TECHNICAL BACKGROUND PAPER ON CLIMATE CHANGE MITIGATION IN IRELAND

NOTE BY THE SECRETARIAT
Thursday 9th July 2015 - 9h30 - Room CC6

This technical paper provides background analysis for the draft Economic Survey on Ireland. It is circulated for information.

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JT03379734

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CLIMATE CHANGE MITIGATION IN IRELAND

Ireland’s GHG emissions in 2012 were higher than in 1990 but emissions grew far slower than GDP resulting in a noticeable fall in emissions intensity. Future reductions in emission intensity will be progressively more difficult as there has already been a substantial switch to gas. Ireland’s EU obligation is to reduce non Emissions Trading System emissions to 20% below their 2005 levels by 2020. With a long-term vision of reducing CO₂ emissions by 80% by 2050, national policy will consist of an iterative process with a series of national plans up to 2050 towards a low-carbon economy.
Greenhouse gas emissions and energy trends

1. Irish GHG emissions stabilised after 2000 and fell during the recession. Total energy supply, mainly through coal and oil burning, grew substantially up to 2000. The subsequent switch to gas played an important part in decoupling, with renewables playing only a small part, despite some recent development. Both transport and agriculture have seen significant improvements in emission intensity.

Trends in greenhouse gas emissions

2. Ireland’s total greenhouse gas emissions peaked in 2001, and were nearly 17% lower by 2012, though they were no longer on a downward trend. Emissions in 2012 were some 6% above the 1990 level. Provisional data show a small fall in emissions in 2013.

Trends in total GHG emissions by sector

3. Emissions from agriculture declined after 2000, the only key sector with emissions in 2012 significantly below (by about 8%) the 1990 level. Emissions from energy rose through to 2005, with marked growth in emissions from transport. Emissions from energy other than transport stabilised after 2000 and declined with the onset of recession. Emissions from transport accounted for 9% of total emissions (excluding LULUCF) in 1990 but now represent more than 18% of total emissions. Since 1990, emissions of CO$_2$ from transport, mostly from road traffic in Ireland, increased by 122%. This increase was accentuated by fuel-tourism as about 9% of fuel sold in Ireland was used in vehicles in the UK and other countries (DECLG, 2014).

Figure 1. Total GHG emissions per sector


Trends in total GHG emissions by gas

4. The CO$_2$ share has risen fairly steadily as emissions grew throughout the 1990s, stabilised thereafter and fell only with the recession; in 2012 it represented two thirds of GHG. Emissions of methane, the second most important GHG, were stable up to the early 2000s and fell thereafter. Nitrous Oxide (NO$_2$) emissions rose somewhat in the 1990s but thereafter fell, like methane (CH$_4$). Better treatment of household waste as well as lower animal numbers and reduced fertiliser use in agriculture contribute to these trends.
**Figure 2. Total GHG emissions by gas**

![Graph showing total GHG emissions by gas]


**Trends in GHG emissions per capita**

5. Population rose by around 30% between 1990 and 2012 but emissions growth was slower, resulting in per capita emissions declining by about 15% over the period. However, they remained 20% above the OECD average in 2010 (compared with 30% above in 1990) according to the IEA\(^1\). The high proportion of GHG associated with agriculture in Ireland explains to a large degree this high level, and Ireland tends to be much closer to average in respect of CO\(_2\) emissions per capita.

**Figure 3. GHG emissions per capita**

![Graph showing GHG emissions per capita]


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\(^1\) According to national data submitted to the UNFCCC, emissions per capita decreased from 15.8 to 12.8 thousand kg per capita between 1990 and 2012.
Trends in GHG emissions per unit GDP

6. As GDP growth has been driven mainly by rapidly growing low emitting manufacturing and services industries, emissions per unit GDP have declined dramatically, the largest proportionate fall of all countries that were members of the OECD in 1990. From a position well above the OECD average in 1990, due to a high share of emissions from agriculture, Irish emission intensity has fallen to about average.

Figure 4. GHG emissions per unit of GDP


Trends in the energy sector

Trends in energy supply

7. Total primary energy supply peaked in 2007. Initial rapid growth in energy supply during the 1990s was met by a near doubling of oil use. Ireland became steadily more energy efficient after 2000 and also began a switch away from oil towards gas and small amounts of renewables. Coal burning has declined but remains significant, more important than renewables. Total energy supply briefly rose to over 14 Mtoe before the recession and most recently has been slightly below this level. Fossil fuels (including peat) contribute all but just under 0.9 Mtoe (half solar and wind, half biofuels) of this.
Figure 5. Total primary energy supply by product (individual country time series 1990-2013, IEA data)

Trends in electricity generation mix

8. Overall electricity supplied has risen proportionally somewhat more than total primary energy supply. Nearly all of this growth was supplied by gas up to around 2005. Since then growth in renewables, though relatively small in absolute terms, has allowed the share of gas to decline, particularly as overall demand has fallen with the recession. Both these trends have helped the CO₂ content of electricity generation to fall, from well above the OECD average in 1990 to only a little above it by 2012.
Figure 6. CO₂ per kWh of electricity generated (all countries in 1990 and 2013, IEA data)

Note: excludes data for 1990 in Luxembourg


Figure 7. Electricity generation by product


International Commitments and Goals

Kyoto Protocol

9. The EU15 target under the Kyoto Protocol was to reduce 2008-2012 GHG emissions by 8% compared with their 1990 level. Within the EU burden sharing agreement that defines national targets, an increase of 13% compared over the 1990 level was permitted for the 2000-8-12 period for Ireland. For the 2013-20 period the target for EU28 is to cut to 20% below the base year emissions.
10. Under the second commitment period of the Kyoto Protocol (2013-20), Ireland will have to contribute to the EU’s quantified emission limitation or reduction objective (QELROS). The EU target consists of an average EU-wide 20% reduction in GHG emission from 1990 levels as part of a global and comprehensive agreement for the period beyond 2012.

*Mitigation targets/goals for 2020*

11. The Europe 2020 Strategy, also known as the 20/20/20 package, is an EU climate policy which drives member countries’ national legislation and supports a low-carbon and inclusive growth with a set of targets. By 2020, the EU aims to: reduce its GHG emissions by 20% from 1990 levels (enforced by the EU ETS Directive and the Effort Sharing Decision for emissions outside of the EU ETS); increase the share of renewable energy in total energy consumption to 20% (enforced by the Renewable Energy Directive); and improve energy efficiency by 20% (driven by the Energy Efficiency Directive). Furthermore, the EU committed to supporting development of Carbon Capture and Storage via the CCS Directive. Taken together, the package is in line with the EU long-term objective of reducing GHG emissions by at least 80% in 2050 compared to 1990 levels.

12. Ireland’s target for 2020 under the EU effort sharing is to reduce emissions of GHG not covered by the Emissions Trading System by 20% compared with 2005. Ireland and all other Member States have individual targets for each year over the period 2013-2020. The target for the year 2013 is set at the average of these emissions for the years 2008-2010. Targets in the intervening years, 2014-2019 are on a linear interpolation between the targets for 2013 and 2020. Over two thirds of Irish emissions are not covered by the ETS. The target for the ETS sector, which applies on an EU wide basis, rather than at Member State level, is for a 21% reduction relative to 2005 by 2010. This reduction is enabled by a gradual tightening of the cap on the trading system.

*Intend Nationally Determined Contributions*

13. Based on the actual progress to reach its 20/20/20 targets (section 3.2), the European Commission adopted in 2014 a proposal for EU 2030 Policy Framework for Climate and Energy. It includes:

- A binding target of reducing GHG emissions 40% below 1990 levels by 2030, which is much more stringent than the existing 2020 target. To achieve this target, GHG emissions covered by the EU ETS would have to decline by 43% compared to 2005, and non-ETS GHG emissions would need to be cut by 30% below 2005 level. In contrast to the 2020 target, this would be met through domestic measures only, with no use of international offsets.

- The target for GHG emissions covered by the EU ETS translates into a 2.2% annual decline of the cap from 2021 onwards (compared to 1.74% up to 2020). The reform of the EU ETS will include the establishment of a market stability reserve for the next ETS trading period in 2021, to address the surplus of emission allowances that has built up and improve the system’s resilience to major shocks.

- An EU-wide binding target to boost by 2030 the share of renewable energy to at least 27% of the EU’s energy consumption. This EU-wide target will not be translated into legally-binding renewables targets for individual member states beyond 2020;

- Following a review of the Energy Efficiency Directive, a 30% energy savings target for 2030 was proposed. However, the European Council endorsed an indicative target of 27% to be reviewed in 2020. Targets will not be translated into nationally binding targets.
14. As an EU Member state, Ireland will contribute to the EU-wide 2030 Climate and Energy Policy Framework. The national allocation to reach this target has not been defined yet. Proposals on how the non-ETS burden will be shared amongst Member States are expected to be published and negotiated in 2016.

**Measurement, reporting and verification**

15. As an Annex-I country, Ireland was required to submit its Sixth National Communication to the United Nations by January 2014. It submitted its National Communication in March 2014 and its GHG inventory in April 2014.²

**Domestic policy settings**

**Setting domestic targets and national planning processes**

16. In 2015, Ireland developed the climate action and low carbon development bill that stipulates that a national low carbon transition and mitigation plan should be set within the next 2 years, and reviewed every 5 year. This bill is in line with the National Policy Position³ on climate action and low carbon development (released in April 2015) according to which Ireland should aim for an aggregate reduction in CO₂ emissions of at least 80% by 2050 (compared to 1990 levels) across the electricity generation, built environment and transport sectors. It also set an approach to carbon neutrality in agriculture and land-use sector, including forestry.

Ireland’s National Energy Efficiency Action Plan (2014) aims to cut final energy consumption from an average of 160 000 GWh (primary energy equivalent) to 128 000 GWh in 2020. This represents a 20% cut. On that basis, consumption had fallen to 147 000 GWh by the end of 2012.

17. REN21, the Renewable Energy Policy Network, reports:

- 10% target for renewables in transport fuel by 2020, of which at most 6% from 1st generation biofuels and at least 2.5% from non-food sources.
- 12% target for renewables in heat consumption, 2020.
- 16% target for renewables in gross final energy consumption, 2020.
- Planned 0.5 GW installed ocean generating capacity by 2020.

18. Policy measures to meet these targets include implementing EU directives tightening building standards, incentives to improve existing homes and eco-labelling programmes. The feed-in tariff has helped to increase renewable electricity generation. The authorities intend to further modify vehicle taxation to encourage energy efficiency. Provision has also been made for natural gas as a transport fuel at the minimum excise rates which will also allow for the use of Biogas as a fuel. There are also tax reliefs in


³ [http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php)

place to encourage the purchase of electric and hybrid electric vehicles. Ireland’s national communication recognises that further policy steps are needed to meet its targets (DECLG, 2014).

**Trends in energy taxation**

19. Energy taxation in Ireland consists of a carbon tax, a mineral tax, and taxes on the consumption of electricity. These taxes are levied within the framework of the 2003 EU Energy Taxation Directive. Carbon taxes apply to most oil products used in the transport and heating and process use categories, including fuel oil, diesel, kerosene gasoline and LPG at the same rate of €20 per tonne of CO₂ emissions for both sectors. Effective taxation per unit of carbon content nevertheless varies widely across energy uses. Average taxation of energy, per carbon content, was the 7th highest in the OECD in 2012. It was the 5th highest when expressed as tax per energy content.

20. Over the last decade, total revenue from environmental taxation in Ireland has remained broadly stable at around 2.4% of GDP. Within this total, energy taxation has increased slightly in relative importance, from the equivalent of just under 1.3% of GDP in 2004 to almost 1.5% in 2013 (Eurostat: Environmental Tax revenue data). The major development in recent years has been the implementation of a carbon tax beginning in 2009. The tax is now levied on all fossil fuel emissions outside the EU ETS at a rate of €20 per tonne since early 2014. Ownership and use taxes on private motor cars were also substantially re-oriented towards lower emissions vehicles in 2008, leading to substantial reductions in the average emissions per km of newly registered vehicles.

**Figure 8. Taxation of energy on a carbon emissions basis (Taxing Energy Use, OECD data)**

Budgetary support and tax expenditures for fossil fuels

21. The OECD has compiled an inventory of over 550 measures that support fossil-fuel production or use in its 34 member countries (OECD, 2013a).\(^4\) As of 2014, the only support measure identified for Ireland is a public service obligation (PSO) levy charged on all final electricity consumers to finance purchases of peat-generated power by the Electricity Supply Board when the cost of such generation exceeds the market price of electricity (Table 1; OECD, 2013a). This subsidy is being phased out. The same PSO mechanism is also used to subsidise renewable energies.

22. Some other indirect support for fossil fuels comes through reduced VAT for fuels used for heating purposes. No data is available to quantify this.

Table 1. Summary of fossil-fuel support to coal - Ireland
(Millions of EUR, nominal)

<table>
<thead>
<tr>
<th>Support Element</th>
<th>Jurisdiction</th>
<th>2005</th>
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<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011p</th>
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<tr>
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<td></td>
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<tr>
<td>Support to unit returns</td>
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<td>44</td>
<td>10</td>
<td>47</td>
<td>-39</td>
<td>94</td>
<td>78</td>
</tr>
</tbody>
</table>

Tax expenditures for any given country are measured with reference to a benchmark tax treatment that is generally specific to that country. Consequently, the estimates contained in the table above are not necessarily comparable with estimates for other countries. In addition, because of the potential interaction between them, the summation of individual measures for a specific country may be problematic.


Emission trading systems

23. The EU ETS covers about 28% of CO\(_2\) emissions in over 100 large installations. Verified emissions represented only 84% of European Unit Allowances allocated for the 2008-12 period. Allocation was free, based on grandfathered emissions, except for about 9% of the total, which were retained for new entrants and cost-covering; about two thirds of this amount remained unallocated. Free allocation is greatly reduced in the third phase of the EU ETS (2013-2020), and only about one third of Irish ETS emissions benefit from this provision in this phase.

Feed-in tariffs

24. Feed-in tariffs (known as REFIT) replaced Ireland’s initial innovative system of competitive tenders for renewable schemes. One scheme, REFIT3, covers specifically biomass and another, REFIT2, all other renewables. REFIT2 specified the basic FIT, for schemes approved up to the end of 2015, as €66.35 per MWh for wind and €83.81 for hydro and €81.49 for captured emissions from landfill, indexed to changes consumer prices as from 2010, plus up to an additional €9.90 when market payments are particularly low. REFIT3 has FITs ranging up to €150 per MWh for different types of biomass and different scales of production.

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\(^4\) Inventory of estimated budgetary support and tax expenditures for fossil fuel: [http://www.oecd.org/site/tadffss/](http://www.oecd.org/site/tadffss/)
ECO/EDR(2015)/15/ANN1

Regulations

Power sector

25. The EU emissions trading scheme is the only measure directed towards decarbonising power supply.

Transport sector

26. The biofuels obligation scheme commenced on 1 July 2010, and is administered by the National Oil Reserves Agency. The initial rate of the obligation was 4% by volume. This rate increased to 6% by volume from 1 January 2013. There are tax reliefs for the cost of public transport for commuting and for the purchase of bicycles for commuting. Voluntary “Smart Travel” schemes in large employers and tertiary educational institutions encourage car sharing and bicycle use.

27. The National Spatial Strategy and the Regional Planning Guidelines under the amended Planning and Development Act include provisions to encourage development in line with existing transport corridors. Sustainable Energy Ireland is offering grants of up to €5,000 for electric vehicles registered before the end of 2015. VRT (vehicle registration tax) reliefs are available for the purchase of hybrid electric vehicles, plug-in hybrid electric vehicles, plug-in electric vehicles, and electric motorcycles. In addition, the largest electricity generator, ESB, is providing free connection points in the home of each of the first 2,000 vehicles purchased.

Energy efficiency

28. Steadily tightening building standards have been the main active non-price measure, for both housing and public buildings.

29. In the commercial sector, measures concentrate on information provision and energy efficiency promotion through the Energy in Business Programme, which provides a number of services that promote structured energy management and supports the efforts of all business sectors to improve energy efficiency and competitiveness. Energy assessment and business training programmes are available for SMEs, and there is an Advice Mentoring and Assessments programme. The Accelerated Capital Allowances for Energy Efficient Equipment measure incentivises companies to invest in energy efficient equipment by allowing companies to deduct 100% of capital expenditure incurred on eligible equipment from trading profits. It has been extended until end of 2017.\(^5\)

30. Implementing the EU Ecodesign Directive Ireland also acts to improve the environmental performance of energy-related products by setting minimum criteria that manufacturers must meet in order to place their product on the EU market.

31. Awareness campaigns and educational action in schools are also part of the government’s long-term action. The government is formulating a National Strategy on Education for Sustainable Development.

Support for energy research and development

32. Irish RD&D spending on energy is relatively low. Figure 12 shows the dominant position of spending on energy efficiency in Irish RD&D spending, while figure 13 shows how the pattern has varied a lot from year to year.
Key policies in the agriculture, forestry and other land use sector

33. Reform of the EU common agricultural policy links subsidy payments to measures such as retention of permanent grassland, crop diversification and the establishment of ecological focus areas. The Agri-environment Options Scheme includes action to promote the reduced and most efficient use of fertilisers and other measures such as arable margins, green cover establishment from a sown crop, minimum tillage and use of new technologies for slurry spreading.

34. Subsidies for animal husbandry have been switched from payments per animal, which encourage intensive use of land, to area-based payments. Active research is ongoing into methods to reduce emissions from animal husbandry such as different types of feed. The observation that younger cattle have lower emissions of methane has led to a policy to encourage early slaughter of beef cattle is encouraged.

35. An expansion in the value of Irish agriculture, and consequently in emissions, over the period to 2020 to meet the targets set out in “Food Harvest 2020” is expected. In addition, the Irish dairy industry has operated within an EU quota system since 1984 but following the abolition of milk quotas in April 2015, emissions from the agricultural sector are projected to increase with a growth in the dairy cow population (DECLG, 2014). Nonetheless, it has been recognised that Ireland had the lowest cow milk emissions in the EU (European Commission, 2010).

36. Ireland has significant policy in the area of incentivising increasing levels of afforestation. The New National Forestry Programme for 2014-2020 envisages €482m of new investment targeting 44kHa of
additional forest cover by 2020. The long term goal is to increase overall forest cover from current levels of about 11% to 18% by 2050.

Maximising the cost-effectiveness of climate change mitigation policies

37. Effective carbon prices different economic sectors face within and across countries arise either explicitly via carbon taxes or emission trading systems, or implicitly, via the abatement incentives embedded in other policies that influence greenhouse gas emissions (OECD, 2013c). The study of effective carbon prices in Ireland is not available.
BIBLIOGRAPHY


