An Roinn Airgeadais
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Contents

1 Energy Taxes

1.1 Overview

This Chapter examines the main energy taxes – fuel excise as well as electricity tax. It also examines fossil fuel tax subsidies, some of which are coming under increasing scrutiny at EU and international level.

EU LEGISLATIVE FRAMEWORK

Energy taxation in Ireland is governed by the Energy Taxation Directive 2003/96/EC which sets out excise duty rules covering all energy products in the EU used for heating and transport, as well as electricity. The Directive sets out minimum levels of taxation applicable to these energy products but also allows for exemptions and reduced rates of taxation in specific areas. The Finance Act is the means by which any changes to energy taxation policy are passed into law.

In December 2019, the Commission published a new European Green Deal, setting out the policy and legislative agenda for climate and environment in the new Commission's term. Underpinned by the objective of the EU becoming the world's first climate neutral continent by 2050, the European Green Deal Communication is framed as a new growth strategy that aims to decouple economic growth from resource use.

It also commits to amending the Energy Tax Directive, which has not been updated since its implementation in 2003 and is considered outdated in some respects. The Commission consider that the price of transport must reflect the impact it has on the environment and on health. In this regard, it has indicated that it will review current minimum energy tax rates as well as exemptions, such as those provided to aviation and maritime fuels. A legislative proposal amending the Energy Tax Directive may emerge in 2021.

IRELAND'S CO2 EMISSIONS TARGETS

Fossil fuels, to varying degrees, cause damage to the environment and to human health through the emission of pollutants such as particulate matter, nitrogen oxides and carbon dioxide. Energy taxes raise significant revenues for the State and can contribute towards national policy on decarbonisation and public health by putting a price on harmful emissions and incentivising the switch to cleaner modes of transport and heating.

The threat posed by climate change on a global and national level is widely acknowledged. Ireland's 2030 emissions target, as set by the EU Commission, is a 30 per cent reduction of emissions compared to 2005 levels. The 2020 Programme for Government commits to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (a 51% reduction over the decade) and to achieving net zero emissions by 2050. On current trends, the gap to close in order to meet these targets is significant. Failure in this regard will,

among other things, give rise to significant financial penalties in relation to EU targets. The Climate Action Plan sets out a range of measures to address this situation. Table 1 outlines the overall emissions by sector for 2018.

Table 1: Greenhouse Gas Emissions by Sector

Sector	2018 Emissions Kt CO_2e	Percentage of 2018 Emission
Energy Industries	10,365	17%
Residential	6,197	10%
Manufacturing Combustion	4,741	8%
Commercial Services	1,129	2%
Public Services	980	2%
Transport	12,203	20%
Industrial Processes	2,316	4%
F-Gases	1,088	2%
Agriculture	20,597	34%
Waste	891	1%
National Total	**60,507**	**100%**

[1]

In contrast to the residential sector, which has shown a decrease in the share of national emissions[2], there remains a very strong correlation between economic growth and the growth in transport emissions. Emissions from the transport sector increased by 24% from 2012 to 2018, with air travel emissions soaring (associated with aviation energy use increasing by 88% from 2012 to 2018). Reflecting the extraordinary growth in aviation emissions, the average *annual* growth in CO2 emissions from jet kerosene was 9.2% in the period 2015 to 2018[3].

Cars remain as the single greatest source of road transport emissions at 40% of total or just over 6 million tonnes of CO2 in 2018 (about 3 tonnes CO2 per car per annum, on average). Fuel taxes have a role to play in incentivising, where feasible, greater use of public transport and cycling, more car sharing, fewer unnecessary car journeys, switching to more fuel efficient cars, etc. It is acknowledged that car dependency is a fact for many motorists and that they are not in an immediate position to radically reduce their auto fuel consumption and that the

[1] Source Environmental Protection Agency http://www.epa.ie/ghg/indicatorsprogresstotargets/
[2] According to SEAI, energy related CO2 emissions in the residential sector fell marginally in the period 2005 to 2018. Sustainable Energy Authority of Ireland (SEAI) Energy in Ireland 2019 Report : https://www.seai.ie/publications/Energy-in-Ireland-2019-.pdf

[3] SEAI Energy in Ireland 2019 Report

incidence of fuel taxes is not uniform, with lower income motorists and rural motorists disproportionately impacted by increasing fuel taxes. Chapter 3 assess tax policies to encourage motorists to choose the lowest emitting cars possible when purchasing cars for first time registration.

1.2 Fuel Taxes - Rates, Volumes and Yields

The bulk of receipts from energy taxes comes from fuels used in road transport and to a lesser extent the heating of buildings. CSO data[4] shows that in 2018 services and industry (principally the transport sector) paid 52.7% of energy taxes, households paid 44.8%, while agriculture, forestry and fishing paid 2.5%.

Table 2 sets out the tax rates currently applicable on the most popular mineral oil products (per 1,000 litres) together with the volumes released for clearance in 2019.

Table 2: Current Fuel Tax Rates and Volumes

Product	Fuel Duty (per 1000 Litres)	Carbon Tax (per 1000 Litres)	VAT	Volumes 2019 (millions litres)
Petrol	€541.84	€59.85	23%	1,043
Auto diesel	€425.72	€69.18	23%	3,679
MGO ('green diesel')	€47.36	€70.42	13.5%	1,093
Kerosene (heating)	€0.00	€65.74	13.5%	1,068
Aviation Fuel[5]	Exempt	Exempt	Exempt	1,378[6]

In addition the carbon tax is applied to natural gas and solid fuels at the current rate of €26/tCO2 while an excise duty is applied to electricity generated from fossil fuels (with households exempt from this duty) at the very low rate of €1/Mwh.

Table 3 details the annual yield by tax and fuel type. Excise on heavy oils, which include auto diesel, marked gas oil, kerosene and fuel oil, provide the largest yield at over €1.5 billion.

4 See https://www.cso.ie/en/releasesandpublications/er/eaet/environmenttaxes2018/. The CSO also includes levies such as the PSO and NORA levies as taxes for this purpose.

[5] Used in cross border travel. Note: The Energy Tax Directive 2003/96/EC mandatorily exempts fuel used in cross border aviation from taxes.

[6] 2018 volume for Aviation Fuel, SEAI Energy in Ireland 2019

Table 3: Exchequer Receipts from Fuel Taxes 2014 – 2019 (millions)

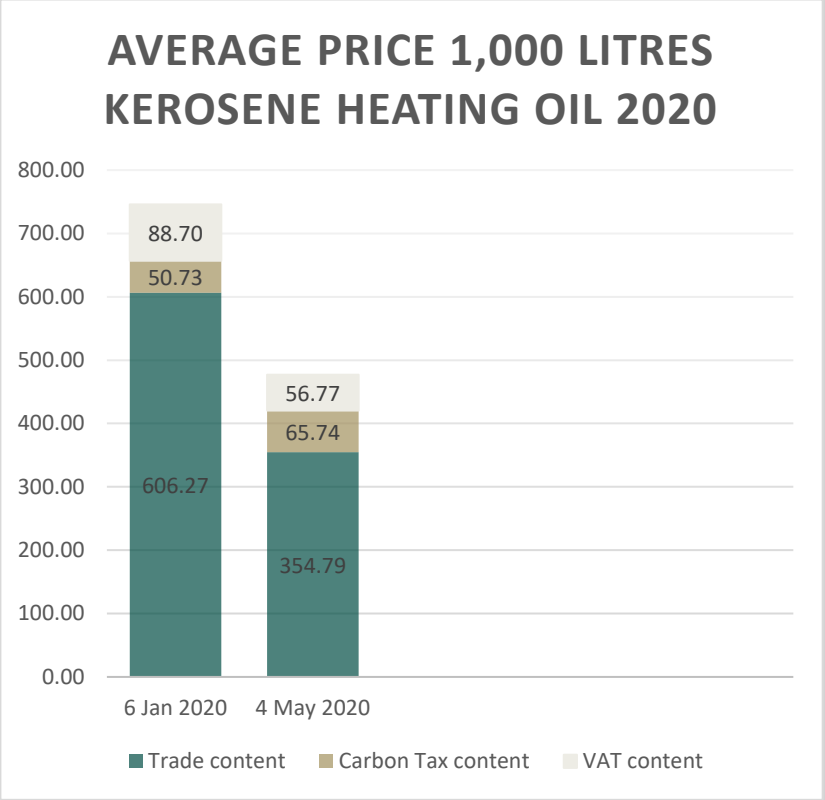
	2014	2015	2016	2017	2018	2019
Excise - Light Oils	€800	€768	€721	€627	€598	€568
Excise - Heavy Oils	€1,219	€1,351	€1,447	€1,434	€1,565	€1,596
Excise - LPG	€0.23	€0.3	€0.27	€0.23	€0.2	€0.2
Carbon Tax	€385	€419	€430	€420	€431	€430
Electricity Tax	€5.5	€4.5	€4.6	€3.6	€2.5	€2.3

In the current year to end July, fuel excise taxes were €1.007 billion compared to €1.246 billion for the same period last year, reflecting the impacts of COVID-19.

RECENT TRENDS IN MINERAL OIL AND NATURAL GAS PRICES

Policy decisions on energy taxation are informed by market trends and consumer behaviour. The volatility of the energy market has been highlighted in the first half of 2020 following dramatic reductions in crude oil prices and also demand as a result of the Covid19 pandemic. Brent crude oil prices heavily decreased since the beginning of the year and this has followed through into lower retail prices for auto and heating fuels. The fall in the prices of marked gas oil and kerosene heating oil has been particularly pronounced and this is likely related to the fact that fuel taxes on these commodities are much lower than petrol and auto diesel. According to the CSO the average price of (kerosene) home heating oil decreased by 41.8% in May 2020 relative to a year previous while the Department estimates that a similarly large reduction was replicated for marked gasoil during the same period. The magnitude of such decreases means that, notwithstanding the increase in the carbon tax on these products from 1 May, the total tax content on these products has actually fallen. This is illustrated below in Graph 1 in respect of kerosene heating oil.

Graph 1 : Illustration of 2020 Fall in Kerosene Prices and Tax Content



Source: European Commission Weekly Oil Bulletin average prices for Ireland

The fall in retail prices has not been as precipitous for petrol and auto diesel, nevertheless significant decreases have been observed. According to the CSO petrol and diesel prices reduced by the order of 10% between January and May 2020. This decrease moderated by end July to 4% for both petrol and diesel.

For natural gas, according to the CSO, prices have reduced by 7.2% in June 2020 relative to a year previous. The June 2020 Bord Gáis Energy Index , reported the first monthly increase in the day-ahead average gas price since November 2019. Robust supplies, a mild winter and lock down restrictions had led to lower prices in 2019 and early 2020 across Europe. However, European gas demand is recovering from lockdown levels as restrictions ease and European economies reopen.

1.3 Cross border retail price comparisons and fuel tourism

Cross border issues arise in particular in relations to solid fuel and diesel. Taxes on solid fuels are higher in the South (higher VAT rate and carbon tax levied in the South) and this, together with different environmental standards, incentivises the illegal sale of coal from North to South.

Legal ‘fuel tourism’ from North to South has been overwhelmingly concentrated in diesel. Table 4 below highlights why diesel is cheaper in the South than the North.

Table 4: Comparison of fuel tax rates in Ireland and the UK

	Fuel Duty Petrol (per litre)	Fuel Duty Diesel (per litre)
Ireland (incl. carbon tax)	€0.60	€0.49
UK	€0.65	€0.65

Note: Exchange rate of £1 = €1.12 used for calculating UK euro equivalent rates above

An ESRI study based on 2015 data estimated that diesel fuel tourism contributes approximately €202 million annually to the Irish exchequer with a further €28 million as a result of petrol purchased south of the border.[7] According to the CSO, fuel tourism amounted to 473, 384, 162 and 184 kilotonnes of oil equivalent in 2015, 2016, 2017 and 2018, respectively.

However, fuel tourism also contributes to recorded Irish emissions as emissions are recorded based on where the fuel is sold rather than where it is used.

1.4 Auto Fuels and Environmental Health concerns

In Ireland, it is estimated that air pollution is responsible for 1,180 premature deaths annually, with the burning of solid fuels and auto fuels being two primary sources for such deaths[8]. Research shows a causal link between exposure to pollutants (NOx, PM, SOx, etc.) emitted from vehicles – particularly diesel vehicles - and a number of chronic conditions including respiratory, cardiac disorders and cancer.

Budget 2020 introduced a Nitrogen oxide (NOx) surcharge into the VRT regime. The surcharge is aligned with the polluter pays principle, with the rate increasing in line with the level of NOx. The surcharge reflects the detrimental effect of these emissions on our environment and, in particular, impacts of older, more pollutant diesel cars.

A number of Member States have sought to address specific concerns relating to pollutants emitted in high levels from diesel vehicles through a more fundamental approach. For example, a number of cities have or are moving to ban pollutant and diesel engine vehicles from within their boundaries, such as London, Paris, Madrid, Athens and a number of German cities.

[7] https://www.esri.ie/publications/assessing-the-level-of-cross-border-fuel-tourism-2
[8] See https://www.epa.ie/irelandsenvironment/air/

This regulatory approach has the advantage of tailoring the measure to cities with high traffic congestion and high population density, where NOx emission levels (as well as PM, SOx, etc.) are significantly higher and where there are many more people whose health is put at risk by such pollution. As such, there are circumstances where regulatory measures may be more effective than taxation measures in addressing the harmful environmental health effects of NOx and other pollutants emitted in high levels by, in particular, diesel vehicles. Additionally, there are diesel surcharges in place across several Member States, including the UK, in relation to a series of motor vehicle taxes.

1.5 Fossil Fuel Tax Subsidies

INTRODUCTION

The extensive coverage of the proposed increases in carbon tax in the national media and wider discourse belies the fact that carbon tax receipts are far lower than potentially environmentally damaging fossil fuel tax subsidies.

In 2019 the CSO published a Research Paper on Fossil Fuel and Similar Subsidies 2012-2016[9]. It found that total Indirect Potentially Environmentally Damaging Subsidies ("PEDS") in 2016 was €2.3 billion, with the vast majority of this relating to the excise rate on Auto-diesel, Marked Gas Oil and Kerosene, and the excise exemption for Aviation Fuel.

The Department estimates, using the same methodology as the CSO, that the cumulative PEDS in respect of auto diesel and marked gasoil ('green diesel') alone, in the period 2012 to 2019, was some €7 billion, with approximately €2.8 billion attributed to auto diesel and €4.2 billion to marked gasoil. In the same period carbon tax receipts were some €2.8 billion.

Recent ESRI research on the impact of removing fossil fuel subsidies and increasing the carbon tax in Ireland[10] analyses the environmental and economic impact of removing eight different fossil fuel subsidies[11]. The research finds that the removal of seven of them has negligible impacts on overall economic activity and households' welfare, the exception being the removal of household energy allowances (different allowances for electricity, gas, and fuel) which would impact on the poorest households hardest. The research finds that among various scenarios of subsidy removals, removing the subsidies to auto diesel and marked gas oil results in the largest emissions reductions overall (with most emission reductions coming from the transport,

[9] https://www.cso.ie/en/media/csoie/releasespublications/documents/rp/fossilfuelandsimilarsubsidies/Fossil_Fuel_and_Similar_Subsidies.pdf

[10] https://www.esri.ie/system/files/publications/RS98_2.pdf

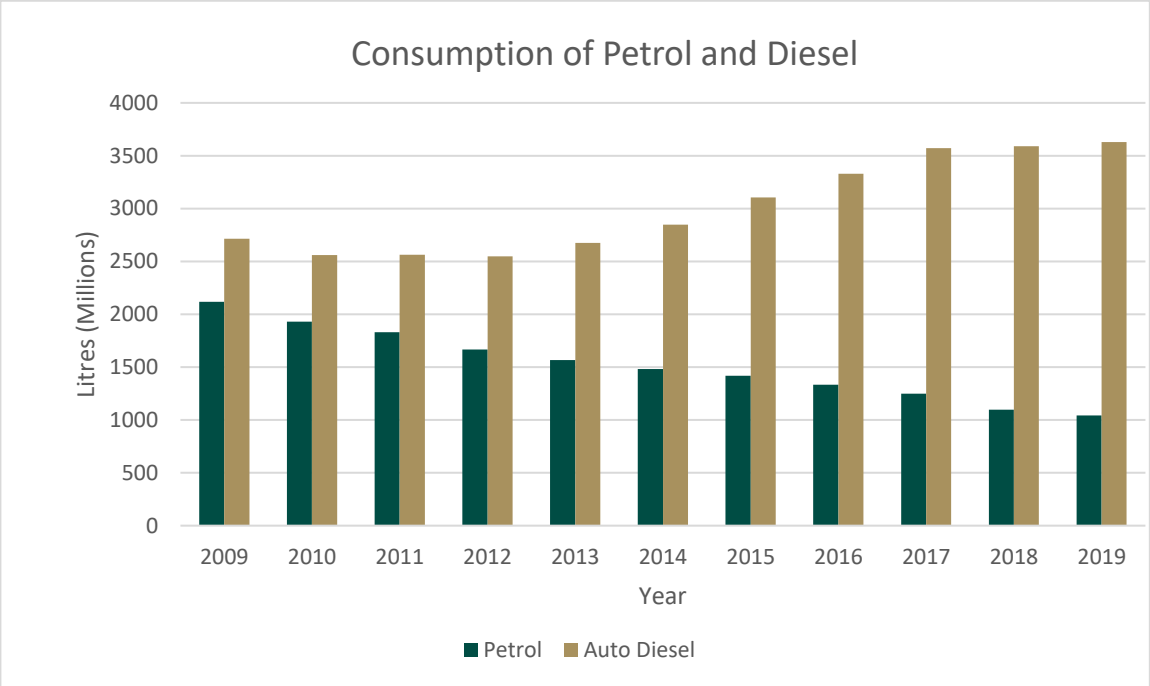
[11] Subsidies covered :1) Household energy allowances 2) Public Services Obligation Levy (PSO) 3/4/5) Lower rates of excise on Auto Diesel, Marked Gas Oil and Fuel Oil (unleaded petrol as baseline) 6)Non carbon excise exemption on home heat Kerosene 7) Diesel Rebate Scheme 8) Excise Exemption on Aviation Fuel

agricultural and construction sectors). The rest of this section examines two specific fossil fuel tax subsidies, the diesel excise gap and the diesel rebate scheme.

DIESEL EXCISE GAP

Over several years, Tax Strategy Papers have demonstrated the extent to which diesel has increasingly become the dominant auto fuel in Ireland. This is further illustrated in the graph below.

Graph 2: Consumption of Petrol and Diesel 2009 - 2019



Excise on petrol is 11.6 cent/litre more than excise on diesel (on a VAT inclusive basis the gap is 14.3 cent/litre). If a diesel car consumes 15,000 litres in its lifetime, this fossil fuel tax subsidy is worth over €2,100 in savings for the owner/owners of that diesel car.

Whereas the lower excise on diesel was originally conceived as a support to businesses reliant on diesel to fuel LGVs and HGVs, there are now more than 1.2 million diesel passenger cars on our roads, comprising of 57% of the total national car fleet in 2019[12]. Among the world's largest trading blocs, the EU is an outlier in terms of the market share of diesel cars (i.e. vastly higher than the US and Asia) while Ireland is among a minority of EU Member States where diesel cars are more than 50% of the national car fleet[13].

[12] See Table 13 of Irish Bulletin of Vehicle and Driver Statistics 2019 (DTTAS)
[13] See *Passenger cars in the EU – Statistics Explained*
https://ec.europa.eu/eurostat/statistics-explained/pdfscache/25886.pdf

Excise on diesel and petrol in the UK are the same and there have been many calls for equalisation of the diesel and petrol excise rates on environmental and public health grounds. The Climate Change Advisory Council, the Joint Committee on Climate Action and the European Commission have all advocated for equalisation in recent years. The Government's Climate Action Plan committed to the equalisation of diesel and petrol excise rates 'over an appropriate period of time'.

In light of such trends and the impact of diesel on public health and the environment, over several years Tax Strategy Papers have set out a pathway for achieving this equalisation notably by increasing diesel excise by some 2.32 cent/litre per annum over 5 years. This remains a valid option to bridge the excise gap while it is also possible to bridge the gap over a longer period of time, for example 1.16 cent/litre per annum over 10 years.

Increasing diesel by 2.32 cent/litre would raise an additional €11m in 2020 and €78m in a full year. Increasing diesel by 1.15 cent/litre would raise half these amounts in 2020 and a full year, respectively.

DIESEL REBATE SCHEME (FOR HAULIERS AND BUS OPERATORS)

Last year's Climate Action and Taxes Tax Strategy Paper set out the background to the Diesel Rebate Scheme, including its original purpose when it was established, the EU legislative underpinning of the scheme, the design of the scheme and the main qualifying criteria.

The paper also cited evidence from ESRI research that this fossil fuel subsidy has been responsible for significant additional emissions of carbon dioxide, nitrogen dioxide and particulate matter, pollutants which are damaging to the environment and public health. The paper further outlined that the UK has no such diesel rebate scheme notwithstanding the fact that there is significantly higher excise on diesel in the UK than in Ireland.

The paper also highlighted that in Budget 2016 the rate of motor tax applicable to commercial vehicles was reduced significantly, in many cases resulting in an annual saving to hauliers in the thousands. At the time the maximum rate was reduced from €5,195 to €900. These reductions are estimated to cost the Exchequer over €40 million per annum.

In Budget 2020, the scheme was significantly enhanced such that the marginal rate of repayment was *doubled* for purchases of diesel at a retail price over €1.07 (VAT exclusive, or €1.316 VAT inclusive) up to a maximum repayment of 7.5 cents per litre. Essentially the marginal rebate rate (VAT exclusive) increased from 30% to 60% beyond this price point. This measure was announced as a temporary support measure for the industry in consideration of the economic challenges caused by Brexit uncertainty and in view of the carbon tax increase on auto diesel.

Auto diesel retail prices have reduced significantly since the beginning of the year, to the benefit of qualifying transport operators while the diesel rebate rate for Q1 2020 was 4.7 cents per litre and 4 cent per litre in Q2.

Diesel Rebate Scheme Budget Options

If climate change targets are to be achieved then the general thrust of policy should be to phase out, rather than enhance, fossil fuel tax subsidies. The 2019 Climate Action and Taxes Tax Strategy Paper set out a way that this could be achieved for the Diesel Rebate Scheme, consistent with the purpose of the scheme to compensate qualifying transport operators when diesel prices are high. This alternative proposal was to half the marginal rebate rate (from 30% to 15%) for all price points beneath €1.13 (VAT exclusive), while retaining the marginal rebate rate at 30% for all price points above €1.13. This alternative proposal remains a valid means of phasing out this fossil fuel tax subsidy. Table 5 compares the current regime, the previous regime and this alternative proposal, at select retail price points. Essentially, this table sets a pathway (from left to right) in which to begin the phasing out of this fossil fuel tax subsidy.

Table 5: Pathway to begin phasing out Diesel Rebate Scheme

Retail Price Points		Current	Previous	Alternative
VAT Excl	*VAT Incl*	*REBATE*	*REBATE*	*REBATE*
1.00	1.23	0.00	*0.00*	0.00
1.05	1.29	15.00	*15.00*	7.50
1.10	1.35	39.00	*30.00*	15.00
1.15	1.41	69.00	*45.00*	25.50
1.20	1.48	75.00	*60.00*	40.50
1.25	1.54	75.00	*75.00*	55.50
1.30	1.60	75.00	*75.00*	70.50

Note: Rebate amounts shown above are per 1,000 litres

1.6 Electricity Tax

BACKGROUND

The Energy Taxation Directive establishes the legislative framework for the application of excise duty to electricity, including the minimum excise duty rates that Member States must apply. The tax is charged on the final supply of electricity to the consumer and the liability arises at the time the electricity is supplied. The supplier is responsible for payment of the tax and for all returns.

The current rate of electricity tax in Ireland is €1.00/Mwh for both business and non- business customers. Electricity supplied for household use is fully exempt from the electricity tax. Non-business use includes use by local and public authorities, including supplies to administration offices and for street lighting. In Finance Act 2019 the rate for business users was increased from €0.50/Mwh to €1/Mwh in fulfilment of a commitment in the Climate Action Plan to equalise rates for business and non-business users.

Electricity tax receipts are exceptionally low, yielding just €2.5 million in 2018 and €2.3 million in 2019. This arises from both the very low rates applied and the wide reliefs which are available from electricity tax. In addition to an exemption for domestic households, there are also reliefs for electricity generated from renewable sources or environmentally friendly combined heat and power plants, as well as electricity used in combined heat and power production, chemical reduction or metallurgical processes or electricity production.

COMPARISON OF RATES WITH OTHER EU 27 AND UK

Ireland's rates of electricity tax are among the lowest in the EU. The average EU plus UK rate applied to business users is €9.06/Mwh with an average of €15.79/Mwh for non-business users. The rate in the UK for both business and non-business users is equivalent to €9.52/Mwh. The highest rates are applied by the Netherlands, at €125/Mwh for both business and non-business users. The table in Annex 1 sets out the rates across the EU and the UK.

PROFILE OF TAXPAYER AND INCIDENCE OF TAX

The business electricity market is highly skewed, with a small number of large customers responsible for a highly disproportionate amount of electricity usage. This is illustrated in Table 6.

Table 6: Profile of Electricity Market from Business Consumer Perspective

2018	Number of Customers	MWh	% of customers	Market Share by Usage
Small Businesses	184,542	3,727,638	65.8%	20%
Medium Businesses	94,167	4,084,843	33.6%	22%
Large Businesses	1,910	10,587,288	0.7%	58%
Total Business	**280,619**	**18,399,769**	**100%**	**100%**

Source: CRU Electricity and Gas Retail Markets Annual Report 2018

The yield in 2018 was €2.5 million, divided over some 280,000 customers. Using crude averaging that translates to small, medium and large businesses having paid in 2018 €2.74, €5.89 and €753.15 in Electricity Tax, respectively.

ELECTRICITY PRICES

While the electricity tax rate in Ireland is low by EU standards, electricity prices for non-household users (exclusive of taxes and levies) are relatively high by EU standards (2019). The combination of these two factors means that electricity prices are broadly equivalent to the EU 27 plus UK average when taxes and levies are included. This is illustrated in table 7 below.

Table 7: Comparison of Irish and European Business Electricity Prices

	€ per Kwh	
Consumption Band (Mwh)	**IRELAND**	**EU27 + UK**
2,000 – 20,000	0.1368	0.1294
20,000 – 70,000	0.1075	0.1100
70,000 – 150,000	0.0983	0.0965
150,000+	0.0893	0.0877

Source: Eurostat electricity prices for non-household consumers, H2 2019.

Recent developments in the electricity market indicate that wholesale prices are falling sharply. According to the CSO, June 2020 saw the wholesale price of electricity as a manufacturing input fall by 40% year on year from June 2019[14].

[14] https://www.cso.ie/en/releasesandpublications/er/wpi/wholesalepriceindexjune2020/. Table 5 Wholesale Price Indices for Energy Products

POTENTIAL IMPACT OF CLIMATE ACTION PLAN ON EXCISE TAX RECEIPTS

Currently, excise from fossil fuels and vehicle taxes provide a large revenue stream to the exchequer. The Climate Action PIan foresees a mass transfer from the use of mineral oils to the use of electricity, the majority of which is intended to be generated from renewable sources[15]. Replacing internal combustion engine vehicles with electric cars and home heating oil with heat pump technology are two important measures in this strategy. The State collects €3,114 million in excise and VAT from mineral oils (2019), and only collects €2.3 million in electricity tax (2019). Therefore, increasing electricity tax rates over time and, at some point in the future, potentially broadening the electricity tax base to include households, may be a lower order measure to provide some small level of replacement of exchequer funding which is anticipated to be at risk from successful medium to long term carbon reduction policies.

BUDGET OPTIONS

Table 8: Budget 2021 options regarding electricity tax (business and non-business)

Increased Rate (per Mwh)	Estimated Full Year Additional Yield (€ millions)
€2	4
€3	8
€4	12
€5	16

Note: this assumes that business and non business rates are to remain at the same level

[15] Among the Plan's 84 actions, 16 actions specifically relate to the electricity market and improvements in the supply which can help to contribute to carbon emissions reductions targets, including a goal of having 70% of Irish electricity produced from renewable sources.

2 Carbon Tax

2.1 Background

The Commission for Taxation recommended the introduction of a tax on carbon emissions from fossil fuels released for consumption in Ireland in order to broaden the tax base and to protect and enhance the environment.

The Carbon Tax was first implemented in 2009 on a phased basis and applied to petrol and diesel initially at a rate of €15/tCO2. It was extended to other liquid fuels in 2010 and to solid fuels in 2013. The rate was increased to €20 in 2012 and remained at that rate until Budget 2020 when it was announced that the rate would increase to €26/tCO2. Budget 2020 also signaled the Government's intention to follow a trajectory of annual rate increases bringing the Carbon Tax rate to €80 by 2029. The Government also committed at that time to ring-fencing all revenues raised from carbon tax increases in 2020 for energy poverty, just transition and climate mitigation purposes. The current Programme for Government, published in June 2020, sets out the intention of the Government to increase the Carbon Tax rate to €100 by 2030 by a series of annual increments from 2021. This proposed policy will be informed by an ESRI study on fuel poverty prevention due to be published by October 2020. Whereas the original carbon tax annual trajectory was €6/tCO2 the annual trajectory in the current Programme for Government is €7.50/tCO2. By way of illustration, €1.50/tCO2 adds about 1/3 of 1 cent to a litre of petrol.

Carbon tax (VAT exclusive) receipts in 2019 were approximately €430 million. Table 9 sets out the Annual Carbon Tax Yields for the period 2012 to 2019.

Table 9: Breakdown of Carbon Tax Receipts 2012 to 2019

Year	Auto Diesel	Petrol	Kerosene	Marked Gas Oil	Natural Gas	Solid Fuel	Other Fuels	Total Net Receipts
2012	€131m	€75m	€40m	€55m	€45m	-	€9m	€355m
2013	€137m	€70m	€47m	€60m	€57m	€7m	€10m	€388m
2014	€145m	€66m	€42m	€54m	€52m	€17m	€9m	€385m
2015	€158m	€62m	€53m	€55m	€57m	€23m	€11m	€419m
2016	€171m	€59m	€53m	€56m	€56m	€24m	€11m	€430m
2017	€180m	€54m	€52m	€49m	€54m	€19m	€12m	€420m

2018	€183m	€48m	€59m	€54m	€50m	€25m	€12m	€431m
2019	€193m	€48m	€54m	€54m	€50m	€20m	€12m	€431m

With the carbon tax increase in Budget 2020 the original forecast receipts for 2020 was €543 million whereas the revised forecast is now €455 million.

2.2 Cost to Consumers

Table 10 shows the impact of the carbon tax on a typical fuel bundle at the current rate and at rates of €33.50 (26 + 7.50) and €100, respectively.

Table 10: Carbon Tax content for fuel bundles

Fuel Type	Typical Fuel Bundle	Carbon Tax at €26 (incl VAT)	Carbon Tax at €33.50 (incl VAT)	Carbon Tax at €100 (incl VAT)
Petrol	60 litre fill	€4.42	€5.70	€17.00
Diesel	60 litre fill	€5.11	€6.58	€19.65
Kerosene	900 litre tank	€67.15	€86.52	€258.27
Peat	12.5kg bale	€0.68	€0.88	€2.62
Coal	40 kg bag	€3.11	€4.01	€11.96
Natural Gas	11,000 kwh	€58.80	€75.76	€226.15

2.3 Energy Poverty and Support Measures

The National Fuel Allowance is a payment under the National Fuel Scheme to help with the cost of heating homes during the winter months. Approximately 369,100 households are in receipt of this payment at an estimated cost for 2020 of €295m. In response to the Covd-19 pandemic the fuel allowance was extended by 4 weeks for 2020.

Since its launch in 2009 the Better Energy Homes Scheme has provided funding for energy efficiency improvements in over 242,000 homes at a cost of over €271million. The Sustainable Energy Authority of Ireland (SEAI) also operates the Better Energy Warmer Homes scheme which provides grants for the full costs of energy efficiency improvements in the homes of the elderly and those most vulnerable to fuel poverty. Over 141,000 low income households have

received free energy efficiency upgrades to improve energy efficiency in their homes at a cost of €264 million under this scheme.

Both the fuel allowance and the SEAI energy grant schemes received additional funding in 2020 as a result of the decision to ring fence additional revenue raised from the carbon tax increase for measures relating to protecting those vulnerable to fuel poverty. At the time of the increase it was estimated that the increase would yield some €90 million additional revenue in 2020 which was allocated for expenditure on measures related to climate action, protecting the vulnerable and the Just Transition. Over a third of this estimated additional yield, some €34 million, was allocated to protecting those most vulnerable to fuel poverty by increasing the national fuel allowance payment and providing increased funding for energy efficiency upgrades.

2.4 Business Mitigation Measures

In terms of tax measures to mitigate the impact on businesses for whom diesel fuel comprises a large proportion of business expenditure and who have no realistic alternative to diesel at the point in time, the Diesel Rebate Scheme (DRS) provides mitigation to qualifying hauliers and bus operators for carbon tax induced prices increases to diesel.

More generally, there is a VAT refund scheme for business diesel expenditure. The effect of this is that businesses pay for their auto fuel at 81% (1/1.23) of the rate that private motorists do. As VAT is applied to the carbon tax, business will be able to secure a refund on the VAT on any additional carbon tax.

Section 664A of the Taxes Consolidation Act 1997 provides mitigation to farmers by way of providing for double income tax relief on farm diesel.

Finance Act 2012 introduced section 664A which provides for tax relief for farmers in respect of increases in carbon tax on farm diesel. This section provides that a farmer may take an income tax or corporation tax deduction for farm diesel (including any carbon tax charged in respect of the diesel) and then a further deduction for farm diesel which is equal to the difference between the carbon tax charged and the carbon tax that would have been charged had it been calculated at the rate of €41.30 per 1,000 litres of farm diesel (the 2012 baseline).

The measure was introduced having regard to a Programme for Government (2011-2015) commitment to “exempt farm diesel from further increases in the carbon tax”.

In the context of the 2014 Agritax Review, Indecon estimated the cost of the measure at around €3.4 million per annum. Revenue do not currently record claims for the relief on Form 11 and so it is not possible to provide a more up-to-date estimate of the cost. However, the order of cost is unlikely to have changed significantly in the intervening period.

Agricultural contractors who incur expenses in relation to farm diesel in the course of their trade of agricultural contracting may claim an income tax or corporation tax deduction for those expenses, including any carbon tax charged in respect of the diesel. However, agricultural contractors are not directly entitled to the additional relief available under section 664A as they are not carrying on a trade of farming; under the definition contained in section 654 of the Taxes Consolidation Act 1997, the trade of farming requires the occupation of farm land.

Agricultural contractors have sought to have the relief under section 664 TCA extended out to their sector citing the following rationale:

- Almost two-thirds of all green diesel purchased in the country is used by agricultural contractors;
- Contractors bring economies of scale to the farming sector;
- From a climate action perspective, it is more environmentally efficient for a number of farmers to utilize the services/equipment of a single agricultural contractor, rather than each individual farmer owning and utilizing their own equipment;
- Contractors generally have newer and more efficient machinery as compared to individual farmers.

Notwithstanding the arguments that can be made in support of the continuation of section 664A as a targeted sectoral relief, such an approach gives rise to issues of equity whereby, in the context of increases in carbon tax envisaged in the Programme for Government, certain sectors of the economy may be asked to bear the full costs of carbon tax increases, while other sectors may be in a position to avail of tax reliefs that mitigate the impact of these increases.

The Department of Finance Tax Expenditure Guidelines advise the following in relation to tax incentive measures:

- Use the tax system in limited circumstances where there are demonstrable market failures and where a tax-based incentive is more efficient than a direct expenditure intervention.
- Time-limit all tax expenditures and subject those with higher costs to ex ante evaluation.
- Conduct a regular programme of tax relief reviews using public consultation as appropriate and publish the results.

In relation to the income tax relief available to farmers under section 664A, as noted already, there is currently no reporting obligation in relation to the level of relief availed of on the Form 11 tax return. The relief has yet to be subject to a review.

Having regard to the increased policy priority attached to climate action measures, as set out in the Programme for Government, and in accordance with the Tax Expenditure Guidelines, it would seem that there is a case to be made for a review of the relief available under section 664A. It is understood that Revenue proposes to amend its Form 11 (and Form Ct1) in the current year to facilitate the gathering of data in relation to the levels of tax relief being availed of under the section. The data gathered through in this way will assist in the examination of the costs and benefits of the measure.

2.5 Long Term Carbon Tax Policy

The 2020 Programme for Government sets out the intention of the Government to increase the rate to €100 by 2030. There have previously been calls that a multi-annual trajectory should be legislated for in order to deliver certainty to consumers and to investors in cleaner technologies. The Department, while recognising the merit in such an approach, also pointed to the downsides, observing that the price signal is not in the carbon tax itself but in the final retail price. The following passage in the Climate Action & Taxes Tax Strategy Group Paper 2019 stated:

"However, there are other considerations related to locking in to a long term trajectory of carbon tax increases. Such a move reduces the flexibility of the Minister to react to specific circumstances which may have serious implications for the economy, for example Brexit. ***Another relevant consideration is the trajectory of crude oil prices, a volatile commodity where unforeseen changes in prices can occur quite suddenly.***

If crude oil prices were to fall dramatically at some point in the next decade it would seem that this would undermine the environmental efficacy of locking in to annual increases in the carbon tax of say €5 per tonne. On the other hand, if crude oil prices were to increase dramatically at some point in the next decade it would seem that locking in to annual increases in the carbon tax of say €5 per tonne could be economically damaging. In other words, setting a long term carbon tax trajectory that is wholly insensitive to developments in crude oil markets (or more relevantly price developments at the retail end) may imprudently limit the flexibility of the Minister for Finance to appropriately react to the circumstances of the day.

This suggests that if there is to be a long term trajectory in place it should be flexible enough to allow for both a 'step-off' from the carbon tax escalator or, in the alternative, an ability to increase the speed towards €80 per tonne.*"*

The quantum of the decreases in energy retail costs since the beginning of the year has overpowered the effect of the carbon tax increase, resulting in significant savings to taxpayers. The efficacy of the carbon tax as a behavioural instrument designed to reduce CO2 emissions is undermined when the retail prices of fuels is lower notwithstanding an increase in the carbon tax.

2.6 Budget Options

Following the trajectory as proposed by the draft Programme for Government would see the carbon tax increase from €26t/CO_2 to €33.50t/CO_2 in 2021 followed by annual increments of €7.50 until 2029 and a final increase of €6.50 in 2030.

In previous years, the Minister for Finance has delayed the implementation of carbon tax increases to home heating fuels to alleviate additional costs on households during the winter heating season. This delayed commencement also applied to marked gasoil, as a further support to the agriculture sector.

Table 11 sets out the estimated additional yields arising in 2021 from an increase in the rate to €33.50 applying to auto fuels from budget night and non-auto fuels from 1st January 2021 and alternatively applying to auto fuels from Budget night and non-auto fuels from 1st May 2021.

Table 11: Carbon Tax Budget 2021 options

Increase in Carbon Tax	Additional Revenues 2021 (increase to non-auto fuels from 1/1/2021)	Additional Revenues 2021 (increase to non-auto fuels from 1/5/2021)
To €33.50	€149 million	€116 million

3 Motor Vehicle Taxes

3.1 Overview

BACKGROUND

Motor vehicle taxes, in the form of VRT and motor tax, are principally paid by owners of private passenger cars, reflecting a desire not to curtail the movement of goods and services in the economy as well as a reality that, overall, private motorists have more scope to reduce their CO2 emissions than transport operators.

As outlined in section 1.1, road transport emissions are responsible for a large share of Ireland's GHG emissions and on an unsustainable trajectory. Private cars are responsible for around twice as much annual CO2 emissions as Heavy Goods Vehicles and Light Commercial Vehicles combined.

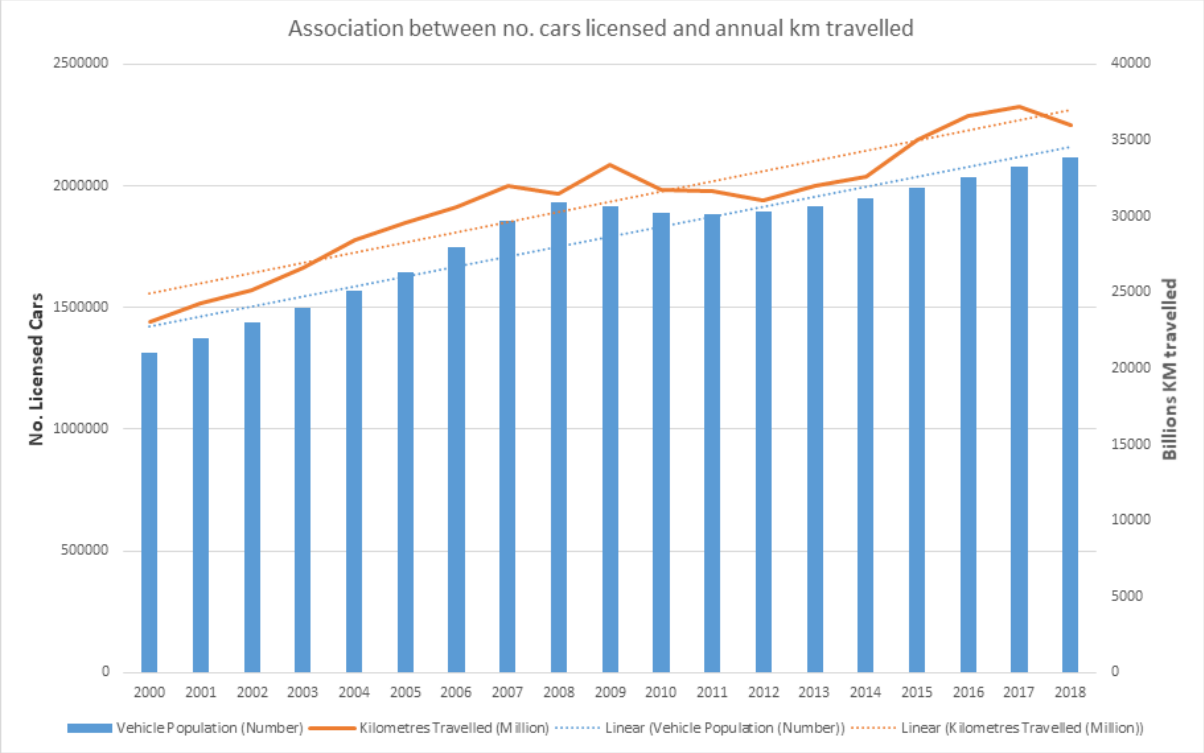
The continued high emissions from cars is principally related to the fact an ever greater number of cars in the national fleet (from 1.887m in 2011 to 2.175m in 2019 – net inflow was +3.25% in 2019 alone) is resulting in greater cumulative distances travelled each year (from 31.6 billion km in 2012 to 36 billion km in 2018 and trending towards over 40 billion km by 2022) and these additional billions of km require additional fuel given the very low number of BEVs in circulation[16].

The graph overleaf shows the strong association to date between the number of cars licensed and the annual km travelled by cars[17].

[16] While BEV market share (new registrations) has increased in recent years, DTTAS data (Annual Transport Bulletin, 2019) indicates there were only 8,473 electric cars as at end 2019.

[17] Annual Car Kilometres data is sourced from CSO Transport Omnibus series while Number of Licensed Cars data is sourced from DTTAS Annual Bulletin of Vehicle and Driver Statistics

Graph 3: Association between no. cars licensed and annual km travelled



Research shows that there is a strong correlation between vehicle annual mileage and vehicle age, with new vehicles that enter that national car fleet typically travelling much greater annual distances than old vehicles that exit the national car fleet (e.g. via scrappage)[18]. So even if there was no net increase in the national car fleet additional annual kilometres could be expected. But in the 8 years between 2011 and 2019 there was a net increase of almost 300,000, or 15.2%, in the national car fleet. Passenger cars are estimated by the CSO to have travelled 272 billion kilometres in the period 2011 to 2018 but if the annual distance was held constant at 2011 levels they would have travelled 19 billion *fewer* kilometres. This amount of kilometres is likely to have generated a demand for over a billion litres of auto fuel during the period.

Fast car fleet renewal, when assessed on a life cycle basis, can significantly add to overall emissions due to the relatively high emissions embedded in the manufacturing and end-of-life cycle of a car[19]. The notion of continually replacing cars for those with moderately lower emissions is unlikely to have a net effect of reducing CO2 when measured over the lifecycle CO2 of a car[20].

[18] See for example figures 7 and 8 in https://ec.europa.eu/clima/sites/clima/files/transport/vehicles/docs/2nd_hand_cars_en.pdf

[19] https://www.eea.europa.eu/signals/signals-2017/infographics/range-of-life-cycle-co2/view#tab-related-publication

[20] https://www.transportenvironment.org/sites/te/files/publications/2018_04_CO2_emissions_cars_The_facts_report_final_0_0.pdf#page=39

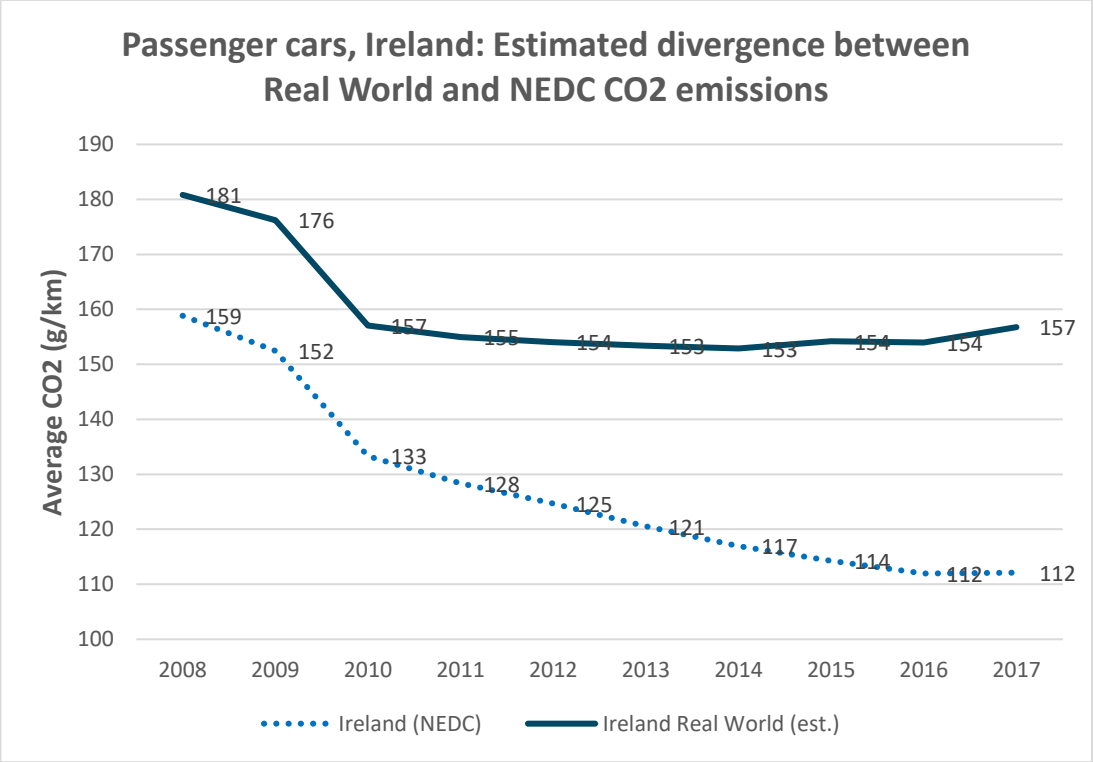
When measured on a narrow tailpipe emissions basis, fast ICEV fleet renewal can deliver fuel efficiency improvements, and potentially counterbalance the emission increasing effects of the continual increase in the number of ICE cars and annual ICE car kilometres (though 'counterbalancing' is very different to 'radically reducing'). However, trends in this regard have been discouraging. The European Environment Agency (EEA) has recently reported[21] that average CO2 emissions for new passenger cars in the EU (plus UK, Norway and Iceland) increased for the third consecutive year in 2019 and pointedly stated that the reasons for these unwelcome trends was the growing share of the SUV segment (38% of European new car registrations in 2019), of which it noted: *"compared to other cars in the same segment, SUVs are typically heavier and have more powerful engines and larger frontal areas – all features that increase fuel consumption".* It further noted an increase in the average mass of cars by 30kg from 2018 to 2019.

The profile of cars entering the Irish national car fleet in the last 6 or 7 years – with a massive increase in the market share of SUVs (from a market share of about 19% in 2013 to about 45% in 2019), as well as very high volumes of used imports with above average CO2 emissions profile – has significantly limited the extent to which fleet wide fuel efficiency improvements can counterbalance the impact of greater mileage in the fleet.

The recorded average emissions of new car registrations during the last decade has been based on the discredited laboratory based NEDC emissions test which has been shown to be a very poor gauge of the real world emissions performance of cars. The 2018 annual 'From Laboratory to Road' report (International Council on Clean Transportation)[22] found that the divergence, or gap, between official and real-world CO2 emission values of new European passenger cars increased from approximately 8% in 2001 to 39% in 2017. The following graph provides an estimate of the divergence between official NEDC data and real world performance. It estimates that between 2010 and 2017 the real world CO2 performance of newly registered Irish cars *completely stagnated*, though the official NEDC data showed a large improvement during the same period[23].

[21] https://www.eea.europa.eu/highlights/average-co2-emissions-from-new-cars-vans-2019
[22] https://theicct.org/sites/default/files/publications/Lab_to_Road_2018_fv_20190110.pdf
[23] The data in figure 28 of the ICCT 2018 report is used to establish the ratio between real world performance and official NEDC performance and this is then applied to Irish NEDC data to estimate the real world CO2 performance of newly registered Irish cars in the period 2008 to 2017.

Graph 4: Divergence between NEDC and real world CO2 emissions



Essentially there is an argument that VRT charges were far too low during the last decade as the rates applied were based on vastly underestimated CO2 values. The ICCT report draws an obvious conclusion that *"from a societal perspective, the growing divergence undermines the EU's efforts to mitigate climate change and to reduce fossil fuel dependence."*

In summary, the continuation of the long term trends outlined in this section, absent strong policy interventions, will prevent the achievement of Government policy to radically reduce total road transport emissions.

GOVERNMENT POLICY

The Climate Action Plan (CAP) 2019 set out ambitious 2030 emission reduction targets for the transportation sector (decrease by 45-50%), with a lot of emphasis on the electrification of the national car fleet. The plan targets having 550,000 EVs and 290,000 PHEVs on the road by 2030. Environmental taxation measures have an important role to play in helping to reduce road transport emissions and in this regard there is a commitment in the CAP to *recalibrate VRT and motor tax for passenger cars to better reflect the emissions impact of individual vehicles.*

The new programme for Government increases the ambition set in the CAP in terms of targeted emission reductions. Road transport is highlighted as an area for reform, with measures including the continued decarbonisation of the fleet (culminating in an eventual ban on ICE cars), growing the EV market and broadening vehicle tax to include harmful 'non-CO2' emissions. Undoubtedly road transport will have to contribute significantly to the 7% average annual emissions reductions and in this regard by far the greatest scope for emission reductions among different vehicle types comes from passenger cars.

If these targets are to be met by 2030, vehicle taxation in relation to average and above average emission cars will need to increase so that the fiscal gap between ultra-low emission vehicles and the rest provides strong enough incentives to motorists in the market for a new car to make 'greener choices'. This understanding informs the policy options presented in the VRT and Motor Tax sections of this chapter.

EU EMISSIONS REGULATIONS

EU Regulations are forcing car manufacturers to produce ever lower CO2 fleet wide averages. EU Regulation 2019/631 entered into application on 1/1/2020 and sets out the emission reduction targets to 2025 and then out to 2030 (Article 4)[24]. Failure by car manufacturers to meet regulatory targets results in the imposition of stiff fines.

Auto manufacturers are thus incentivised to produce much more ultra-low emission cars but their targets are EU based and therefore there may be significant divergences in the CO2 profile of cars supplied to different Member States. The extent to which ultra-low emission cars are sold in the Irish market in the coming years will depend on, among other things, the incentives provided by the taxation regime here and in other Member States.

EU EMISSIONS TEST - WLTP

Ireland is wholly reliant on European emissions testing regime as the basis for determining the CO2 based VRT charge. The discredited NEDC test has been replaced by a new WLTP test. WLTP is a more stringent testing regime than the NEDC test: analysis of European and Irish car market data indicates that WLTP emissions values are, on average, 21% higher than those recorded under the NEDC test[25]. This more stringent test, therefore, will bring the official CO2 data (upon which VRT and motor tax is based) much closer to real world performance.

[24] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0631
[25] In relation to European data see for example https://www.eea.europa.eu/highlights/gap-between-real-world-and

The 2018 and 2019 Climate Action Tax Strategy Papers included detailed sections on the implications of transitioning to the WLTP. In brief summary, a car tested under the WLTP regime will show a significantly higher CO2 value than an equivalent NEDC tested car. If no adjustments are made to the VRT regime a level playing field issue arises with used imports gaining an unfair competitive advantage over new cars (as a result of lower VRT rate) because they were subjected to a less stringent testing regime.

The WLTP test became mandatory for all new car registrations since September 2018[26]. However, until the end of 2020 it is possible to use an NEDC equivalent CO2 value for WLTP tested cars and Ireland has used this mechanism, thus we will be among the last EU Member States to transition to WLTP. From 1/1/2021 it will mandatory to transition to WLTP for the purposes of motor vehicle taxation.

The policy objective is therefore to both maintain a level playing field for new and used cars, while delivering on the Government's climate action goals to the greatest extent possible. Policy options for transition of vehicle taxes to a WLTP base are set out later on in this paper.

COVID 19 AND THE CAR MARKET

The motor sector in Ireland has been significantly affected by the virus pandemic. New car registrations for January and February 2020 were only 5% behind the same period a year previous (broadly reflecting a decline in new car registrations taking place in the EU over the same period[27]); however by end July they were 29% behind, reflecting the impact of virus and associated public health measures. To end July 2020, approx. 72,000 new and 31,000 used cars have registered in the State for the first time, amounting to VRT receipts of €475m. Compared to the same period last year, approx. 102,000 new and 61,000 used cars had registered, generating VRT receipts of €694m. However, there was a notable resurgence in July with over 20,000 new car registrations. Nonetheless, it is acknowledged that the motor sector, like many retail sectors, is facing significant challenges as a result of the virus pandemic.

There have been many calls on the Minister for Finance to provide tax reliefs to sectors negatively impacted by the virus pandemic. An illustration of the impact of the temporary reduction of the standard rate of VAT from 23% to 21%, announced as part of the Jobs Stimulus Package and effective from September, is outlined later in this paper.

[26] A relatively minor 1 year derogation is provided in relation to certain end-of-series cars.
[27] Data from the European Automobile Manufacturers Association (ACEA) shows that passenger car registrations in Europe decreased by 7.4% in the first two months of 2020.

3.2 Vehicle Registration Tax (VRT)

OVERVIEW

VRT is a tax chargeable on the registration of vehicles in the State and is levied as a percentage of the open market selling price (OMSP) of the vehicle. Since 1 July 2008, both VRT and Motor Tax on private motor cars have been calculated on the basis of CO2 emissions, so that cars with higher CO2 emissions attracted a higher tax liability. Annex 2 sets out the current VRT Rates table. Table 12 below outlines recent trends in receipts and car registrations.

Table 12: Recent trends in VRT receipts and car registration volumes

Year	VRT Yield	New Car registrations	Used Car registrations
2012	€379m	76,237	37,902
2013	€437m	71,317	48,146
2014	€542m	92,613	32,806
2015	€659m	125,221	48,398
2016	€814m	146,806	72,718
2017	€841m	131,683	94,456
2018	€885m	121,092	98,415
2019	€941m	112,988	112,147

VRT is a highly pro-cyclical tax based on a one-off transaction in a commodity whose sales volumes tends to track the economic cycle. The vast majority of VRT receipts are raised from the registration of private passenger cars, with light commercial vehicles, which are charged at a fixed rate of 13.3% of the OMSP, contributing a small amount to receipts.

The significant upsurge in the number of used car registrations since 2016 has been principally attributed to the UK decision to leave the EU and the subsequent decline of sterling, creating a favourable environment for the importation of used cars into Ireland. A reduction in UK used car prices (independent of currency movements) may also have been a pull factor for Irish buyers.[28] As the vast majority of UK imports have been diesel cars, this has intensified the dieselisation of the Irish car fleet that commenced with the introduction of the CO2 based motor taxation in 2008. It should be noted that in the global context, Europe is an outlier in terms of its high levels of diesel cars; and furthermore, Ireland's diesel market share is itself something of an outlier within the EU[29]. Given the particularly negative contribution of diesel to environmental health – with older diesels being worst of all - these trends have been most unwelcome.

However, the environmental issue with a high volume of used imports from the UK is not just limited to non CO2 pollutants such as NOx. While most European countries have a vehicle

[28] For example official UK data on used car prices suggests that average prices declined significantly between 2015 and 2019 https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/d7e9/mm23
[29] https://theicct.org/sites/default/files/publications/Euro-VI-versus-6_ICCT_briefing_06012017_revised.pdf

registration tax regime, those that don't, such as Germany and the UK, tend to have a significantly worse CO2 profile than those countries with a credible VRT regime: this is clearly observed in EEA 2019 data on passenger cars[30]. The main issue here from an Irish perspective is that the large volume of used, mostly diesel, cars from the UK have CO2 emissions well above the Irish CO2 average. (even new diesel cars have higher average CO2 values than new petrol cars, based on 2019 and 2020 data).

OBJECTIVES OF VRT REFORM FOR 2021

The principle objectives of VRT reform should be to:

- deliver on the Government's climate action goals to the greatest extent possible;
- maintain a level playing field between cars tested under the NEDC and WLTP testing regimes; and
- ensure that the environmental health rationale in the regime, in the form of the NOx surcharge, continues to act as a strong disincentive to the acquisition of highly pollutant cars.

Options are set out in the next section.

VRT REFORM OPTIONS

Achieving a level playing field between NEDC and WLTP tested cars

From September 2018 to date all newly registered cars are assigned two CO2 values on the vehicle registration document, the one which is based on the WLTP test which the car undertook and a derived NEDC equivalent CO2 value using a European Commission developed conversion tool. This enables a regression analysis of new cars registered in Ireland from September 2018 to January 2020 to understand the WLTP effect. From this analysis a level playing field is achieved using a multiplier mechanism to upwardly adjust CO2 values for NEDC tested cars to a WLTP equivalent. The methodology and multipliers are set out in Annex 3. These multipliers are intended to be used for both options 1 and 2 set out below.

[30] The European Environmental Agency reports annually on the CO2 emissions of passenger cars. The latest report is here: https://www.eea.europa.eu/highlights/average-co2-emissions-from-new-cars-vans-2019

Option 1- Level playing field and retaining the current VRT table

The simplest transition to WLTP involves making no adjustment to rates or CO2 bands to take account of the new test. The existing VRT CO2 bands and rates table is retained for both WLTP and NEDC tested cars. For NEDC tested cars the applicable multiplier is used in order to derive a WLTP equivalent CO2 value. For example, a NEDC tested petrol car with 115 gCO2/km following the application of the multiplier would be re-valued at 140 gCO2/km, meaning a rate increase from 17% to 19%. A car of the same make or model that was WLTP tested is predicted to record emissions of 140gCO2/km and so in this example it means, in effect, that rates have increased by 2%.

While this option achieves a level playing field it does nothing to address the weak environmental rationale that is built into the design of the current VRT regime and it will mostly have the effect of raising rates across the board.

Option 2- Level playing field with greening of VRT structure

This option prioritises balancing a level playing field between NEDC and WLTP tested cars while seeking to 'green' the VRT regime as called for in the Climate Action Plan. A single VRT charging table is retained for all cars, regardless of which test they were subject to.

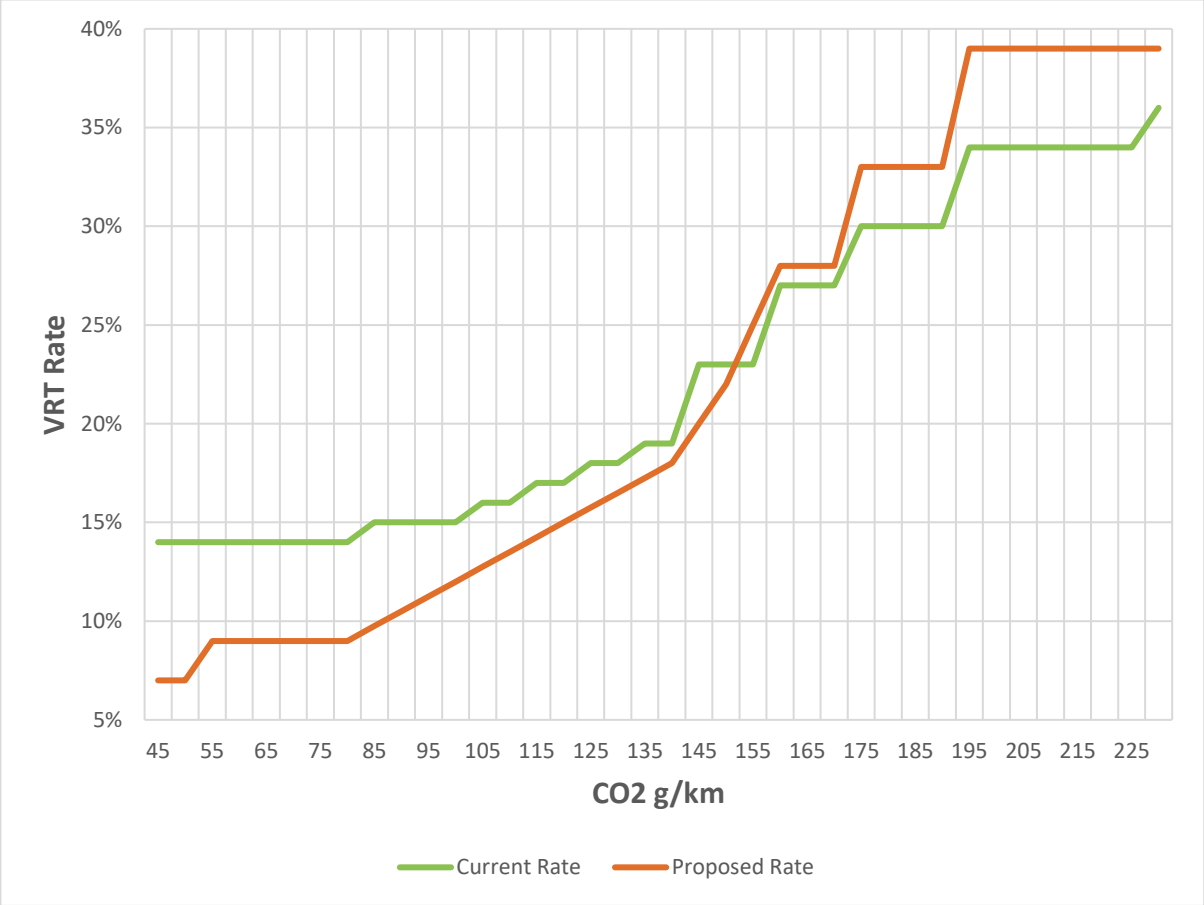
An option to strengthen the environmental rational in the VRT regime is set out in the following table.

Table 13: Possible revised VRT Rates Table

	CO2 g/km (WLTP)		OMSP x
BAND	FROM	TO	Rate
1	0	50	7.00%
2	51	80	9.00%
3	81	85	9.75%
4	86	90	10.50%
5	91	95	11.25%
6	96	100	12.00%
7	101	105	12.75%
8	106	110	13.50%
9	111	115	14.25%
10	116	120	15.00%
11	121	125	15.75%
12	126	130	16.50%
13	131	135	17.25%
14	136	140	18.00%
15	141	145	20.00%
16	146	150	22.00%
17	151	155	25.00%
18	156	170	28.00%
19	171	190	33.00%
20	191	-	39.00%

The following graph compares the current and proposed VRT regimes at different levels of CO2 emissions.

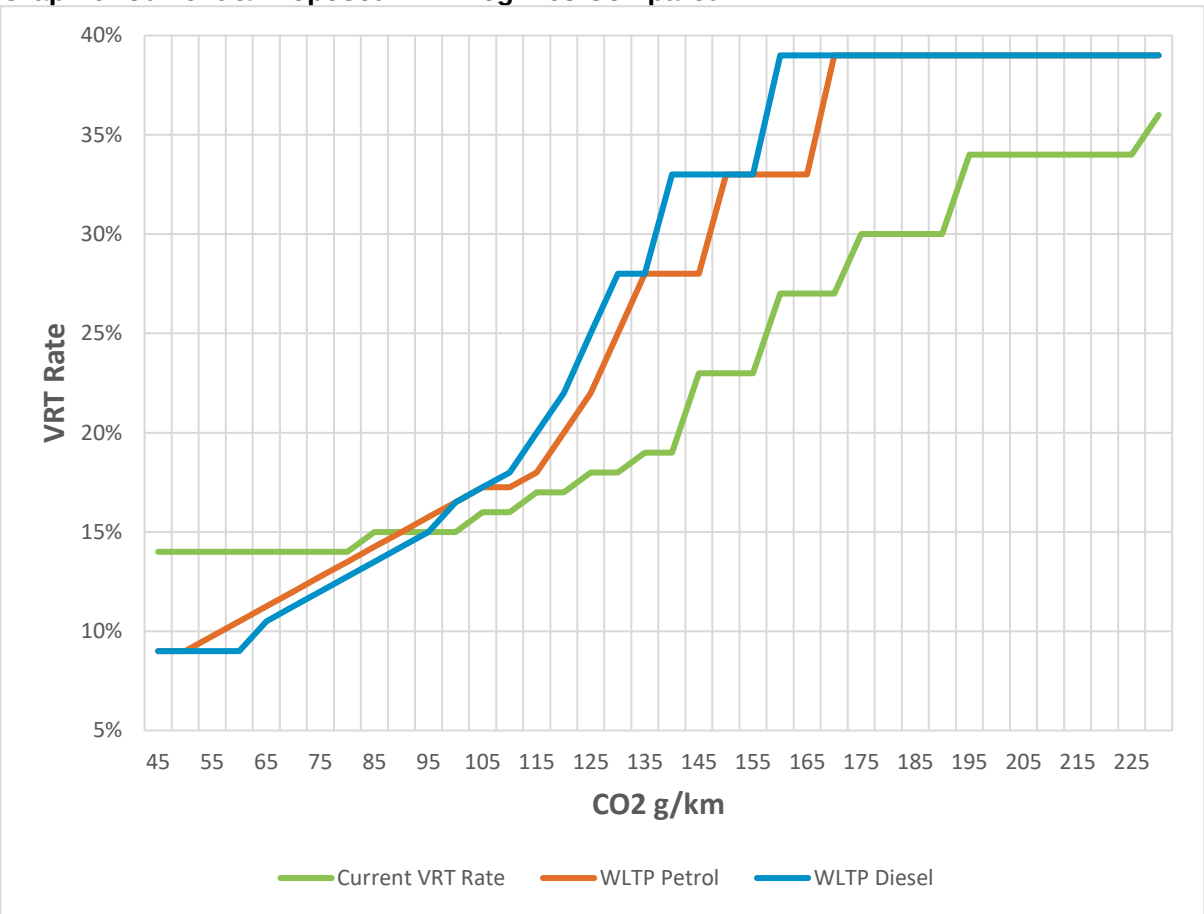
Graph 5: Current & Proposed VRT Regimes Compared



While the proposed VRT regime involves *rate cuts* up until around 150 gCO2/km, the WLTP effect will mean that cars will have shifted rightwards on the CO2 scale and as such this graph does not capture that effect. To give a simple example of this: Irish market data predicts that, on average, a petrol car with NEDC recorded emissions of 115 gCO2/km will have WLTP recorded emissions of 140 gCO2/km. Therefore in the graph above, the relevant comparison of rates is the rates applicable at 115 gCO2/km on the green line Vs 140 gCO2/km on the orange line.

The next graph compares the current and proposed VRT regimes at different levels of CO2 emissions *when the WLTP effect is factored in*.

Graph 6: Current & Proposed VRT Regimes Compared



For the orange and blue lines in the graph, the multipliers for petrol and diesel are used in the graph above to represent the proposed rate based on WLTP values.

There are several ways in which the proposed new VRT table provides for a stronger environmental rationale:

- In line with modern EU regulations, an ULEV (ultra-low emission vehicle) band is created. Current EU legislation defines an 'ultra-low emission vehicle' as one with CO2 emissions of less than 50 g/km. D/CCAE adopted this for the purpose of SEAI grants for commercial plug-in electric vehicles. The new structure would ensure that EVs and well-performing PHEVs would have their VRT reduced by half (14% to 7%).
- The gap between the highest rate and the lowest rate is much greater than under the current VRT regime (32% v 22%), meaning a steeper curve, which is a barometer of how strong the environmental rationale is.

- Increasing the number of bands from 11 to 20, and creating even 5 gram bands (in place of uneven bands of 10, 15 or 20 grams) means there is a much closer alignment with the 'polluter pays' approach. This also lessens the effect of anomalies occurring[31].
- The rate gap between the lowest band and that applied to cars with average emission levels (currently 107 NEDC or approx. 131-135 WLTP) increases from 2% (16% - 14%) to 10.25% (17.25% - 7%). This is a significant widening of this rate gap.

It should be noted that the impact on used cars of the proposed VRT regime would be greater as used cars have significantly higher CO2 emissions than new cars, while still comprising a majority diesel cars; both of these factors would have the effect of increasing the average VRT charge for used cars based on the current profile of used imported cars.

Possible rate adjustments to reflect policy maker priorities

The structure in table 13, with 20 CO2 bands, is considered a significant improvement on the current structure. However, the rates in this table, depending on perspectives, may be deemed to represent reform that is taking place too fast, having regard to challenges facing the motor sector.

If it's considered that the proposal set out in table 13 represents a pace of reform that is too fast then one option is to decrease rates in certain bands, either marginally or by a significant amount. This could be achieved while still broadly strengthening the environmental rationale in the regime.

RELIEFS FOR EVS AND ELECTRIC HYBRIDS

Table 14 below sets out the VRT reliefs currently available for electric vehicles.

Table 14: VRT Reliefs for Electric Vehicles

Type of vehicle	Maximum Relief
Hybrid Electric Vehicles (HEV)	€1,500
Plug-in Hybrid Electric Vehicles (PHEV)	€2,500
Battery Electric Vehicles (BEV)	€5,000
Electric Motorcycles	Exempt

[31] Example 1: a one gram increase from 140 to 141 g/km results in a 2% rate increase, as opposed to 4% under the existing structure. Example 2: Under the current regime two cars, one emitting 81 gCO2/km and the other emitting 100 gCO2/km have the same VRT rate notwithstanding the significant performance difference; under the proposed VRT regime the VRT rate of the car with 100 gCO2/km would be 2.25% higher than the one with 81 gCO2/km.

With the increasing popularity of electric and electric hybrid vehicles, the cost of the reliefs increased significantly in recent years, rising to some €45 million in 2019 as shown in the following table.

Table 15: VRT reliefs for electric and electric hybrid vehicles 2019

2019	HEV	PHEV	BEV	TOTAL
Volume	16,265	3,750	4,107	24,122
Cost of relief	€20.8m	€7.2m	€17.3m	€45.3m

Finance Act 2019 extended the relief for HEVs and PHEVs up until 31 December 2020. However, to address concerns of some high emission electric hybrid vehicles availing of the reliefs, CO2 ceilings of 80 g/km and 65 g/km were applied to the HEV and PHEV reliefs respectively. This meant that, from January 2020, HEVs and PHEVs with CO2 emissions higher than these thresholds no longer qualify for the reliefs. This ensures that, before the reliefs expire at end 2020, only lower emission cars can avail of reliefs.

BEVs (including electric vans and electric motorcycles) registered before 31 December 2021 remain eligible for relief from VRT up to a maximum amount of €5,000. This is a generous tax expenditure and ensures that there is no VRT charge on BEVs with an OMSP of up to approx. €35,700 (the OMSP is typically set at around 90% of the list price).

In the context of VRT reform, where much lower rates are being proposed for low emission vehicles, aside from allowing the VRT reliefs for hybrid electrics to lapse at end 2020, consideration should be given to ensuring the €5,000 BEV relief delivers better value for money for the taxpayer, considering the very high value of some BEVs.

As presented in last year's Tax Strategy Paper on Climate Action and Tax, one means of addressing this is to maintain the €5,000 relief in full for all BEVs with an OMSP of up to €40,000, but to then taper the relief by 50% for every €1 of OMSP above €40,000 (i.e. the relief is no longer available where the OMSP is €50,000 or more). The below table illustrates how this would take effect at various levels of OMSP.

Table 16: Illustration of effect of tapering BEV €5,000 VRT relief

BEV VRT Regime with lowest rate of 7% and tapered VRT relief mechanism					
OMSP €	30,000	40,000	45,000	75,000	100,000
Rate	7%	7%	7%	7%	7%
Gross VRT Charge €	**2,100**	**2,800**	**3,150**	**5,250**	**7,000**

Less: VRT Relief €	5,000	5,000	2,500	0	0
Net VRT Charge €	**0**	**0**	**650**	**5,250**	**7,000**
Effective VRT Rate	*0.00%*	*0.00%*	*1.44%*	*7.00%*	*7.00%*

Under the current VRT regime, the effective VRT rate for a BEV with an OMSP of €45,000 is 2.89% of OMSP (after the €5,000 VRT relief is allowed) so even with such a VRT relief tapering mechanism the effective VRT rate would still be lower for a car with OMSP of €45,000.

It is noted that other countries have already implemented similar measures in regard to ensuring value for money with BEV tax expenditures and subsidies.

VRT NOX SURCHARGE

Budget 2020 introduced a VRT surcharge tied to nitrogen oxide (NOx) emissions levels and in recognition of the environmental and public health impacts of non-carbon vehicle emissions. Vehicle taxes which are solely CO2-based have been criticised for their failure to recognise the specific contribution of other emissions such as NOx and PM to air pollution and to the detriment of public health and the environment. These pollutants are associated with chronic respiratory and cardiac conditions, as well as cancer, and the EPA estimate they contribute to approximately 1,200 premature deaths each year in Ireland[32].

Typically, these pollutants are emitted in greater quantities by diesel vehicles, and the introduction of CO2 based VRT and motor tax regimes in 2008 resulted in a dieselisation of the Irish car fleet. The tax system encouraged consumers to acquire lower CO2 cars, and as many switched to diesel engines, the levels of these toxic pollutants increased. The NOx charge introduced in 2020 is designed to address this imbalance and is based on the polluter-pays principle, where the greater the level of NOx a car emits, the higher the surcharge.

The NOx surcharge structure is set out in the table below:

Table 17: VRT NOx surcharge

Thresholds (NOx mg/km)	Rate per mg/km
0-60	€5.00
61-80	€15.00
81+	€25.00

[32] https://www.eea.europa.eu/publications/air-quality-in-europe-2019

The surcharge is applied on a graduated basis, namely that if a car has NOx emission levels of, say, 90 mg/km then the charge is computed as follows:

First 60 mg/km @€5	€300
Next 20 mg/km @€15	€300
Final 10 mg/km @€25	€250
Total Charge	**€850**

The introduction of a NOx surcharge to VRT from 1/1/2020 had initial success in reducing the volume of the worst polluting used diesel cars coming into the Irish market. In the first two months of the year (i.e. before COVID-19 disruptions affected the market) whereas used imports as a whole decreased by 28.3% compared to the same period in 2019, registrations of used diesels aged 6 to 9 years decreased by 70% while used diesel aged 10 years plus decreased by 61%. In the year to end July, used imports are down 50% versus the same period last year, used diesels aged 6 to 9 years are down 83%.

Based on data from January registrations, the average NOx charge for a new vehicle has been €149, and €395 for used. As anticipated, the average NOx charge increases for older diesels in particular as these are the most pollutant engine types. The average NOx charge for new diesel has been €219, increasing to €485 for a 5 year old, and €1,728 for a 7 year old.

It is also worth noting that the NOx surcharge is likely to have had the indirect effect of increasing OMSP values among used cars registering in the State. The structure of the charge incentivises newer less pollutant cars which, on average, will be higher in value than older cars. This is evidenced by an increase in the mean OMSP for used cars in the first 2 months of 2020 increasing to approx. €18,500, up from €15,000 for the same period in 2019.

NOX BAND ADJUSTMENT OPTION

The level of NOx recorded on the registration documents for, in particular, diesel cars, may well understate the real world NOx emissions. 'Dieselgate' and emissions test cheating has been well documented and the real world NOx emissions may in some cases be significantly higher than recorded on the vehicle documentation[33]. In recognition of this, and principally to support further efforts to incentivise cleaner cars registering in the State, consideration could

[33] https://www.transportenvironment.org/sites/te/files/publications/2015%2007%20RDE%20position%20paper%20FINAL.pdf

be given to an adjustment of the current bands in the surcharge structure. One option would be lower the ceiling of the first band to 40 mg/km.

Thresholds (NOx mg/km)	€ Rate per mg/km
0-40	€5.00
41-80	€15.00
81+	€25.00

This has no impact in relation to a car with NOx levels of up to 40 mg/km, adds €100 to the surcharge on a car with 50 mg/km, and adds €200 for a car with NOx of 60 mg/km or greater.

MEASURES TO PROVIDE TEMPORARY COVID-19 RELATED RELIEF TO MOTOR SECTOR

This section examines measures to support the motor sector in light of COVID challenges in 2020 and potentially extending into 2021.

VRT & Scrappage Scheme

The general consensus from the literature on car scrappage schemes is that they work best in countries with a significant car manufacturing industry (fiscal multipliers, etc.) and they deliver poor environmental outcomes. As an example of this, the following is the conclusion from European Commission sponsored research[34]:

"An initial literature review showed that assessments of scrappage schemes in terms of their effectiveness in reducing GHG emissions were rarely positive. Even when tailpipe GHG emissions alone are considered, the assessments conclude that scrappage schemes are not the best option to reduce the climate impact of transport. When lifecycle GHG emissions are taken into account, the reviewed studies generally concluded that the effectiveness of scrappage schemes is even more uncertain. Scrappage schemes may have the potential to deliver other, non-environmental, benefits, such as safety, economic or industrial benefits. However, also the economic and industrial benefits appear to be contested in the available literature."

[34] https://ec.europa.eu/clima/sites/clima/files/transport/vehicles/docs/ldv_scrappage_schemes_en.pdf

The Climate Action plan called for a scrappage scheme to be considered to support the sale of electric vehicles. Typically, a scrappage scheme works via the mechanism that older cars are traded into dealerships for scrappage, in exchange for a VRT relief on the purchase of a new car. Examining how a scrappage scheme to support EVs would operate, it is likely that the rules and criteria would closely follow some of those of the last scrappage scheme introduced in 2010. It provided VRT relief of up to €1,500 where a new car of CO2 emission Bands A or B was purchased and a car aged ten years old or more was scrapped.

To apply a similar logic to the Climate Action Plan suggestion, a VRT relief of a fixed value could be applied where a car of more than 10 years old is scrapped and an EV is purchased. The Department has considered a scheme along these lines and has the following observations:

- The nature of the existing VRT treatment of BEVs makes an additional benefit of a scrappage scheme questionable. Due to the €5,000 VRT relief on electric cars, there is currently no VRT paid on electric cars with an OMSP of €35,714 or less. So providing a scrappage VRT relief in relation to a BEV which has no VRT charge is of no benefit.
- The target for the scrappage scheme would be motorists with older cars (e.g. 10+ years old). It is unlikely that there is much crossover between the population of motorists with old low value cars and the population of motorists who might be in the market for a new, expensive[35], electric car. It also raises equity issues.
- A €1,500 relief is likely to be far too low to work (as the buyer would likely realise much more by simply trading in the older car of 2011 or 2010 vintage). Notwithstanding the doubts about the level of take-up of such a scrappage scheme, there is potential for considerable deadweight in relation to transactions that do take place under any such scheme.

Our view is that such a car scrappage scheme is not likely to work well.

'Adjusted' WLTP transition

Representatives from the motor industry have made submissions setting out a more benign approach the WLTP transition than the options set out in this paper. It has been suggested that widening bands, and subsequently lowering the VRT charge across cars of all emissions ranges, will help to stimulate sales.

[35] Revenue data for 2019 and 2020 indicates that this €5,000 relief has the effect of reducing the VRT receipts on electric cars by about 80%, with only high-end electric cars paying any significant amount of VRT.

Impact of the temporary VAT relief

The temporary rate reduction being introduced as part of the stimulus package will give broad support to businesses trading during the pandemic. From September the standard rate of VAT (which is applicable to car sales) will reduced from 23% to 21% for a period of 6 months. By way of illustration, for a new car with an Open Market Selling Price of €30,000 a 2% reduction in VAT is worth a little over €400. As VRT is an ad valorem tax applied after VAT in vehicle taxation, the 2% VAT reduction will consequently also reduce VRT amounts applicable to car registrations.

Motor Industry Views

SIMI has presented an alternative rates table which widens the emissions bands by 20%. From an environmental perspective, sweeping VRT rate reductions could be seen as being contrary to the overall intention of Government policy. Temporary measures to support the industry, if desired, would be more appropriate in the form of a temporary VRT relief in relation to certain lower emission cars.

The Irish Car Carbon Reduction Alliance seeks an expansion of the CO2 bands by 30% in Budget 2021 and more generally considers VRT as an impediment to reduced emissions from cars.

The motor industry as a whole favour fast fleet renewal as a means of improving our road transport emissions performance (and the taxation regime to assist with this).

<u>Summary of VRT Options</u>

- Apply a level playing field mechanism to ensure a level playing field between NEDC and WLTP tested cars. CO2 multipliers for petrol and diesel cars would be the mechanism.
- New VRT rates table with 20 CO2 bands.
- Not extending current VRT reliefs to electric hybrids vehicles.
- Tapering the current €5,000 EV relief from OMSP €40,000 such that it expires at OMSP €50,000.
- Adjusting the NOx surcharge bands such that the lowest band is 1-40 mg/km of NOx instead of the current 1-60 mg/km of NOx.

<u>Estimated Exchequer Impact</u>

It is difficult to estimate the Exchequer impact of the measures outlined above at this juncture. The measures around the VRT rates table depend on numerous variables and will require further analysis closer to the budget. It is uncertain what impact consumer behavioural changes and any potential economic stimuli or industry support measures may have on the volumes and composition of car registrations in 2021.

3.3 Motor Tax

BACKGROUND

Motor tax is an annual charge on motor vehicles registered in the State. While HGV's, LCVs, motorcycles, tractors, campervans, etc., are subject to motor tax the focus of this analysis is solely private passenger cars which, at end 2019, constitute by far the largest volume of motor vehicles registered in the State, at some 2.175 million vehicles (c78%).

From July 2008 there has been two separate motor tax systems for passenger cars. Cars under the pre-July 2008 motor tax system continue to be taxed based on engine size (cc) (see Annex 2 for rates table), whereas cars registered from July 2008 are taxed based on their CO2 emissions level. The emission-based charging is based on twelve CO2 bands, aligned with those applied in the current VRT system. The rates range from €120 a year for the lowest-emitting cars to €2,350 for cars with the highest emissions.

Table 18: Recent receipts & structural decline in rates

The table below illustrates recent trends in relation to the motor taxation of passenger cars.

Year	Revenue €m	No. cars ('000s)	Average Rate per car
2015	880	1,985	443
2016	847	2,027	417
2017	816	2,066	395
2018	772	2,106	367
2019	753	2,175	346
2020* est	707	2,180	324

**2020 figures are estimate only and could vary significantly due to no. vehicles declared 'off road' during COVID pandemic*

As can be seen total and average receipts per car are reducing each year. In large part this structural deficit is as a result of the fact that pre-2008 cars typically pay significantly more in motor tax than cars under the current CO2 regime (by around €200) and as pre-2008 cars are replaced in the national fleet by newly registered cars the average motor tax per car reduces. As of end 2019, approximately 27% of passenger cars are taxed on an engine size basis,

down from 59% at end 2015. The fact that motor tax rates have not increased since 2013 has also ensured a structural decline in receipts.

Motor tax reform

In line with the broader VRT reform, motor tax will have to be adjusted to account for the new WLTP emission testing mechanism from 2021. Otherwise, as with VRT, a level playing field issue would develop, though it's likely to be less significant for motor tax.

Again, the policy objectives for motor tax reform are to ensure as close to a level playing field as possible between NEDC and WLTP tested cars, and to deliver on the Climate Action Plan commitment to reform the tax structure in light of more accurate emissions testing.

To achieve a level playing field, there are two broad approaches to restricting motor tax.

OPTION 1: Reverse Multiplier Option

This is essentially the option outlined in the 2019 TSG paper. It involves the application of a multiplier which would reduce the CO2 value for WLTP tested cars to a NEDC equivalent CO2 value. The linear equations set out in the VRT section provide the basis for this calculation exercise; effectively these linear equations would be used in reverse. This 'reverse' multiplier equation would allow for a predicted 'NEDC equivalent' CO2 where only the WLTP is available. All WLTP-tested cars would receive a NEDC equivalent rate and this figure would be plugged into the same motor tax charging table, ensuring a level playing field between NEDC-tested and WLTP-tested cars.

The multiplier mechanism achieves a level playing field between WLTP and NEDC. It also offers relative simplicity in that one equation is used for WLTP cars, otherwise everything falls into the one existing rates table for CO2 post 2008 cars. This option, however, could be viewed as retrograde and anti-environmental. By reverting all WLTP values to a NEDC equivalent (which is an old, discredited test), this approach defies progress in vehicle testing and fails to deliver on Climate Action Plan commitments to reform vehicle taxes in light of improved testing standards.

OPTION 2: Open a new Motor Tax Table for all WLTP tested cars registered from 1/1/2021

Another option is to introduce a separate charging table for WLTP-tested cars registered from 1/1/2021 only. With a separate table, changes to the bands and rates would offer a mechanism for creating the level playing field. This would mean three motor tax charging tables going forward:

1. The pre-July 2008 table based on engine size.

2. Cars registered up to 31/12/2020 (mostly NEDC tested cars)

3. Cars registered from 1/1/2021 (all WLTP tested cars)

The option below sets out possible tables which broadly ensures a level playing field while seeking to strengthen the environmental rationale.

Table 19: Revised Motor Tax rate tables option

NEDC tested cars

CO2g/km		Option
From	To	Rate
0	0	100
1	80	170
81	100	180
101	110	190
111	120	200
121	130	270
131	140	280
141	155	400
156	170	600
171	190	790
191	225	1250
>225		2400

WLTP tested cars

CO2g/km		Option
From	To	Rate
0	0	100
1	50	140
51	80	150
81	90	160
91	100	170
101	110	180
111	120	190
121	130	200
131	140	210
141	150	270
151	160	280
161	170	420
171	190	600
191	200	790
201	225	1250
>225		2400

.

<u>NEDC table</u>

The changes to the rates in the NEDC table are minimal. For bands which cover emissions from 1 gCO2/km up to 140 gCO2/km, there is no change in rates proposed. The regime is 'greened' by small changes at either end of the scale; widening the rates gap between the cleanest and most pollutant cars. In this regard, it is proposed that motor tax for zero emission cars is reduced from €120 to just €100 while the rates for high emission cars are increased as follows: 141-155 +€10; 156-170 +€30; 171-190 +€40; 191-225 +€50; 226 or higher +€50.

Essentially, if the above NEDC table were adopted in 2021, we estimate that this would mean:

- for 1% of cars in this regime there would a €20 rate reduction.

- for 88% of cars there would be no rate change.
- for 7% of cars there would be a rate increase of €10 per annum
- for the remaining, 4%, comprising of the highest pollutant cars, there would be rate increases from €30 to €50 per annum.

WLTP table

For the WLTP-only table, extra bands are added to a) make the aligning of WLTP and NEDC equivalents more workable, and b) strengthen the environmental rationale of the tax by tying it closely to the polluter-pays principle. As the colour coding indicates, the rates for the bands into which the majority of cars fall are aligned as closely as possible to their NEDC equivalent. For example, a WLTP-tested car with CO2 110 g/km is roughly equivalent to 90 g/km under the NEDC test. Therefore a NEDC-tested 90g/km, and a WLTP tested 110g/km, would pay the same €180. However, at the higher emission levels motorists would pay more motor tax under the WLTP table. The volume of cars that would pay significantly more is likely to be very low – there are some 2.2 million cars registered in the State while the WLTP taxed cars are newly registered cars from 1/1/2021.

Estimated Exchequer Impact

As with VRT, is difficult to gauge the impact of the potential new measures on receipts in 2021. The NEDC table in option 2 is designed so that the impact on the existing fleet is minimal. It is likely that motor tax receipts will continue the structural decline that has been witnessed in recent years as the number of pre-2008 cars (which are taxed on engine size and trend to pay higher MT rates) leave the fleet. For the vast majority of post-2008 cars already on the road, there will be no rate changes. The impact of the WLTP rates table on new cars registering will be determined by behavioural changes and sales volumes, though it is estimated that it will have a broadly revenue neutral impact on receipts vs a no-change scenario.

3.4 Taxation relating to Company Vehicles

OVERVIEW

The Climate Action Plan is to radically reduce transport emissions, and with an estimated 85,000 company cars travelling an estimated 2 billion kilometres per annum[36], taxation relating to company cars has a role to play in helping to curb CO2 emissions.

The introduction of a 0% BIK rate for electric vehicles in Finance Act 2017 (restricted to the first €50,000 of the original market value in Finance Act 2018) signalled a policy direction to provide stronger fiscal incentives for a greener company fleet. Changes made in Finance Act 2019 (see below) sought to further strengthen the environmental rationale in the broader tax regime relating to company vehicles.

Revenue do not provide a breakdown of BIK data and as such the Department is not in a position to ex-ante or ex-poste evaluate the impact of tax policy changes in this area, whether environmental impact or Exchequer impact. Notwithstanding the limitations imposed by the current data quality in this area the Department can seek to learn from best practice on company vehicle tax policies in other jurisdictions and develop tax policy proposals which provide for a stronger environmental rationale in relation to the acquisition and use of company cars.

VAT REFUND ON ACQUISITION OF COMPANY VEHICLES

Companies may claim up to 20% VAT deduction on the acquisition of a passenger vehicle[37] which is used at least 60% for business purposes (for a period of 2 years or more). This relief is also subject to an emissions qualifier. Section 53 of the Finance Act 2019 reduced the applicable emissions threshold from 156 gCO2/km to 140 gCO2/km (i.e. only cars with less than 140 gCO2/km can qualify for the relief from 2021).

In principle, the level playing field approach should apply to this provision such that if the acquired passenger vehicle has only been subject to the NEDC test then the CO2 multiplier would be used to derive a WLTP equivalent CO2 value for the car and it would be this CO2 value that is used for the purpose of determining eligibility for the VAT refund.

[36] See Table 5.7 https://www.cso.ie/en/releasesandpublications/ep/p-tranom/transportomnibus2018/roadtrafficvolumes/

[37] A qualifying vehicles includes motor cycles, mopeds, etc. but excludes vans. A qualifying vehicle may be acquired via purchase or through a leasing agreement.

CAPITAL ALLOWANCES IN RESPECT OF COMPANY VEHICLES

The capital allowance regime for company cars is linked to CO2 emissions. More stringent CO2 emission thresholds were introduced in Section 19 of the Finance Act 2019 such that the following applies from 1/1/2021[38]:

CO2 emissions (gCO2/km)	Allowable Expenditure (€)
0 – 140	24,000
141 – 155	24,000, or, if lower, 50% of actual cost
156 +	NIL

However, the way in which these more stringent CO2 criteria was legislated for was to link allowable expenditure to VRT categories (A, B, C, etc.) which corresponded to the CO2 emissions in the table above; rather than to directly link the allowable expenditure to CO2 values. As the VRT regime may well be reformed in 2021 (no longer with bands A, B, C, etc.) this would require a change to the capital allowance provisions to ensure that the thresholds set out in the table above are based on WLTP CO2 values, with the multiplier used for any NEDC tested only cars which are acquired from 1/1/2021.

VEHICLE BENEFIT-IN-KIND (BIK)

Until the Finance Act 2019 Ireland's vehicle BIK regime was unusual in two respects: there was no overall CO2 rationale in the regime, despite a CO2 based vehicle BIK regime being legislated for as far back as 2008 (but never having been commenced); and the existence of 'mileage bands' (whereby the greater the number of business kilometres travelled in a year, the lower the applicable BIK rate) provides perverse environmental incentives.

Section 6 of the Finance Act 2019 provided for the introduction of a CO2 based BIK regime for company cars from 1/1/2023. From that date, the BIK charge is calculated as follows: the original market value (OMV) of the car multiplied by a BIK rate which is determined by the number of business kilometres travelled in the year and the CO2 emissions of the car[39]. The BIK rates in the lowest mileage band (up to 26,000 business kilometres) varies from 22.5% to 37.5% according to the CO2 emissions of the car. Similarly, for the other mileage bands the lower the CO2 emissions of the car the lower the BIK rate.

[38] An exception exists for a scenario where the contract for the hire of a company car was entered and the first payment under that contract was made before 1/1/2021. The less stringent CO2 criteria remains in place for such cars.

[39] For company provided vans the BIK charge is calculated by multiplying the OMV of the van by a fixed 8%. That is, there is no environmental rationale, as with VRT where vans are charged a fixed 13.3% of the OMSP.

The current highly favourable BIK regime electric vehicles (zero BIK charge for the first €50,000 OMV of the vehicle) is scheduled to end on 31/12/2022. Without any extension of this date, from 1/1/2023 the applicable rate for EVs in the lowest mileage band will be 22.5%.

As all newly registered cars have been WLTP tested since September 2018, there is a possibility of a small number of company cars - that were only NEDC tested – being used by employees from 1/1/2023 (whether being first used or the car has been used in the years previous by the employee). In this scenario, the multiplier outlined in the VRT section and Annex 3 should be used as the level playing field mechanism, with the effect that such cars would need to re-value the CO2 from NEDC to WLTP equivalent, potentially impacting on the BIK charge.

It is acknowledged that the continuation of 'mileage bands' in the vehicle BIK regime provides perverse environmental incentives and is well out of line with other EU Member States and the UK. For example, in Ireland an employee with a company car with emissions of, say, 165 gCO2/km, who does business mileage of, say, 60,000 km per annum (generating more than 10 tonnes of CO2 per annum), is subject to an ultra-low rate 6% BIK rate (which is set rise to 13.5% from 2023). In the UK, an employee provided with such a car would be charged 37% (of the list price of the car) irrespective the annual business mileage. Such differences in the respective regimes reflect different policy priorities, with the UK regime prioritising the environmental efficacy of its BIK regime while the Irish regime prioritising the tax impact on high business mileage company employees.

The changes to the vehicle BIK regime in Finance Act 2019 provided for a stronger environmental rationale in the regime, though as long as the mileage bands continue to be in place, such a rationale will remain somewhat blunted.

OPTIONS

VRT reform in 2021 may in any event require consequential changes to taxation relating to company vehicles (e.g. capital allowances). Other options include:

- Ensure that there is a level playing field between WLTP and NEDC tested company cars for all emissions based taxation by the deployment of the CO2 multiplier which would provide a WLTP equivalent CO2 value for all NEDC only tested cars.
- Extend the zero BIK rate for electric vehicles beyond 31/12/2022 out to 31/12/2023 or beyond, potentially reducing the €50,000 OMV threshold to €40,000 OMV, in line with proposed changes to the EV €5,000 VRT relief.

3.5 The Future of Vehicle Taxation

BACKGROUND

Vehicle and motor taxes have been used as a means to raise revenues for the State, to help pay for the maintenance of the road network and more latterly to provide incentives for the purchase of lower emission vehicles thereby mitigating the level of pollution generated by road transport.

Motor taxation levels are indifferent to where and when cars are driven and as such do not seek to address the public health, environmental and economic costs of traffic congestion. These costs are significant. Research by the Environmental Protection Agency has highlighted the elevated levels of nitrogen oxides in different parts of Dublin, strongly associated with traffic congestion[40]. Exposures to high levels of nitrogen oxides over short periods can give rise to acute health effects, aggravating respiratory diseases, particularly asthma. Longer exposures to elevated concentrations of nitrogen oxides may contribute to the development of asthma and potentially increase susceptibility to respiratory infections and lead to respiratory failure. In relation to economic costs, analysis undertaken by IGEES/DTTAS estimates that the cost of time lost due to aggravated congestion was €358 million in 2012 and is forecast to rise to over €2 billion by 2033.[41]

A second issue arises in relation the future of vehicle taxation, namely that with the scale of the proposed 'electrification' of the national vehicle fleet, there are significant annual Exchequer revenues at risk. The State relies on the purchase/acquisition and fuel usage of ICE vehicles to raise significant revenues every year. The 2019 DPER spending review paper on EVs estimated that if the Climate Action Plan 2030 EV target is achieved, the Exchequer will lose approximately €1.5 billion worth of revenue annually from motor tax, VAT, fuel excise.

The next section briefly explores some options around replacing emissions and fossil fuel-based taxation with alternative revenue streams from road transport.

ROAD USER TRACKING- ODOMETER READING

One option to road user charging would be the systematic recording of odometer readings on vehicles and applying a charge based on the kilometres driven. Essentially, the kilometres driven by a vehicle in a given period, e.g. a year, are recorded via an automated process (connecting with central motor tax database) and potentially supplemented by periodical or sample based manual checks (e.g. at car tests in NCT centres). This forms the basis of a Euro per kilometre charge.

This method is simpler than GNSS based road user charging (see next section), avoiding the privacy concerns of recording people's journey data. A flat rate charge is consistent with the

[40] http://www.epa.ie/newsandevents/news/pressreleases2019/name,66485,en.html
[41] https://assets.gov.ie/13615/110debccab3346aa9a6f871f0ae660d9.pdf

polluter pays principle, though it would be open to taper the rate beyond certain Km thresholds to take account of the fact that certain motorists are required to drive longer distances. However, a simple per km motor tax charge could disadvantage rural motorists with long journeys to work or elsewhere and no viable public transport options. Also, by not being able to discriminate charging by road type or time of day, it does nothing to address urban or suburban traffic congestion. There are also some practical issues which could undermine such a system, such as an inability to apply a fair and accurate charge to motorists who regularly drive across the border.

ROAD USER TRACKING

The Global Navigation Satellite System (GNSS) is a system of satellites that allow for the tracking of vehicles. In theory, a device inserted into the vehicle records 'journey' data (such as where the vehicle has driven, at what time, kilometres travelled etc.) and feeds this into a database. The data collected then becomes the basis for calculating the road charge. The charge operates with say, a base Euro per kilometre rate, with adjustments for the location driven and the time the journey took place. For example, a lower per kilometre rate would apply to a journey in a rural setting compared to an urban commute at peak traffic times. Civil use of GNSS is a relatively novel venture and it may be some years before comparable extensive rollouts are operational. Singapore's electronic road pricing system is currently being updated so that physical gantries which clock the presence of cars are supplemented with the GNSS technology[42].

Theoretically, GNSS based road user charging could provide for an intelligent system of road charging that is aligned with the polluter pays principle (linking the emissions of the car with the number of kilometres travelled), that is also sensitive to geography, road type and time.

If this is to emerge as a new way of road charging it would appear preferable that it would be developed at an EU level as EU Regulations could mandate car manufacturers to fit in the requisite tracking technology in the manufacturing process, thus delivering quality assurance and consistency, extensive coverage and economies of scale. In parallel, EU legislation could address the privacy issues within a legal framework which sets out, among other things, the required data, data security/encryption standards and the data retention period.

The challenges and timeframe in which such a system could emerge for cars should not be underestimated. While the technology may be well advanced (and most likely could be installed at a modest cost during the manufacturing process), it would require the development of an administrative and legislative framework that is workable and broadly accepted within the political system and society.

[42] https://www.lta.gov.sg/content/ltagov/en/who_we_are/our_work/road.html

ROAD TOLLING AND CONGESTION CHARGES

The most common road user charging currently practiced are road tolling and congestion charging. Toll charging is common in Ireland, and it is possible to extend dynamic toll charging as a mechanism to curb traffic congestion and make better use of the road space at all times.

Congestion charging provides the opportunity to specifically target the areas experiencing the heaviest volumes of traffic, congestion and air and noise pollution. London has operated a congestion charge since 2003, and more recently, the ULEZ (ultra low emissions zone). The congestion charge applies a daily rate for almost all vehicles entering the London zone, while the ULEZ applies specific charges to vehicles not meeting certain emissions standards. Similar charging regimes are in place in other European cities, where some are applied every time a motorist enters a charging zone (rather than a daily charge).

However, broad acceptance with congestion based charges may be an issue as it gives rise to equity issues (between those who can easily afford the charges and those who can't). Other concerns about congestion charging include the effects on neighbourhoods that are just outside the charging zone (increased car parking demands, traffic build-up, air pollution, etc.)

LIMITATIONS

The anticipated structural decrease in fossil fuel usage and tailpipe emissions over the next decade will be welcome from the perspective of public health and climate action, helping the State to achieve carbon reduction commitments. There are however, negative externalities associated with vehicle use beyond tailpipe emissions. In terms of the life cycle of a vehicle, low emission cars (and even BEVs) remain carbon intensive. The exploration and extraction process for rare earth minerals and vehicle manufacturing carry a substantial carbon footprint[43,44]. Furthermore, based on the current carbon intensity of Ireland's electricity generation, fossil fuels are still burning in order to 'fuel' an EV. In more general terms, vehicle usage contributes to noise pollution, wear and tear on road infrastructure, and congestion in cities and towns. The 'greening' of the fleet does not nullify the justification for, and necessity of, vehicle taxation.

The design of vehicle taxation in the future to address broader policy objectives is complex and challenging. It would be difficult for vehicle taxation to contribute to the achievement of broader policy objectives without complementary policies in place in relation to urban planning, public transport, cycling and walking infrastructure, etc.

[43] https://reader.elsevier.com/reader/sd/pii/S1876610217309049?token=3C5AD307447BE8036873159A6DFF28FC87CFF4C4E22A742EF03ED57F132AAD1E1F8DBE2D7761C66AB35D790952680F08

[44] https://theicct.org/sites/default/files/publications/EV-life-cycle-GHG_ICCT-Briefing_09022018_vF.pdf

4 Tax based proposals to reduce GHG emissions in the Agri-sector

In this chapter we will consider a number of proposals for tax-based measures to reduce Green House Gas emissions in the agri-sector.

4.1 Background

Agriculture accounted for approximately 34% of Ireland's total Green House Gas (GHG) emissions in 2018[45], with emissions from the sector having increased annually in seven of the most recent eight years. This particular composition of emissions differs from most other European countries where agriculture related GHG emissions are typically closer to 11% of total emissions.

A key factor in the upward trajectory of our agricultural related GHG emissions is the increased size of the national herd, which has led to an associated increase in methane production. Dairy cow numbers and milk production levels have increased by 25% and 40% respectively since 2013- this reflects national plans to expand milk production under Food Wise 2025 and the removal of the milk quota in 2015.

Other sources of emissions in the agri-sector include the following:

- The use of Nitrogen containing fertilisers (resulting in nitrous oxide release after application);
- The storage and spreading of manures/slurry (resulting in methane and nitrous oxide release);
- Fossil fuel combustion (diesel for agricultural machinery emits carbon dioxide as does the generation of electricity used on farms).

[45] http://www.epa.ie/ghg/agriculture/

THE ALL OF GOVERNMENT CLIMATE ACTION PLAN

The 2019 Climate Action Plan[46] sets out over 180 actions over a number of key sectors designed to help Ireland meet its ambitious EU emissions reduction targets for 2030; 34 of these actions relate to the agri-sector.

The Action plan contains an emissions reduction target of 10% to 15% for agriculture, bringing emissions to between 17.5 and 19 metric tonnes in 2030. The sector will also contribute to the removal of 26.8Mt CO2 from the atmosphere through afforestation and new ways of managing land. The long-term challenge for the sector is to meet the national policy objective of an approach to carbon neutrality, which does not compromise the capacity for sustainable food production as outlined in Food Wise 2025, while also balancing the need to maintain viable incomes for farmers.

THE JOINT OIREACHTAS COMMITTEE ON CLIMATE ACTION REPORT

The Joint Oireachtas Committee on Climate Action[47] reported on its work in March 2019. With regard to the agri-sector, the Committee recognised the urgent need for "bottom-up approaches to address rising emissions in agriculture and support the sector to transition to a low emission model".

The Committee was conscious of the importance of agriculture to the rural economy and sought to propose recommendations which support on farm measures to reduce emissions and improve the sustainability of farming in Ireland, including agricultural diversification.

A suite of measures were proposed to reduce soil carbon emissions and enhance the carbon sequestration potential of land through for example, sustainable forestry practices, maintaining hedgerows and rewetting peatlands. The Committee put an emphasis on the role of the Common Agricultural Policy (CAP) in encouraging farmers to engage in climate mitigation measures.

[46] https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

[47] https://data.oireachtas.ie/ie/oireachtas/committee/dail/32/joint_committee_on_climate_action/reports/2019/2019-03-28_report-climate-change-a-cross-party-consensus-for-action_en.pdf

THE AG CLIMATISE PLAN

Using the Climate Action Plan's targets as an overarching framework, in November 2019 the Department of Agriculture, Food and the Marine published: "*Ag-Climatise- A Draft National Climate & Air Roadmap for the Agriculture Sector to 2030 and Beyond*"[48], a public consultation document aimed at translating the overall sectoral ambitions into more detailed actions and targets for delivery over the coming years. Submissions to the consultation were accepted from the public up to Friday 10 January 2020.

4.2 Proposals for tax-based measures to reduce GHG emissions

One mechanism by which GHG emission reduction targets for the agri-sector might be achieved is through the introduction of Accelerated Capital Allowances for investment in:

- Low Emission Slurry Spreading (LESS) systems; and,
- Additional Capacity for Slurry storage.

This joint proposal was brought forward for consideration by the Department of Agriculture, Food and the Marine in its Budget 2020 submission to the Minister for Finance. The proposal was analysed but ultimately not proceeded with at the time; the following chapter outlines the analysis that underpinned this decision.

DAFM PROPOSAL

DAFM asked that consideration be given to the introduction of Accelerated Capital Allowances for investment in Low Emission Slurry Spreading (LESS) systems; and, an additional capacity for slurry storage.

The proposal was framed in terms of two separate options: a 100% ACA over one year, or a 50% ACA over two years. While not specified, it must be assumed that the value of any grant provided would have to be deducted from the overall cost of the investment for the purpose of arriving at the level of qualifying expenditure under the ACA (in accordance with

[48] https://www.agriculture.gov.ie/media/migration/ruralenvironment/climatechange/bioenergy/ClimateandA

s658 TCA 1997 (13)- *Farming: allowances for capital expenditure on construction of buildings and other works*).

An ex-ante evaluation of the DAFM proposal is outlined below:

1. **What is the objective of the tax expenditure?**

The objective of both measures is to further encourage on-farm investment in environmentally positive farming practices which are targeted at reducing emissions of both greenhouse gasses and ammonia (a requirement under the revised National Emissions Ceiling Directive).

2. **What is the market failure being addressed?**

The key challenge for the agri-sector over the coming years is to adopt an approach towards carbon neutrality which does not compromise sustainable food production. In order for the sector as a whole to meet its targets, there must be extensive behavioural change at the level of each individual farmer (collectively totalling some 139,000); this will involve capital investment by these individuals in mitigation measures across emissions reductions, carbon sequestration and displacement of fossil fuel.

3. **Is a tax expenditure the best approach to address the market failure?**

Behavioural change may be incentivised by Government through the use of direct expenditure, tax expenditure measures or by regulation. A tax expenditure measure should only be considered where it is deemed to be the most efficient method of intervention and where it does not represent a duplication of other supports.

In the normal course of events, 'wear and tear' allowances are already provided at a rate of 12.5% over 8 years for plant and machinery investments.

When considering the proposed Accelerated Capital Allowance for the purchase of LESS equipment, it is important to note that direct exchequer support is already provided as follows:

- The Targeted Agricultural Modernisation Scheme (TAMS 2) provides grants to farmers for the purchase of this equipment at a general grant rate of 40%, rising to 60% for qualifying young farmers. DAFM advise that to-date there have been 1,700 applications received under the general LESS scheme and 400 for LESS under the Young Farmers Capital Investment Scheme.

- Furthermore, low emission slurry spreading is already an action under the (GLAS) scheme (this scheme provides payments to farmers who are in compliance with a number of core requirements and actions).

In the case of the ACA for additional slurry storage capacity:

- The Targeted Agricultural Modernisation Scheme (TAMS 2) provides grants to farmers for a variety of investments in slurry storage.

DAFM have advised that there may be issues with accessing TAMS grant support in the case of dairy farms who undertook expansion prior to investing in additional slurry storage capacity. However, this may not provide sufficient justification for the introduction of an entirely new tax incentive, when an adjustment to TAMS might otherwise resolve the issue. As such, the proposal for a scheme of ACAs in both cases represents an additional layer of Government funding for the same category of investments and therefore creates a duplication of supports.

Furthermore, there is already an obligation on farmers to prioritise these investments- there are existing and (intended) forthcoming requirements for mandatory compliance with the Nitrates Regulations. Compliance with these Regulations is one of the Statutory Management Requirements under the Single Payment Scheme.

4. What economic impact is the tax expenditure likely to have?

A certain amount of additional investment may result from the dual availability of a tax based measure and a grant scheme, however, these investments would be likely to occur even in the absence of this incentivisation, as part of the normal business requirement to replace outdated equipment/facilities. It is possible that the availability of both tax incentives and grants may lead to increased prices in the market.

5. How much is it expected to cost?

Teagasc have provided estimated costs for these measures (see below). However, tax expenditures are demand led and so there is no certainty that the scheme would remain within these boundaries.

It should be noted that the former Farm Waste Management Scheme (a predecessor to the waste matter storage scheme) was projected to cost €248m but ultimately ended up costing over €1 billion. A key issue was that the scheme was not cash limited, as is the case with tax expenditures.

LOW EMISSION SLURRY SPREADING (LESS) EQUIPMENT

Teagasc estimate that there is a need for investment in 1,500 pieces of LESS equipment per annum over the proposed four year period of this incentive (2020-2023). They have therefore estimated that if 6000 pieces of equipment were purchased at a cost of €35,000 per item, the total cost of the ACA over the four year period would be as follows:

- c.€3.4 million (100% ACA over one year);
- c.€2.9million (50% ACA over two years).

Additional slurry storage capacity

Teagasc have prepared an estimate on the cost of this measure on the basis of projected on-farm storage capacity requirements over the coming years (which they believe will require a total investment of some €447.4 million). They estimate that the total cost of this proposed measure, if made available over the four year period from 2020 -2023, would be:

- c.€7.9 million (100% ACA over one year); or,
- c. €6.4 million (50% ACA over two years).

In both cases, they have made their calculations on the basis of 4% Net Present Value.

However, in terms of Budgetary impact, if both measures were introduced together as a 100% ACA, the cash cost in terms of tax foregone in 2020 would be €26 million. Alternatively, if both measures were introduced together as a 50% ACA over 2 years, the cash cost in terms of tax foregone would be €10 million in 2020 and a further €20 million in 2021 (Teagasc cost estimates).

4.3 Conclusion

While the importance of adopting measures that allow Ireland to meet its ambitious decarbonisation targets is acknowledged, the proposals give rise to a number of concerns from a Department of Finance perspective for the following reasons:

- Duplication of support: these investments are already supported by Direct Expenditure under the Targeted Agricultural Modernisation Scheme (TAMS 2) and, in the case of LESS, the GLAS scheme;
- The pre-existing availability of 'wear and tear' allowances for plant and machinery (at a rate of 12.5% over 8 years);

- Economic deadweight: the replacement of outdated facilities/equipment is likely to occur in the absence of an additional layer of exchequer support;
- The high level of existing subsidies across the agriculture sector; it is important to bear in mind that each additional tax expenditure measure tends to deprioritise and reduce the effectiveness of others.
- State Aid considerations: State Aid granted to farmers is subject to certain maximum ceilings under the Agricultural Block Exemption Regulations (ABER); for example a lifetime ceiling of €70,000 applies to the amount of State aid granted to young trained farmers. It is likely that any aid received by an individual under this proposed measure would have to be aggregated along with other tax reliefs to comply with this ceiling.

Annex 1: Electricity Tax Rates

Electricity Tax Rates in the EU 27 and UK				
Business			Non Business	
	€ per Mwh			€ per Mwh
Sweden	0.4840	1	Bulgaria	0.0000
Luxembourg	0.5000	2	Hungary	0.9274
Croatia	0.5060	3	Ireland	1.0000
Lithuania	0.5200	4	Luxembourg	1.0000
Romania	0.5346	5	Portugal	1.0000
Denmark	0.5358	6	Lithuania	1.0100
Hungary	0.9274	7	Latvia	1.0100
Ireland	1.0000	8	Croatia	1.0120
Portugal	1.0000	9	Romania	1.0692
Latvia	1.0100	10	Czech Rep	1.0995
Bulgaria	1.0226	11	Poland	1.1422
Czech Rep	1.0995	12	Slovakia	1.3200
Poland	1.1422	13	Malta	1.5000
Slovakia	1.3200	14	Slovenia	3.8500
Malta	1.5000	15	Estonia	4.4700
Slovenia	3.8500	16	Greece	5.0000
Estonia	4.4700	17	Belgium	5.3700
Greece	5.0000	18	UK	9.5217
Spain	5.1000	19	Spain	9.6000
Belgium	5.3700	20	Cyprus	10.0000
Finland	7.0300	21	Austria	15.0000
UK	9.5217	22	Germany	20.5000
Cyprus	10.0000	23	France	22.5000
Italy	12.5000	24	Finland	22.5300
Austria	15.0000	25	Italy	22.7000
Germany	15.3700	26	Sweden	33.5915
France	22.5000	27	Denmark	119.4830
Netherlands	125.0000	28	Netherlands	125.0000
Average	9.0648		Average	15.7931

Annex 2: Current VRT and Motor Tax Rates Table

Vehicle Registration Tax Rates for Passenger Cars

VRT Bands	CO2 emissions g/km	VRT Rate (% Open Market Selling Price)
A1	0-80	14%
A2	81-100	15%
A3	101-110	16%
A4	111-120	17%
B1	121-130	18%
B2	131-140	19%
C	141-155	23%
D	156-170	27%
E	171-190	30%
F	191-225	34%
G	Over 225	36%

Motor Tax Rates for Passenger Cars

Band	Emissions	Rate €
A0	0	120
A1	1 - 80	170
A2	81 - 100	180
A3	101 - 110	190
A4	111 - 120	200
B1	121 - 130	270
B2	131 - 140	280
C	141 - 155	390
D	156 - 170	570
E	171 - 190	750
F	191- 225	1,200
G	>226	2,350

Annex 3: The NEDC Multipliers

NEDC-WLTP Adjustment Mechanism[49]

As set out in the 2019 Tax Strategy Group paper, the Department conducted an analysis of Irish market data for cars which had both NEDC and WLTP emissions test values. In line with the European Commission's study and similar data from other Member States, the average emissions under WLTP are 21% higher than the NEDC (there is a fuel-type variance, with diesels 23% higher and petrol 19% higher). A regression analysis of this data is used to generate linear equations, which allows for the derivation of a 'predicted' WLTP value for a car which is NEDC tested only. The line equations are:

Petrol: y = x(0.9355)+32.846

Diesel: y = x(1.1404)+12.429

The exercise, following the European Commission methodology, is based on analysing unique car observations, whereby duplicates (cars of the same make/model) are removed from the dataset. Thus the exercise is not based on sales weighted volume.

As an example, to derive a 'predicted' WLTP equivalent for a NEDC-tested petrol car, the NEDC CO2 is plugged into the equation for x. Taking a NEDC CO2 value of 110, the WLTP equivalent value is 136.

*y = **110**(0.9355)+32.846. y = 136*

This exercise will be further reviewed but is not anticipated that the linear equations will materially change.

[49] Line equations may be updated in light of the latest car registration data.

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