduced in 2008 and revised in Budgets 2012 and 2013);
- improvements to the fuel economy of private cars, supported by the EU Regulation which mandates maximum levels of CO^2 for new cars to 120g/km in 2015 and 95g/km in 2020
- renewable energy penetration of 3% out to 2020 which is supported by the Biofuel Obligation Scheme 2010.

Under the With Additional Measures scenario, transport emissions are projected to increase by 12% over the period 2011 – 2020 to 13 Mtonnes of CO^2 returning transport emission to 2009 levels by 2020. In this scenario, it is assumed that:

- renewable energy penetration is 10% by 2020 – this is the RES-T target which is a binding target under the Renewable Energy Directive. The Biofuels Obligation

Scheme 20107 and the rollout of Electric Vehicles (EVs) underpin the achievement of this target.

- more efficient road traffic movements and public transport efficiencies will deliver savings.

It is important to note that the With Additional Measures scenario assumes that all targets in Government policy documents such as the NEEAP5 and NREAP6 are met. The difficulties associated with meeting these targets should not, however, be underestimated. Failure to meet these targets will result in higher emissions levels than those projected under this scenario and result in Ireland's emission levels moving even further from target.

Next Steps

Climate Action and Low-Carbon Development Bill/ Sectoral Low Carbon Roadmaps

The Programme for Government gave a commitment to develop national policy and legislation on climate change and that commitment is being underpinned through legislation currently being drafted – the proposed Climate Action and Low-Carbon Development Bill.

In line with one of its key requirements, Departments with responsibility for key sectors in the transition to a low-carbon economy have been tasked with the preparation of individual 2050 low-carbon roadmaps, taking account of the EU low-carbon agenda, the interim and final NESC Secretariat policy analysis, and such further evaluation of measures as the Departments concerned consider necessary.

This requires the Departments concerned to frame the low-carbon vision/objective for their sectors and to undertake the evaluation that is necessary to develop a robust and cost-effective policy platform for delivery of that vision in their area. The key sectors are energy/built environment, transport and agriculture. The objective is to finalise these sectoral roadmaps – including an 8 week period of consultation – in the fourth quarter of 2013.

The Department of the Environment, Community and Local Government will coordinate the preparation of the national roadmap, including the required public consultation and

relevant environmental assessment requirements, but the final national roadmap will be a Government policy position for which all Departments concerned (particularly the Departments with sectoral roadmaps, and the Departments of Finance, and Public Expenditure and Reform) will have responsibility.

Five core elements are envisaged:

1. *Introduction* – setting out the context for the sectoral roadmap.
2. *Objectives for the sector* – reflecting the profile to date, the projected profile to 2050 on a business-as-usual basis, and the proposed profile to 2050 in response to the mitigation objective for the sector. The differences between the two 2050 profiles will be the GHG mitigation gap to be addressed by the sector.
3. *Sectoral Action Plan* – presenting in detail (a) the agreed/approved mitigation actions to achieve the ambition milestone identified in the sectoral profile for **2020**, and (b) the preparations to be made for the purposes of meeting the ambition milestone identified for **2030**. Specific actions for 2030 to 2050 will be addressed in subsequent plans.
4. *Measure, Report, Verify* – setting out the mechanisms already in place or being put in place to measure, report and verify progress under the Sectoral Action Plan.
5. *Underlying analysis* – an Analytical Annex on the underlying environmental and economic analysis, including methodologies and assumptions.

Work has already commenced within the Department on the preparation of the Transport Sectoral Roadmap. In drawing up the roadmap the Department intends launching an initial public consultation phase in the summer by seeking submissions to a thematic paper on key policy considerations within the transport sector. Such considerations include continuation of a least cost measures approach, a focus on technology, sustainable land use patterns, alternative fuel options and market susceptibility. It is hoped to provide an 8 to 12 week period for this consultation and receipt of submissions.

Subsequent to this phase and consideration of submissions, the Department will draw up an initial roadmap for consultation with other Departments by the end of October.

Potential further transport measures under consideration

It is expected that across all sectors a key input to preparation of the national and sectoral roadmaps will be the Final Report prepared by the National Economic and Social Council on 'Ireland and the Climate Change Challenge', published in 2012.

With regard to transport measures, the NESC Report recognised the centrality of technology development, such as engine improvements, electric vehicles, gas-based vehicles and ICT, that could be exploited for the benefit of a more sustainable transport sector.

In addition to largely internationally driven technological development the range of potential additional measures that could be deployed to narrow the gap between projected emissions and targeted levels are well known. They include:

1. *Further relative incentivisation of the purchase of lower emissions vehicles*
   Complementary to technology development. an examination of mechanisms to secure the earliest feasible take up of cleaner technologies in Ireland both for the passenger car sector and, in particular, in the area of freight vehicles which accounts for 20% of emissions and has been the slower adaptor.
2. *An additional biofuel obligation***.** The current biofuel obligation is set at 6%. This currently represents a straight forward reduction of 6% of all road transport emissions with any increase resulting in a further percentage reduction in transport emissions. Consideration of any such increases would need to take account of availability of biofuels, costs to consumers, cost effectiveness of biofuels in transport, and the wider sustainability of the biofuels themselves.
3. *Additional carbon tax.* The carbon tax is currently set at a level of €20/tonne and applies to both petrol and diesel. Although the interaction of this tax with other measures is not straightforward, expert opinion suggests long term reductions in travel demand and fuel demand with increasing price. Therefore increasing the carbon tax could reduce transport emissions, in particular in the longer term. Potential risks include increased transport costs for businesses, fuel tourism to Northern Ireland, potential to adversely impact on accessibility to transport for specific socio-economic groups, increased costs

for personal travel with a particular impact on rural dwellers, and potential to work against concept of balanced regional development.

4. *Modal shift to walking, cycling and public transport.* Smarter Travel contains ambitious targets for modal shift away from the car. These targets were based on planned investment in public transport infrastructure, and on promoting modal shift to walking, cycling and car passenger through both investment in necessary infrastructure and soft measure such as mobility plans. Mode switching also has important co-benefits in terms of congestion reduction and health benefits. The level of savings will clearly depend on the extent of modal shift.
5. *Further speed reduction measures.* It is estimated that enhanced enforcement of existing speed limits in recent years has resulted in significant GHG emissions savings. A potential further measure would be actual reductions in speed limits. However, speed reductions carry with them significant economic costs.
6. *Ecodriving schemes.* Eco-driving is generally viewed as a cost effective measure although leveraging beneficiary investment through PAYS type schemes would require development in the absence of available exchequer investment.
7. *Traffic management/demand management/road pricing etc.* Application of "user pays" or "polluter pays" in some form to the transport sector would be expected to result in significant reductions in emissions relative to a business as usual case where there are relatively large upfront costs to vehicle ownership and relatively lower costs associated with vehicle use. The exact level of emissions savings would depend on the type of measures applied, and the extent of users and road types covered by any such measure. Potential negative impacts are similar to those raised in terms of increasing carbon tax, namely increased transport costs for businesses, potential to adversely impact on accessibility to transport for specific socio-economic groups, increased costs for personal travel with a particular impact on rural dwellers, and potential to work against concept of balanced regional development. Aside from emissions reduction, demand management measures would be preferable to carbon tax in the sense that other externalities can also be included in the pricing (e.g. congestion). Ultimately charging would be revenue raising, however, the revenue raised would likely require rebalancing of other taxation streams such as motor tax and VRT to ensure overall burden of taxation on transport users remains similar.

Transport sector measures are generally recognised to have high marginal abatement costs compared to other sectors, and the potential for further intervention needs to be considered in the context of costs of measures across the full range of non-ETS activity.

It is also important to note that achieving transport sector emissions reduction requires co-ordinated action across a range of Departments. The Department of Communications, Energy and Natural Resources lead on the Electric Vehicle area, on the biofuels area, and in terms of the overall target of 10% of transport energy coming from renewable sources by 2020. The Department of Finance are the key players in terms of motor taxation and vehicle registration tax (along with the Department of Environment, Heritage and Local Government) as well as Carbon Tax and other Excises. The Department of Environment, Heritage and Local Government are also key to ensuring that future land use and settlement patterns do not drive ever increasing demand for motorised transport.