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Box H:

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The Carbon Intensity of Employment in Ireland

By Thomas Conefrey, Enda Keenan and Tara McIndoe-Calder¹

This Box identifies recent trends in the carbon intensity of employment in Ireland in the context of the 2030 carbon reduction targets. Across the EU, greenhouse gas (GHG) emission levels have declined since 2008 even though employment has continued to grow.² In Ireland, the pace of decline in emissions has been slower than the EU-average over this period, which has seen the country become the EU's 5th most carbon intensive economy in 2019, moving from 8th position in 2008. Two sectors – Agriculture and Energy and Utilities – make up around two-thirds of non-household sectoral emissions in Ireland, while accounting for a relatively small proportion of employment. For emissions to be reduced while maintaining a given level of activity and employment in a sector, other factor inputs and technology will have to adjust and changes in the composition of output may be needed. The transition to a less-carbon intensive economy will also likely see growth in new sectors and products, with related opportunities for employment growth.

Emission Levels

In order to counteract and lessen the damaging effects of climate change, Ireland has committed to reducing GHG emissions by 51 per cent between 2018 and 2030 and achieve net-zero emissions by 2050.³ Air emissions data collected by the Environmental Protection Agency and published by the CSO show that total Irish GHG emissions declined by 13 per

¹ Irish Economic Analysis Division.

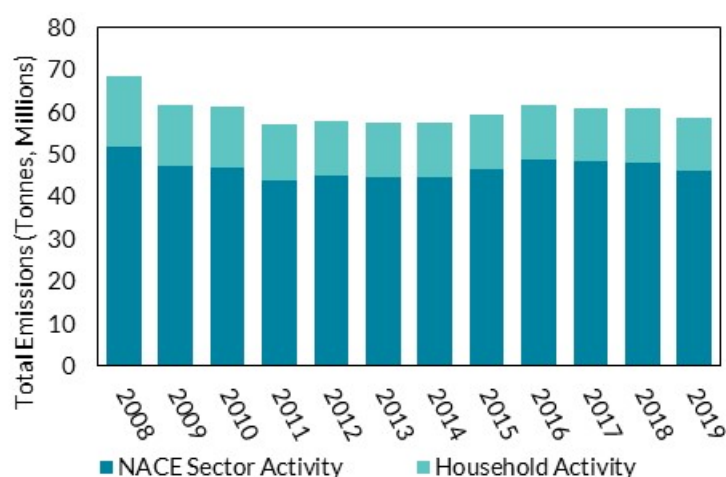
² GHG emissions refer to the sum of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorinated gases and are measured in CO₂ tonne equivalents. See [EPA](#) for further details

³ [Climate Action Plan 2021](#)



cent between 2008 and 2019 to 58.7 million tonnes of CO₂ equivalent.⁴ Non-household NACE sector activity accounts for an average of 78 per cent of emissions over the period, with household activities comprising the remainder (see Figure 1). Overall, non-household NACE sector emissions have declined by 11.2 per cent. This masks considerable variation between sectors with reductions in the Energy and Utilities and Manufacturing sectors being partially offset by increases in emissions in Agriculture. Households have exhibited a relatively greater rate of decline (23.2 per cent) due to a number of factors such as improved building standards and greater energy efficiency.

Figure 1: Irish Greenhouse Gas Emissions (2008 – 2019)



Source: CSO, Eurostat and author's calculations

Notes: Emission levels refer to territorial emissions only

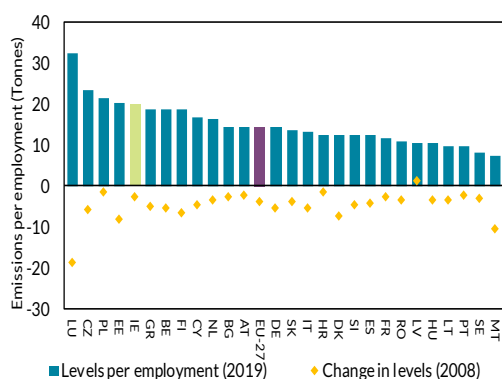
The carbon intensity of employment refers to the ratio between a country's non-household NACE sector emissions and total employment levels as expressed in CO₂ tonne equivalents, hereafter referred to as carbon intensity. Figure 2 shows the level of carbon intensity across the EU-27 as well as the change in carbon intensity between 2008 and 2019. In all countries with the exception of Latvia, the level of carbon intensity declined in recent decades. For the aggregate EU, NACE sector emissions declined by 20 per cent, while employment increased by 3.5 per cent. This decrease can be attributed to a number of factors including the shift towards to service sector-led employment growth as well as gains in energy and resource

⁴ National air emissions accounts are adjusted for non-territorial activities to calculate a territorial emission level that is then measured against national emission targets. This adjustment is calculated by removing transport sector emissions from non-resident units in Ireland and adding Irish resident units abroad. See [CSO release](#) for further details. A similar treatment is applied to all EU countries to allow for cross-comparison of emission levels.



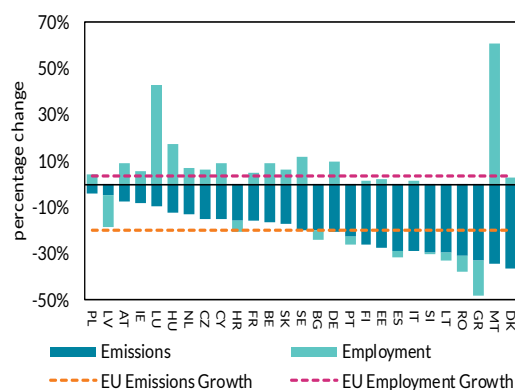
efficiency ([ILO, 2018](#)). In Ireland, carbon intensity fell by 3 tonnes per employment to 19.9 tonnes between 2008 and 2019 (see Figure 2). Within the aggregate EU area, 19 countries reduced their carbon intensity levels to a greater extent than in Ireland. As shown in Figure 3, Ireland's annual average employment growth from 2008-2019 was above the EU-27 average (5.6 per cent versus 3.5 per cent) but the country also recorded the fourth smallest decline in emissions and significantly below the EU average. These developments explain the change in Ireland's position from 8th most carbon intensive economy in the EU in 2008 to 5th in 2019 (Figure 2).

Figure 2: Carbon Intensity of Employment⁵



Source: CSO, Eurostat and author's calculations

Figure 3: Changes in NACE Sector Emissions and Employment (2008 - 2019)



Source: CSO, Eurostat and author's calculations

Compared to other EU countries, Ireland has a smaller share of employment in some energy-intensive industries such as manufacturing and energy but a significantly higher proportion of emissions linked to the agriculture sector (See Table 1).⁶ Looking at overall non-household NACE sector emissions, agriculture is the largest sectoral emitter in the Irish economy (44.5 per cent) followed by Energy and Utilities (22.4 per cent) and Manufacturing (16.2 per cent).⁷ Agriculture in Ireland is carbon intensive relative to the EU average primarily due to the scale of livestock farming practiced here compared to other countries where arable farming plays a

⁵ Luxembourg (LU) emission levels and carbon intensity measurements are likely to be distorted due to the high proportion of the country's workforce that resides in neighbouring countries.

⁶ European Parliament (2021) "[Climate Action in Ireland: Latest state of play](#)"

⁷ If household emissions levels were also included, agriculture would account for approximately one-third per cent of total economy-wide GHG emissions.



greater role.⁸ The large share of agriculture in overall NACE sector emissions in Ireland, combined with the increase in emissions in this sector over time, is a key factor explaining the overall carbon intensity of the Irish economy and Ireland's relative position in an EU context.⁹

The Energy and Utilities sector accounts for a high share of emissions due to the use of fossil fuels in electricity generation, although the use of peat in electricity production has been phased out at end-2020.¹⁰ It is planned to increase the proportion of renewable electricity close to 80 per cent by 2030 from the current level of 42 per cent.¹¹ The sectors with the lowest carbon intensity are Financial and Real Estate activities and Professional services, which are primarily office-based, non-energy intensive and have increased their share of overall employment since 2008.

Table 1: Sectoral Emission and Economic Statistics (2019)

Sector	% of Emissions	% of Employment	% of GVA	Carbon Intensity Level
Agriculture	44.5	4.7	1.1	186.3
Energy and Utilities	22.4	1.1	1.4	393.6
Manufacturing	16.2	10.9	34	29.4
Transport	6.9	4.6	2.1	30.3
Retail	2.6	13.1	7.5	3.9
Public Admin	1.5	4.9	2.8	6.1
Construction	1.1	6.3	2.5	3.3
Health	1	12.5	4.7	1.6
Accommodation	0.9	7.7	1.7	2.3
Education	0.6	7.9	2.9	1.6
Admin	0.5	4.8	7.1	2
ICT	0.5	5.3	15.4	1.8
Professional	0.5	5.9	4.5	1.5
Other services	0.4	2.5	0.9	3.5
Arts	0.2	2.3	0.5	2.3
Finance and Real Estate	0.2	4.9	10.8	0.8

Source: CSO, Eurostat and author's calculations

Notes: Carbon intensity level is GHG emissions in tonnes of CO2 equivalents divided by total employment.

⁸ See [CCAC \(2021\) Annual Review 2021](#)

⁹ As well as in Ireland, the agriculture share of non-household emissions has increased across a number of other EU countries between 2008 and 2019.

¹⁰ In 2020, coal and peat accounted for 21 per cent of carbon emissions from electricity generation, despite only accounting for 5 per cent of actual electricity generation. This results in the carbon intensity of Irish electricity being one of the highest in the EU despite the progress in using renewable energy. See [EPA \(2020\)](#) for further details

¹¹ See [SEAI \(2021\) Energy in Ireland](#)



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Conclusion

Despite steps taken over the last decade to lower emission levels such as through increased use of renewable energy sources, improved use of technological innovations in various sectors and some retrofitting of the building stock, the carbon intensity of employment in Ireland remains relatively high in EU terms. Starting from this elevated position highlights the scale of the challenge faced by many sectors in meeting Ireland's 2030 climate targets. For carbon intensive sectors such as agriculture, significant action will be required that delivers a transition to low-emissions farming and land use, along with investment in new technologies.¹²

¹² See [CCAC \(2021\) Annual Review 2021](#)