Climate Action and the Taxation of Motoring in Ireland

Submission to the Tax Strategy Group on behalf of the Irish Car Carbon Reduction Alliance

August 2020

Colm McCarthy and Associates,

Economic Consultants,

51 Pembroke Road,

Dublin 4. DO4 TT17

colm.mccarthy@ucd.ie

Contents

Introduction and Summary

Recent reports of the Tax Strategy Group have considered the structure, as well as the rates, of taxes on motoring. This report argues that a radically different approach to raising revenue from road users is becoming inevitable. The amounts are substantial – taxes on acquisition of vehicles, annual taxes on ownership, and fuel taxes, with a small component of charges for actual use, add up to about €6 billion per annum. A rough estimate of the direct and indirect costs attributable to road users totals to the same order of magnitude: the total take from motoring, including currently unrecovered emission and congestion costs, is at the right level. But the structure is not coherent and is unsustainable.

The decarbonisation of the vehicle fleet will progressively undermine the revenue base for fuel taxes, currently the principal revenue raiser, and the Irish system of taxes on vehicle acquisition has perverse effects in a context where fleet conversion is public policy.

Chapter 1 outlines the structure of motoring taxes in European countries and notes the heavy reliance in Ireland on fuel taxes, and on the acquisition tax, Vehicle Registration Tax (VRT), which is discouraging the purchase of new cars. Most other European countries have substantial fuel taxes but only a few share Ireland's reliance on upfront taxes on vehicle acquisition. Direct charging for the use of road transport infrastructure has become more widespread in Europe but is still responsible for only a modest portion of public revenue.

The second chapter considers the Climate Action Plan released in July 2019 and the broader context in which policy on the taxation of transport must be enshrined. Irish emissions as measured are mainly outside the European Union's Emission Trading System or ETS, to a greater degree than in other EU countries. This imposes a differential adjustment obligation, since non-ETS targets must be attained entirely through national policy measures. Ireland's targets are affected greatly by the measurement system, which counts emissions from agriculture on a production basis. Most other emissions, for example fuel combustion in the road vehicle fleet, are counted on a consumption basis. This measurement issue is important since Ireland is a substantial net exporter of agricultural products.

Chapter 3 discusses the direct (construction, maintenance, and policing) costs of the road system and the indirect costs, principally carbon emissions, low-level non-carbon emissions and congestion externalities. It concludes that the non-carbon and congestion externalities are significant and are not recovered from motorists.

The following chapter assesses the Irish system of taxes and charges on road users. The principal conclusion is that, when non-carbon emissions, congestion, the current low levels of the carbon charge

and of direct user charges are taken into account, the total annual yield from all motoring taxes and charges is roughly in line with identifiable direct costs and the un-collected externality costs. However, the structure is not well aligned with the incentivisation of emission reduction and fleet replacement. There is an unintended incentive to encourage the importation of older, high-emission, vehicles from the United Kingdom, the only other European country with right-hand steering wheels. There is a resultant leakage of VAT revenue. As the fleet becomes electrified, and as electricity moves to zero- or low-carbon technologies, the current reliance on fuel taxes, over half of revenue from all sources, becomes problematic.

Chapter 5 argues that the current structure of motoring taxes is not sustainable in the longer term, even though aggregate revenue does not appear to be excessive and there is a policy prerogative to protect revenue in current circumstances. Ultimately there will need to be a system which collects attributable direct costs from road users while incentivizing the reduction of carbon and non-carbon emissions and congestion externalities.

The final chapter considers the unrealistic timeline that exists for the adoption of electric passenger cars and the policy options during the transition to a new system, which should be based on electronic road pricing and congestion charging. Such a system has the incidental benefit that, through charging for road space, it would restore the competitive advantage of bus-based public transport which is suppressed in the current structure where road space is effectively free. During the transition, which could take a decade or more, the system of motoring taxes should seek to protect aggregate revenue while promoting fleet replacement.

The report concludes with a short appendix outlining the main components of an electronic road pricing system. The report's principal recommendation is that the government should undertake a detailed study of the practicalities of introducing a comprehensive system of road-user charging in Ireland.

Chapter 1: Road User Taxes and Charges in European Union Countries

European countries collect substantial revenues from road users, principally through levies on vehicle purchase, ownership, and fuel. There has been an increasing reliance in recent decades on direct charges, including road tolling and congestion charges in addition to the conventional taxes but user charges remain a small portion of the total in nearly all countries.

Use of the road system imposes costs directly in the form of road construction, road maintenance and traffic management, including traffic policing, which are borne by state authorities. Users also impose externality costs, often unrecovered, in the form of congestion and negative environmental impact, on other road users and on the public.

Overall Revenue from Motoring Taxes and its Composition

Data for a range of European countries has been collected by ACEA, the European Automobile Manufacturers' Association[1]. They include VAT as a tax on motoring, which could equally be regarded as a general tax on consumer spending, applicable to almost all categories of goods and services and accordingly not a recovery of the cost components listed above.

Table 1.1: Yield of Taxes on Road Users, Selected European Countries, in Euros or National Currencies.

Purchase or transfer	AT (€ bn) 2017	BE (€ bn) 2018	DE (€ bn) 2018	DK (DKK bn) 2018	ES (€ bn) 2018	FI (€ bn) 2018	FR (€ bn) 2018	GR (€ bn) 2019	IE (€ bn) 2019	IT (€ bn) 2018	NL (€ bn) 2019	PT (€ bn) 2019	SE (SEK bn) 2019	UK (£ bn) 2018/2019[4]
1.VAT on vehicle sales, servicing, repair & parts	3.1	7.4	31.3	–	5.0	1.7	18.5	0.3	0.7	18.6	1.2	4.5	25.0	12.5
2. Sales & registration taxes	0.5	0.5	–	20.7	0.5	1.0	2.3	0.3	1.0	1.8	2.2	0.7	–	–
3. Annual ownership taxes	2.4	1.7	9.0	9.9	2.9	1.2	0.9	1.2	0.9	6.8	4.3	0.7	13.9	6.5
4. Fuels & lubricants	5.4	8.8	41.7	17.5	20.8	3.9	42.8	5.6	3.5	37.8	10.4	3.5	45.0	28.0
5. Others														
Driving license fees	–	0.0	0.2	–	0.1	–	–	–	0.0	–	0.3	–	–	–
Insurance taxes	0.4	1.0	5.3	1.5	–	0.4	5.1	–	0.1	3.9	1.2	–	2.8	–
Tolls	2.1	0.7	5.7	0.5	–	–	12.6	–	–	2.2	0.2	0.2	2.7	–
Customs duties	–	–	0.2	–	–	–	–	–	–	–	–	–	–	–
Other taxes	0.4	0.7	–	–	0.7	–	1.7	0.1	–	5.3	1.8	–	–	1.5
TOTAL (national currencies)	14.3	20.7	93.4	50.1	30.0	8.1	83.9	7.4	6.2	76.3	21.5	9.6	89.4	48.1
TOTAL (€)[5]	14.3	20.7	93.4	6.7	30.0	8.1	83.9	7.4	6.2	76.3	21.5	9.6	8.1	54.1
GRAND TOTAL = €440.4 billion														

Key: AT = Austria, BE = Belgium, DE = Germany, DK = Denmark, ES = Spain, FI = Finland, FR = France, GR = Greece, IE = Ireland, IT = Italy, NL = Netherlands, PT = Portugal, SE = Sweden, UK = United Kingdom.
Source: ACEA Tax Guide 2020.

[1] https://acea.be/uploads/news_documents/ACEA_Tax_Guide_2020.pdf

Taxes on motoring are substantial in all these countries. Their composition across countries varies, with only a few relying heavily on sales and registration taxes. In the next table, the revenue from these taxes (purchase taxes additional to VAT) is expressed as a percentage of the total.

Table 1.2: Revenue from Sales and Registration Taxes as a Percentage of Total Motoring Taxes.

Country	Revenue, Sales and Registration	Revenue, All sources	Percentage
Austria	0.5	14.3	3.5
Belgium	0.5	20.7	2.4
Germany	0.0	93.4	0.0
Denmark*	20.7	50.1	41.3
Spain	0.5	30.0	1.7
Finland	1.0	8.1	12.3
France	2.3	83.9	2.7
Greece	0.3	7.4	4.1
Ireland	1.0	6.2	16.1
Italy	1.8	76.3	2.4
Netherlands	2.2	21.5	10.2
Portugal	0.7	9.6	7.3
Sweden*	0.0	89.4	0.0
United Kingdom*	0.0	48.1	0.0

* = national currencies, all others in Euro.

Three countries, Germany, Sweden and the United Kingdom, have no purchase taxes aside from VAT. Denmark has the highest purchase taxes but does not charge VAT. Ireland is next highest, but also levies VAT. If VAT and the purchase taxes are combined, adding the first two rows from Table 1.1, Denmark, Finland, and Ireland are the clear outliers, with 41%, 33% and 27% of motoring taxes levied on the sales price either as VAT or a registration charge. For ten of the fourteen countries, the percentage collected as a sales or registration tax (other than VAT) is zero or in single digits.

Collecting revenue at first sale, as VAT or a registration tax, or annually through an ownership tax, affects vehicle ownership and replacement but does not target vehicle usage. Since the unrecovered social costs (environmental impact, congestion) are related to usage, taxes on fuel are a better proxy.

The ideal tax to target these externalities would be some combination of fuel levies and electronic road pricing or congestion charging. The balance between the taxes affects vehicle ownership and use, and countries, including Ireland, which rely heavily on taxing vehicle acquisition or ownership create incentives for lower levels of ownership accompanied by higher annual mileage by fewer vehicles.

There is an additional feature which concerns the used car market. Taxes levied on first sale become embodied in used car prices and the large variations in tax strategy prevent the emergence of a single market in Europe for used cars. If the tax systems come to be harmonised around fuel (or carbon) taxes and direct charges such as tolls, prices on acquisition would differ only due to differences in VAT rates, which are limited. At present there is a strong impediment to the emergence of a normal secondary market in used vehicles, even between neighbouring countries (Denmark and Germany, Spain and Portugal, or Ireland and the United Kingdom) because new car prices differ so much. This is due mostly to registration taxes, not to VAT differentials.

Taxation is a 'national competence' in the EU structure and the European Commission has been unable to pursue sufficient tax harmonisation to create a truly single market in vehicles for this reason. Cross-border trade is inhibited by requirements to re-register and pay additional taxes, and such trade as occurs in used vehicles tends to be in one direction. This important component in the European single market, the car market, has become balkanised through the inability of the European Commission to make progress on tax harmonisation.

Fuel Taxes in European Countries

The ACEA report also presents data for January 2020 on fuel taxes. The forecourt price of auto-fuel is heavily taxed in Europe and in some other non-European countries, although there are some, including oil producers, where forecourt prices are below the ex-refinery price due to government subsidies. The principal element in the tax at retail is fuel excise duty but some countries impose separately a carbon tax on energy products (including solid fuels and heating oil) which applies to auto-fuel, as well as VAT.

The variation in fuel excise is clear from the next table. Tax competition between fiscal jurisdictions is limited by the capacity of fuel tanks but there is known to be substantial 'fuel tourism' in border regions. Of Ireland's remaining 26 EU partners after the departure of the United Kingdom, 18 have lower excise on petrol and 8 charge more. The highest excise on petrol is in the Netherlands, more than double the figure for Bulgaria. The highest excise on diesel is in Italy, not quite double the lowest EU member, again Bulgaria.

Excise duties per litre are generally lower for diesel than for petrol. The 'discount' for diesel in Ireland is not exceptional – 12 of the 26 partner countries remaining in the EU have larger discounts when expressed in cent per litre. Importantly the United Kingdom has no discount, nor does EU member Belgium.

Virtually all road freight vehicles have diesel engines, and this has influenced the taxation policies of governments. To the extent that road freight is seen as an intermediate input into the export sector there is a logic to a lower rate of tax – countries typically seek to avoid taxes on exports. Petrol demand comes mainly from private cars and the higher rate of tax can more clearly be identified as a consumption tax. However, the recent rise in the popularity of diesel cars has altered this perspective – the preferential

treatment of diesel has leaked across into the private car fleet, at one time consisting almost entirely of petrol-powered vehicles.

Table 1.3: Excise on Auto-Fuels, January 2020, in EU Countries.

Excise Duties on fuels in €/1,000 litres		
Country	**Unleaded Petrol**	**Diesel**
Austria	515	425
Belgium	600	600
Bulgaria	363	330
Croatia	520	413
Cyprus	429	400
Czech Republic	499	425
Denmark	631	429
Estonia	563	493
Finland	702	530
France	683	594
Germany	654	470
Greece	700	410
Hungary	366	338
Ireland	602	495
Italy	728	617
Latvia	509	414
Lithuania	466	372
Luxembourg	472	355
Malta	549	472
Netherlands	800	503
Poland	383	337
Portugal	643	488
Romania	373	342
Slovakia	555	393
Slovenia	547	469
Spain	504	379
Sweden	619	438
EU minimum rates	**359**	**330**

Source: European Commission, TEDB – 'Taxes in Europe' database

In addition to carbon emissions, diesel engines are responsible for low-level emissions which, especially in cities, are believed to be responsible for reductions in air quality and resulting damage to human health. In consequence several cities are pursuing policies designed to discourage diesel emissions, including exclusion of large commercial vehicles in Dublin and a differential congestion charge in London. Some cities are contemplating a full prohibition, not readily enforceable with current technology, and there have been calls in many countries for the tax gap between petrol and diesel to be narrowed or closed. It should

be conceded that car manufacturers have responded to these concerns and the newer diesel models have greatly reduced NOx emissions.

The figure shown in Table 1.3 for Sweden, which has moved further towards a carbon tax system with a reduced excise component, results in a higher retail price for diesel than for petrol, as explained in the detailed discussion in the national chapter of the ACEA report[2].

Table 1.4: The Build-up of Retail Prices for Auto-Fuel in Sweden.

	Petrol (SEK/l) **1 January 2020** **Unleaded 95** **Environmental class 1**	**Diesel (SEK/l)** **1 January 2020** **Environmental class 1**
Energy tax	4.1	2.461
Carbon dioxide tax	2.59	2.248
Total taxes (excl. VAT)	6.69	4.709
Cost of product	6.21	8.755
VAT 25%	3.23	3.366
Price at pump	**16.13**	**16.83**

Swedish pump prices in January were higher for diesel than for petrol, despite the slightly lower carbon content and lower energy tax, because of the high product cost for diesel at that time. There is now a diesel glut because of the demand collapse induced by COVID and some technical factors peculiar to the diesel refining process[3].

Closure of the excise differential favouring diesel versus petrol in Ireland has been considered in recent reports of the Tax Strategy Group (TSG). While worldwide crude prices have recovered from the lows seen in May, futures markets do not see a major rebound and lower retail prices in Ireland suggest that it is timely for the TSG to revisit the issue. The matter is considered further in Chapter 5 below.

Charges for Road Use in Europe

No country in Europe has moved decisively to direct charging for the use of road infrastructure, although there has been some movement in this direction in recent decades. Some roads are tolled for

[2] The sheer complexity of motoring taxes in Europe is illustrated by the length of the ACEA report, which does not treat all the issues comprehensively and yet runs to 314 pages.
[3] https://www.hellenicshippingnews.com/swamped-by-diesel-refiners-struggle-with-coronavirus-recovery/

some or all users, often to fund the private financiers of new schemes as in Ireland but also to ration urban street capacity through cordon charges, as in London, Stockholm, and other cities. More extensive reliance on direct charging is already in evidence across the continent, driven by concerns about traffic management and the imperatives of climate action.

The figures shown in Table 1.1 for toll income are incomplete and misleading – the zero entries for Ireland and the United Kingdom are incorrect. Both countries have tolls on some roads and bridges and London has cordon charges for vehicles entering the central area.

The countries, according to the figures as shown, with the highest share attributed to tolls are Austria, where the preponderance of through traffic has stimulated political support for tolling; France, where the national motorway routes are tolled; and Sweden, where Stockholm and Gothenburg have cordon charges. Revenue from congestion charging schemes can be substantial – had the COVID downturn not intervened, the London system would have generated over €400 million in gross revenue for the year 2020, most of which is hypothecated to the financial support of bus transport in the city.

Acquisition Tax (VRT) in Ireland

Ireland's reliance for revenue on the acquisition tax, called Vehicle Registration Tax (VRT), is not merely an outlier, it is incongruous at a time when the fleet is acknowledged to contain too many older, high-emission vehicles. It is desirable to encourage fleet replacement, ultimately to electric vehicles (EVs) in a country where electricity generation has already been decarbonised and further substantial decarbonisation is feasible and is planned. Ultimate conversion of the fleet to electric propulsion calls into question the even greater reliance in Ireland on fuel taxes, the justification for which consists in part of charging for carbon emissions.

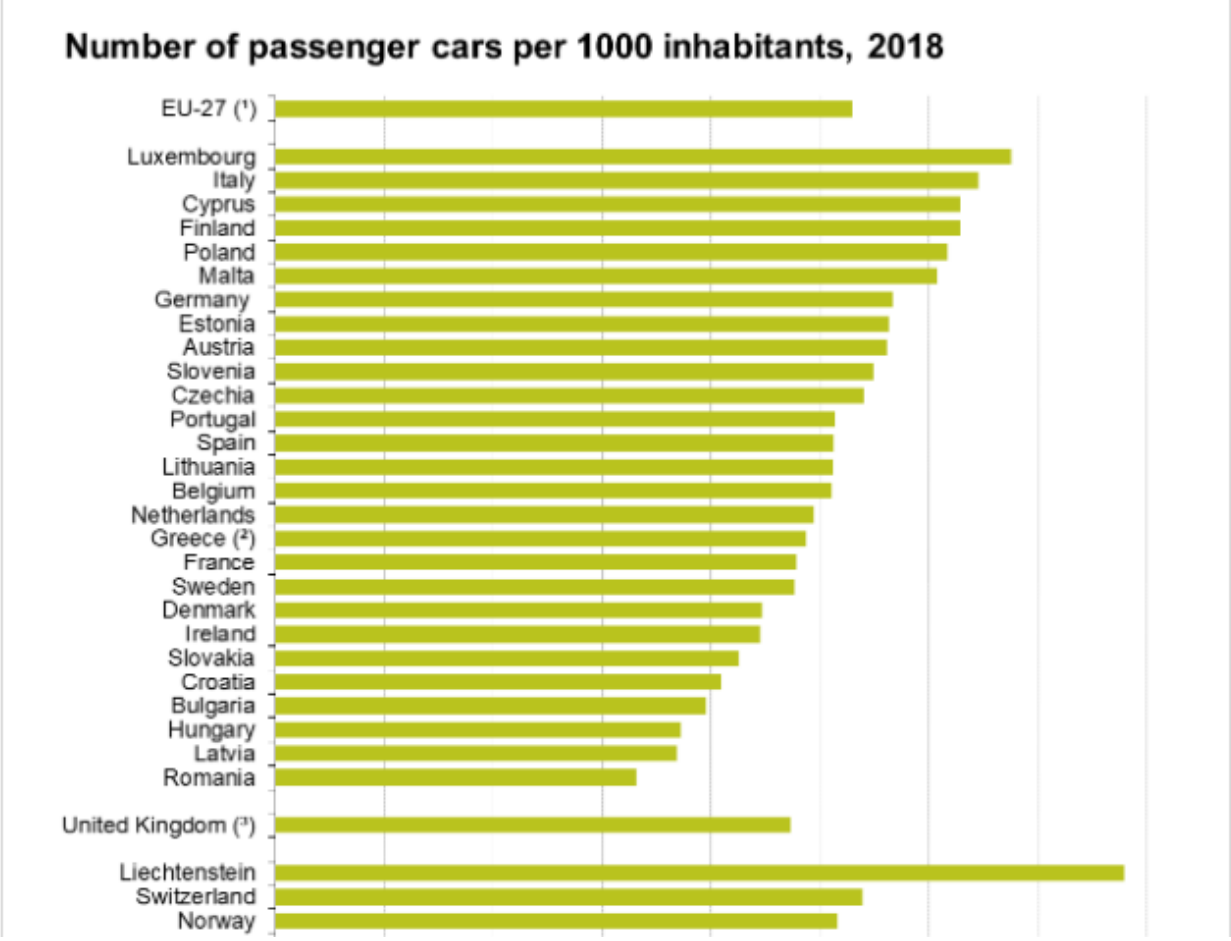
As currently structured the VRT is discouraging the purchase of new internal combustion engine (ICE) cars in circumstances where the shift to electric cars has been slow and is not expected to accelerate, on the figures in the government's Climate Action Plan (CAP), until the end of the decade. In the meantime the practical choice, especially for first-time buyers and for low-income purchasers, is between new ICE cars, where emissions from newer models are decreasing, or used imports from the UK, many of which are five or six years old and even older. The VRT system has resulted, for 2019, in fully one-half of Irish demand met from used imports with higher carbon emissions and including a high proportion of diesel cars which are increasingly criticised because of non-carbon emissions.

Ireland has, for its level of economic development and real consumer income, a notably lower rate of car ownership than might be expected and a higher annual mileage per car. The chart shows ownership rates per 1,000 population for 2018.

The countries with higher car ownership rates than Ireland include several with annual per capita household income lower, in some cases far lower, than Ireland, including Poland, Estonia, Slovenia, Czech Republic, Portugal, Lithuania and Greece.

Not one of the six countries with car ownership below the Irish figure have higher household income: Slovakia, Croatia, Bulgaria, Hungary, Latvia, and Romania are relatively poor countries by European standards. Based on household income, Ireland would be expected to have a car ownership to population

ratio towards the top of the European rankings. Instead it ranks 21st out of the EU-27, alongside another high-income country, Denmark, which also has high taxes on the acquisition of private cars.



Source: Eurostat

Discouraging car ownership is not the same thing as discouraging car use. Emissions, and other indirect costs such as congestion, derive from car use, not from acquisition or ownership. The Irish VRT system has also encouraged the importation of used vehicles from the United Kingdom, the only other country in Europe which drives on the left and thus has the steering wheel on the right. The UK is a far larger market and the second-hand trade in the UK can readily meet Irish demand for entry-level and less expensive vehicles. There is a known 'vintage' effect in emissions, so a fleet continually replenished with older cars from the UK will have a slower rate of conversion to the newer, and lower-emission, ICE models. Discouraging ownership in Ireland, especially of newer cars, is not guaranteed to deliver lower overall mileage and can result in a fleet whose emission characteristics for ICE vehicles are not improving as quickly as is possible.

The Irish economy continued its recovery from the financial crash through the period from 2016 to 2019. It could have been expected that new car sales would expand. Total acquisition of cars, new and used

imports, did increase, by about 3%, but the composition moved adversely. Prices to the customer for new cars have risen by around €3000 at all price points, reflecting increased manufacturers' prices with VRT and VAT additions. The effect was to price the cheaper new cars out of the market, and new car sales fell by 21%, the fall concentrated in the cheaper end of the market.

Table 1.5: The New Car Market in 2016 and 2019.

Customer Price €	Sales in 2016	Sales in 2019	% Change
less than 20,000	31,363	21,288	-32.1
20,000 – 25000	30,760	15,325	-50.2
25,000 - 30,000	31,981	22,690	-29.0
30,000 - 35,000	26,592	20,988	-21.1
35,000 - 40,000	9,099	13,769	+51.3
40,000 - 45,000	5,335	8,137	+52.5
45,000 – 50,000	4,132	5,287	+28.0
50,000 plus	6,997	8,264	+18.1
Total	146,259	115,756	-20.9

Source: SIMI

It is in the lower price brackets, especially for models costing up to €30,000 new, that the price increases were felt. Demand is sensitive to price in this area of the market and sales of new cars under €30,000 fell by 34,801. Used imports rose by roughly the same amount. It is striking that sales of more expensive cars rose strongly over this three-year period.

Overall additions, new and used, were about the 225,000 level consistent with fleet replacement but the composition is unfavourable to the attainment of fuel economy and emission reduction – the median age of the used imports is high, which means that they are coming from an earlier generation of cars offering inferior performance.

Manufacturers and distributors maintain that the viability of the market needs to be viewed in the round: without sales of the more expensive ICE models, the industry does not have the resources to provide cheaper, low-emission ICE cars, nor to invest in the electric car production capacity for the future.

Chapter 2: The Economics of the Climate Action Plan

In July 2019 Minister Richard Bruton TD published the government's Climate Action Plan[4]. The document, prepared by the Department of Communications, Climate Action and Environment, was subsequently considered by an all-party Oireachtas committee which broadly endorsed its conclusions.[5] A first Progress Report[6] on the Climate Action Plan has also been released.

In this chapter it is argued that the Climate Action Plan is an unsatisfactory basis for a cost-effective climate policy. The analysis underlying the document has not been fully revealed and where it has been made public is not convincing. The plan needs revision if it is to form the basis for a climate strategy which seeks out and implements the policies likely to achieve what should be the shared objective of countries around the world, controlling the climate at minimum economic cost.[7]

The point of departure for Irish climate policy has been the framework and targets deriving from Ireland's commitments as a member of the European Union.

European Union Climate Policy – the Emissions Trading System

The European Union has pursued an active policy to reduce greenhouse gas emissions in member states. The two most important components have been the ETS (Emissions Trading System) and an agreed set of national targets for emissions which fall outside the scheme. The ETS is a cap-and-trade system established in 2005 which allocates emission allowances to firms whose production processes entail the release of carbon and other greenhouse gases. Sectors covered include electricity generation and many heavy industries, including paper products, cement and steel. The ETS cover emissions from more than 11,000 power stations and industrial plants in the EU and four neighbouring countries, as well as airlines that operate within Europe.

Allowances are allocated to firms (mainly free, and 'grand-parented', that is, based on historical emissions) and can be sold if not required, while allowances can be purchased where the firm's production volume has risen beyond its allocation. Roughly 45% of Europe's greenhouse gas emissions is covered by the ETS, but this figure varies across countries. In Ireland only 29% of total emissions are covered by the workings of the ETS, leaving 71% to be addressed through national policy. This imposes a differential burden on domestic policy in Ireland.

The price of allowances is determined daily by supply and demand in a secondary market (the 'trade' part of cap-and-trade), the largest such market in the world, while the European Commission withdraws

[4] https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf

[5] https://data.oireachtas.ie/ie/oireachtas/committee/dail/32/joint_committee_on_climate_action/reports/2020/2020-01-13_report-on-consultation-on-ireland-s-final-integrated-national-energy-climate-plan-2021-2030_en.pdf

[6] https://assets.gov.ie/38342/3c550a8b60574f298a76591d3f565d1e.pdf

[7] McCarthy, Colm and Sue Scott (2008): https://www.esri.ie/publications/controlling-the-cost-of-controlling-the-climate-the-irish-governments-climate-change

allowances from the market over time (the 'cap'). The system is designed to limit emissions towards an ultimate target while permitting companies to make their own decisions along the way, incentivised to control emissions through fuel and technology choices. If the price of emissions in the secondary market rose steadily over time towards levels consistent with climate stabilisation, firms would have incentives also to avoid investment in assets likely to be stranded. Europe is responsible for about 11% of world emissions, so a successful policy would ideally require all other significant countries, notably China and the USA, the largest and second-largest emitters, to achieve similar levels of carbon charging. These three large economic units, China, the USA, and the EU, have been responsible recently for about 55% of total worldwide emissions.

Estimates of the ultimate price to be placed on carbon (and equivalent greenhouse gases) have been computed and there is an extensive literature on the matter. Figures in the range €80 to €100 per tonne are often cited and the necessary ultimate figure could be higher. The ETS has been criticised on the grounds that there has been an excess of allowances in the market in recent years, resulting in a price that is too low, and that the price has been unstable, failing to provide a clear signal to those planning technology investments.

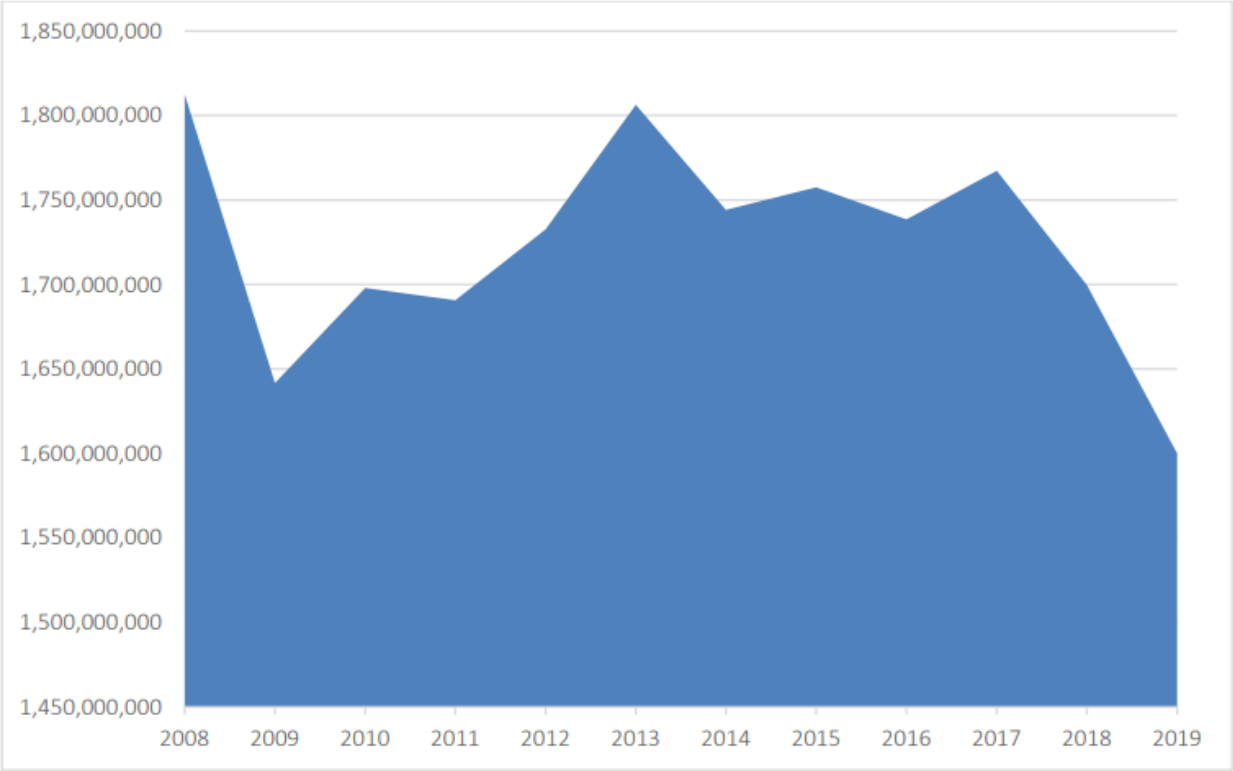
An uncertain future path for the carbon price makes the return on investment uncertain, in contrast to the alternative to cap-and-trade, a straightforward tax on carbon emissions designed to increase predictably over time. The history of the traded emissions price, in € per tonne, in the ETS is shown in the chart.

Chart 2.1: The Price of Emissions Traded under the ETS, € per tonne.

Source: Reuters

Prices have only recently re-attained the level which prevailed prior to the financial crash. Moreover, the price has been unstable. Investors who committed to expensive carbon-saving technologies at €30 per tonne before the financial crash will have regretted their decisions. The ETS has not delivered the predictable and steady rise in the real carbon price recommended by economists thirty and more years ago as the best signal to potential investors in carbon-saving technologies. Nor has the system delivered substantial emission reduction in the sectors covered – the decline after the financial crash was fully reversed by 2013, the supply of permits facilitating the price decline evident in Chart 2.1 and encouraging the resurgence in demand.

Chart 2.1: Emissions in the ETS Sector, 2008 to 2019.



Source: EU Transaction Log.

The COVID crisis has depressed electricity demand and industrial output in the first half of 2020, resulting in another price decline and renewed volatility – the closing price for the three-month contract on May 7th was €19.52. Since the COVID crisis became a major concern in February, this contract has ranged from a high of €25.82 to a low of €14.88.

Chart 2.3: The Price of Three-Month Emissions Futures.

As recently as August 2017 the five-year contract had traded for several years below €5 per tonne, a fraction of the price estimated to be the shadow cost of carbon emissions decades earlier. In Ireland, since the budget of October 2019, the carbon tax was increased from €20 to €26, a figure acknowledged as a step towards an ultimate figure of €80 to €100 or even more. Cap-and-trade systems where quantity rather than price is fixed by policy can give rise to instability of this type and the theoretical issues were first raised in a widely-cited journal article by the American economist, the late Martin Weitzman, as long ago as 1974.[8]

Economists have long drawn attention to a series of arguments favouring a carbon tax over the cap-and-trade model chosen by the EU.[9] Carbon tax rates are predictable, encouraging investment in carbon-saving technology. There is no need for the allocation of emission permits to existing industries and hence no scope for political favouritism or for the inhibition of new entrants. There are fewer opportunities for corruption.

Most importantly a carbon tax, if adopted by all economically significant countries, would diminish demand for carbon-intensive goods and services everywhere and would leave the allocation of

[8] Prices vs. Quantities, Martin L. Weitzman, The Review of Economic Studies, Vol. 41, No. 4 (October 1974), pp. 477-491.

[9] Nordhaus, W. D. (2008), A Question of Balance: Weighing the Options on Global Warming Policies, New Haven, CT, Yale University Press.

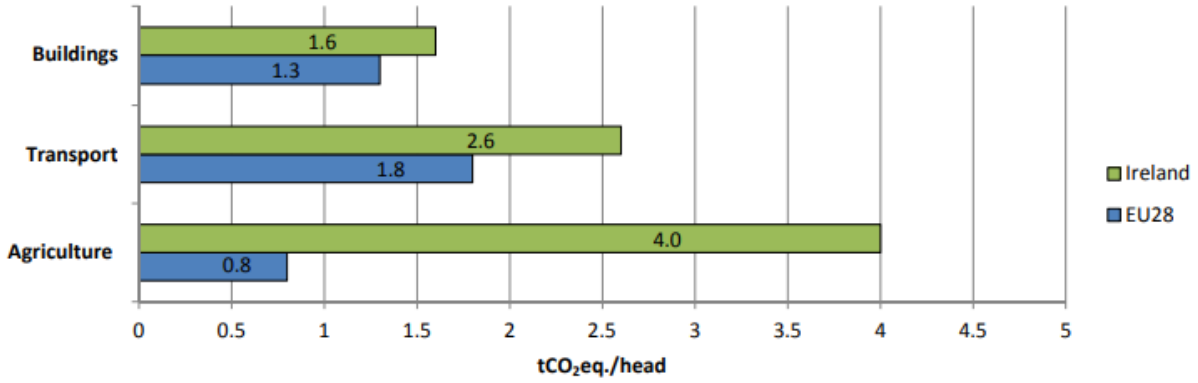
production to play out through international trade and comparative advantage. Enterprise-based allocations of allowances cannot readily accommodate the efficient international division of economic activity.

European Union Policy – National Emission Targets

For the 55% of emissions arising across Europe outside the ETS sectors, in areas such as transport, heating and ventilation of buildings, and agriculture, the EU has pursued a policy of national targets for each member state. The ETS targets are pan-European and, at least in principle, the ETS does not discriminate between member states. The non-ETS sector, where emission reduction is to be attained through quantified national targets, has great potential to disfavour those states most exposed to the process of target selection. Ireland is one of those states – only 29% of Irish emissions are in the pan-European ETS, with 71% covered by the allocated national target.

The high share of non-ETS emissions in the Irish total is illustrated in this chart from the CAP document.

Figure 2.1 Ireland's Non-ETS Sector CO_2 eq. Emissions per head Compared to the EU, 2016



Irish emissions for buildings and transport, measured on a consumption basis, are somewhat above the EU average. But the main explanation for Ireland's status as an outlier in the EU is the figure for agriculture. Agricultural emissions are measured on a production basis, and most Irish food output is exported to Europe and around the world. On a consumption basis, per capita emissions in all categories, in Ireland and in other high-income EU countries, are likely to exceed the European average. For buildings and transport, Irish people are responsible, as consumers, for 1.1 tonnes of 'extra' emissions per annum, or 35% above the EU per capita average of 3.1 tonnes. But the excess for agriculture, this time measured on a production basis, is three times the combined excess for buildings

and transport at 3.2 tonnes. Irish people are responsible, on the figures as measured according to the EU methodology, for five times the EU average per capita emissions from the farm sector.

Most of the apparent excess of per capita emissions in Ireland arise from the treatment of agriculture, which is measured on a production basis, thus including emissions which relate to consumption elsewhere in Europe and beyond. This calculation, regularly reproduced without reference to the method of measurement in official documents and media commentary, is no more than a confirmation that Ireland is a successful producer of farm produce. The country has a low population density, advantages of climate including rainfall, plentiful productive farmland and hence an agricultural surplus exported to countries whose endowment of soil and climate are less favourable to agricultural production.

The EU policy of national targets for the non-ETS sectors, of which there have been several iterations, has attracted criticism on the grounds that base-years are arbitrary, the selection of targets is unsystematic, and the measurement of emissions is a mish-mash of production-based and demand-based methodologies. The crucial weakness is the territorial basis of the chosen targets. The economist Dieter Helm, noting recently that the COVID pandemic brings only a temporary pause to emissions growth, puts it thus:

'The key flaw in the EU and UK net zero ambitions - which the pause should be used to address - is the focus on unilateral territorial production targets. The flaw results in raising the incentive to switch from home production to imports of high carbon intensive goods and services. The correct target if the aim is to cease being a cause of global warming, is consumption, not production. It is simply not true, as the UK Climate Change Committee claims in its 2019 Net Zero Report, that: "By reducing emissions produced in the UK to zero, we also end our contribution to rising global temperatures".' [10]

The national emission targets which provide the point of departure for the Irish government's Climate Action Plan are subject to the same criticism. It is true that if all countries achieve net zero on a production basis then the world achieves net zero. But that is also true if every country achieved net zero on a consumption basis, and it is not even necessary that every country reach net zero on any basis, only that the planet should do so. Indeed, it is highly improbable that an optimal worldwide allocation of a net zero planetary target would imply net zero in each of the world's approximately 200 national territories. While the Kyoto and successor international accords, culminating in the Paris Agreement ratified in October 2016, specify national emission targets, they are voluntary and unenforceable. Countries can ignore the targets or withdraw from the agreement, as the USA has done. The EU targets are binding on member states who cannot withdraw *a la carte* from EU policies, and there are penalties for non-compliance.

The EU's targets are calculated relative to a base year, originally to base 1990. Voluntary target-setting in Kyoto and successor worldwide agreements has followed the same template. Whatever year is

[10] http://www.dieterhelm.co.uk/energy/climate-change/climate-change-has-not-gone-away-cop26-net-zero-and-the-coronavirus/

chosen, subsequent fortuitous events will render the targets sub-optimal. Russia saw a steep recession through the 1990s after the collapse of the Soviet Union while China enjoyed an unprecedented boom.

Russia easily met its reduction obligations while Chinese emissions grew rapidly. Not surprisingly countries have felt that these targets, relative to a distant base year, are not binding when circumstances change as they invariably do over the time-horizon of plans lasting a decade and more. Fast-growing economies have undershot their commitments while countries suffering economic setbacks have claimed credit for unearned emission reductions. Any policy of quantitative reduction targets is arbitrary in this sense. The 1995 Kyoto agreement and its influence on the design of EU policy attracted this criticism in the 2008 ESRI McCarthy and Scott report:[11]

'…..any base-year approach penalises fast-growing economies and those which were energy-efficient in the base-year. It benefits slow-growth economies, thus encouraging a spatial misallocation of economic activity, and rewarding those, such as Russia, which were energy-inefficient in the base-year. This partly explains why Russia joined and the USA did not. By contrast tax-based policies avoid the need for quantitative baselines altogether.'

The same report notes that the constancy of percentage reduction targets over any long period can also lead to sub-optimal outcomes: least-cost technologies become available discontinuously and the best path for ultimate reductions may involve unequal annual emission cuts, an important consideration with the deployment of new technologies such as electric road vehicles.

The European Commission has powers to impose penalties for non-compliance, so the process of target-setting has serious potential consequences. That process has been opaque, and it is not clear that cost-minimisation, at national or European level, has been the driving concern. The measurement of each member-state's emissions has also been the target of criticism. Some of the non-ETS emissions are measured by consumption, some by production, and the methodology of measurement has not been favourable to some members, including Ireland. The production-side measurement of emissions in sectors such as agriculture involves a potentially perverse attribution of responsibility for emission reduction and conflicts with both efficiency and fairness.

Ireland's Emission Reduction Targets

Data from the Environmental Protection Agency[12] show adverse recent trends in Ireland's emissions in the non-ETS sector, the largest portion, whose reduction under the EU's Effort Sharing Regulation (ESR)

[11] https://www.esri.ie/publications/controlling-the-cost-of-controlling-the-climate-the-irish-governments-climate-change

[12] https://www.epa.ie/ghg/currentsituation/

is a national responsibility and the focus of public policy in each member state. Emissions in the ETS sector, while an EU-wide rather than a national policy target, are relevant indirectly, in that rising ETS emissions can inhibit the feasibility of compliance in the non-ETS sector or can increase the costs of compliance.

Any cumulative failure to meet non-ETS targets by specified dates such as 2020 and 2030 triggers financial penalties for the transgressing EU member.

Chart 2.3: Actual and Target non-ETS Emissions, Ireland.

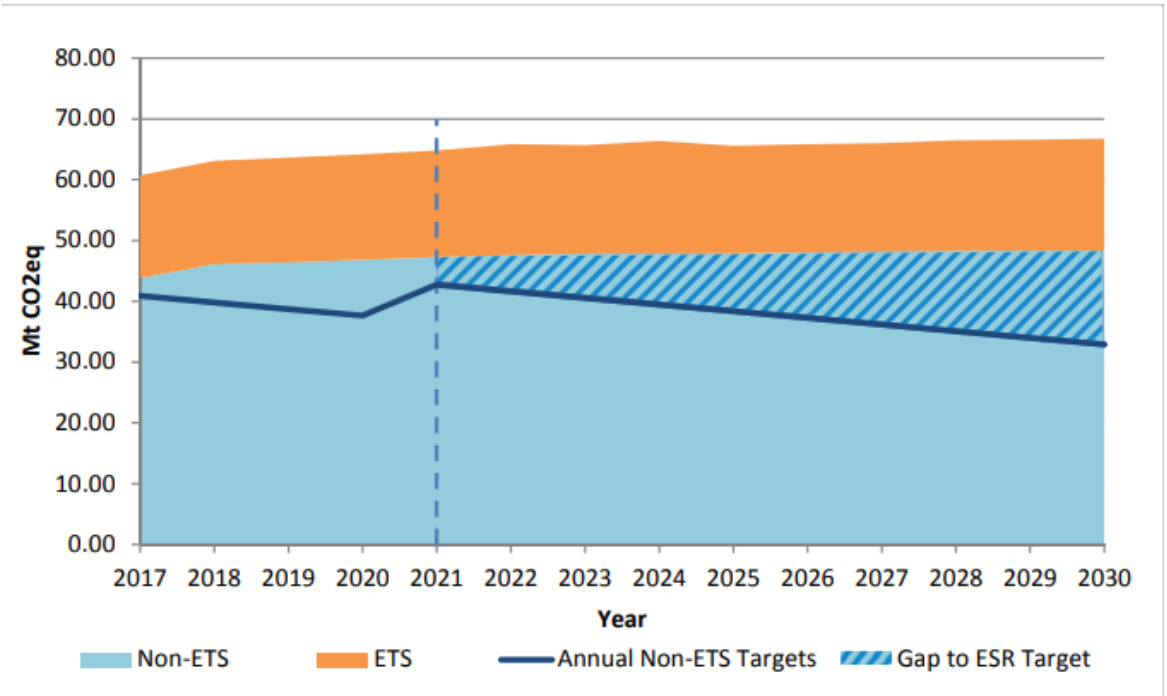
	2013	2014	2015	2016	2017	2018	2019	2020	
Total ESD emissions	42,206.8	41,663.0	43,037.2	43,798.2	43,828.7	44,974.0	0.0	0.0	**kt CO2eq**
EU ESD Targets	46,891.9	45,760.9	44,629.9	43,498.9	40,885.1	39,807.1	38,729.2	37,651.3	**kt CO2eq**
Distance to target (= F-G)	-4,685.1	-4,097.9	-1,592.7	299.3	2,943.7	5,166.8			

Targets are cumulative: a state which exceeds the ceiling for a given year must reduce emissions faster in later years to avoid penalties. Non-ETS emissions in Ireland were below target in the three years 2013, 2014 and 2015 during recovery from the financial crash but have exceeded target by increasing amounts in 2016, 2017 and 2018. It is expected that 2019 will have seen a further overshoot – the data are not yet available – but emissions will likely have fallen again in 2020 due to the COVID shutdown of economic activity.

The CAP, released in July 2019, pre-dates the shutdown and identified a likely failure to meet both 2020 and 2030 non-ETS emission ceilings. The excess for 2020 will now be lower (bear in mind that it is the cumulative figure which matters, not just the once-off annual figure for 2020) but the projected growth in emissions to 2030, and consequent overshoot, could nonetheless materialise with post-COVID recovery.

The next chart is also taken from the CAP document and compares projected emissions to the EU target in the dominant non-ETS sector – projected emissions in the ETS sector do not have to meet a national-level target.

Figure 2.4 Ireland's Projected ETS and non-ETS Emissions and Annual Targets



From 2021 Ireland's emissions from the non-ETS sector, a higher portion of the total than elsewhere in the EU, are required to decline substantially to 2030. A steady increase is instead projected, resulting in a growing overshoot and a compliance requirement for remedial action. The emissions in the ETS sector are also expected to rise, despite ambitious plans for renewables to achieve further displacement of high-carbon sources in power generation.

The CAP translates these projections of excess emissions into the overall cut needed in the non-ETS sector. No domestic response is required to the projected growth in ETS emissions – the rise in this sector (power generation and heavy industry) is seen as taking care of itself, a European rather than an Irish concern. The CAP states:

'..... over the entire 2013 to 2020 period Ireland is projected to cumulatively exceed its compliance obligations by between 16.3 MtCO2eq. and 17 MtCO2eq. Some of these have already been acquired.'

Since the 2020 excess will be reduced by the COVID downturn, the amount of allowances to be purchased by Ireland to cover past overshoots will be less than had been feared and neither the quantity nor the price of allowances already purchased to cover the gap is publicly available.

The Selection of Measures Proposed in the Climate Action Plan

The CAP identifies measures under a range of headings designed to accelerate emission reduction, additional to those which would have arisen as the National Development Plan (NDP) unfolded. These measures were intended to secure a reduction in Ireland's projected non-ETS emissions, but it would have fallen short of the EU targets.

Table 3.2 Non-ETS Cumulative Compliance Gap Estimates under Different Scenarios

	Carbon Budget	Compliance Gap
Effort Sharing Regulation (ESR) Ceiling	378.3 Mt	-
Projected Emissions (Pre-NDP)	479.9 Mt	101.6 Mt
Contribution of Project Ireland 2040 NDP Measures	- 16.4 Mt	85.2 Mt
Contribution of LULUCF	- 26.8 Mt	58.4 Mt
Additional Abatement Effort Required	- 58.4 Mt	0 Mt

In the discussions about government formation between the Fianna Fáil, Fine Gael and Green parties, the annual target for emission reduction in Ireland, which corresponds to the non-ETS figure, was became an issue, with reports that the Greens favoured the annual 7% reduction finally adopted while a reduction of 2% was envisaged in the CAP. There is a big difference over a ten-year time horizon – if 2020 non-ETS emissions turn out to be around the 2018 figure of 45 million tonnes, a decade of 2% annual decline would yield a 2030 figure of 37 million, an 18% cumulative cut, but an annual reduction at 7% would reduce emissions by 52% to just 22 million. While the measures identified in the CAP would not be adequate to achieve the 7% annual reduction, there are grounds for concern about the cost, feasibility and efficiency, including carbon efficiency, of the measures now included in the draft Programme for Government.

The principal driver of the measures selected in the CAP is a report from the consultants McKinsey for the Department of Communications, Climate Action and Environment. A passage on page 31 proclaims:

'This Plan identifies the pathways that will create the least burden, while also offering the most long-term opportunities and benefits' and elsewhere states:

'An important factor in choosing policies to deliver the 2% per annum reduction is a realisation that in the period between 2030 and 2050, a much steeper decline of 7% per annum will have to be achieved based on achieving a minimum 80% emissions reduction by 2050, relative to 1990. One important implication of this for the period to 2030 is to ensure that all investment choices make sense in terms of decarbonising by 2050, and we avoid creating stranded assets by choosing what may appear to be cheaper options in terms of our 2030 decarbonisation goal.'

The full report from McKinsey (MACC) has not been released – only a slide presentation of its findings from the Department, lacking technical detail, has been made available. Some aspects of the CAP appear not to be fully aligned with the summary McKinsey findings and we consider this aspect in Chapter 6. It is not possible, without access to the full McKinsey document, to assess whether the measures chosen in the CAP are likely to yield the targeted emission reductions at least-cost. In several important sectors there are reasons for doubting whether this is the case. Moreover, there are doubts whether certain of the key policies are capable of implementation as envisaged. The Climate Action Plan includes elements which may not be desirable, may not be feasible, or both. Three components of the CAP illustrate these concerns, the proposals for electricity, transport, and agriculture.

Electricity Generation and Transmission in the CAP

The unpublished report from McKinsey is claimed, in the CAP, to have located least-cost pathways to the emission reduction targets. However, the CAP document admits, on page 34, that:

'The MACC does not address the cost of enabling infrastructure (e.g. the Electric Vehicle (EV) charging network, and the electricity infrastructure such as offshore wind connections, transmission and distribution, and system services), or other barriers to change. Much of this enabling infrastructure is already required to support current decarbonisation targets and has already been identified in Project Ireland 2040. In addition, the cost of infrastructure does not grow in line with increasing decarbonisation ambition. Furthermore, sensitivity analysis, conducted in preparation of the MACC and targets, confirms that the same scale and pace of technology deployment would be required for targets under this plan even if the cost of infrastructure was added to the cost of the relevant technologies.'

In the absence of detailed costings, it is impossible to evaluate the credibility of these assertions. A report[13] released in March 2020 by the Irish Academy of Engineering estimated that the investment bill for the ETS sector, including generation, transmission and distribution capital costs, would reach €20 billion, some of which would be private investment in renewables and some would be investment by the state companies Eirgrid and ESB Networks, the cost of which would be postalised across all electricity consumers. Aside from direct support via the REFIT price guarantee scheme, being replaced by an auction system, renewables generators enjoy a cross-subsidy from electricity consumers through below-cost charges for network augmentation occasioned by their developments.

[13] http://iae.ie/publications/ideas-for-programme-for-government/

The strong growth in the requirement for electricity network investment is driven largely by two factors, the 70% target for the share of renewables in the generation mix and the planned growth in the facilitation of data centres in Ireland. Extra onshore and offshore wind and solar farms will require extensive provision of high voltage transmission lines and interconnectors, as will supply to data centres, major gobblers of electricity which have been accommodated to a surprising extent in Ireland. The capacity of the data centres already here exceeds substantially any demand arising in Ireland, so the country has chosen to become an exporter of data management and hence of electricity, the main input. It is not explained in the CAP why such a large proportion of Europe's demand for data management has chosen Ireland. In the ordinary course of events it would be expected that northern European countries would enjoy a large share of data centre provision, since temperature control is more readily facilitated. But the decisions to locate in Ireland on such an extraordinary scale (29% of power demand is expected by Eirgrid to come from data centres within a few years) may also have their motivation in the failure to require full costs, including infrastructure costs, from the data centre companies.

If there is any overall constraint on the construction of windfarms and solar generation facilities, their contracted supplies to data centres, a feature of the public communications strategy of several data centre operators, diminishes the availability of low-carbon power to the non-ETS sector. The extensive Irish commitment to data centres could have a cost to consumers generally, through penalties for non-compliance with national targets or extra costs of non-ETS emission reduction.

The CAP commits to an ambitious target for renewable penetration in the power generation sector and Ireland's current substantial fleet of windfarms has been assembled at considerable cost in support payments whose burden falls on electricity customers. Economists have drawn attention repeatedly to the so-called 'waterbed effect', which they regard as a design flaw in European policy, see Pahle et al (2018).[14] When someone sits on a waterbed, depressing its height at that location, the water goes somewhere else, raising the height at another point. So it is with the ETS: a country which expands renewables will have spare allowances and these will be traded away to emitters elsewhere. An efficient ETS system with a declining overall Europe-wide emission ceiling would adequately incentivise low-carbon technologies without ad hoc subsidy schemes, it is argued. On this view, exceptional effort to expand renewable power in countries like Ireland facilitates the retention of coal-fired capacity in Poland and Germany, without any beneficial impact on overall European emissions.

Cost is not the only concern with the CAP targets for the electricity industry. The enormous roll-out of windfarms and solar units envisaged will necessitate a major programme of upgrading to the transmission network. The construction of new high-voltage lines in Ireland has been controversial and no new lines have been completed in recent times. The interconnector with Northern Ireland, planned almost twenty years ago, has finally received clearance after a Supreme Court appeal in the Republic but has faced delays in Northern Ireland and construction has yet to commence. The onshore transformer station for the Ireland-France interconnector in county Cork is being opposed vigorously by residents' groups and there is active community opposition to many other projects around the country.

[14] https://www.strommarkttreffen.org/2018-04_Pahle_Preserving_the_environmental_integrity_of_EU_ETS.pdf

The Proposals for Transport

The central proposal is to 'Accelerate the take up of EV cars and vans so that we reach 100% of all new cars and vans being EVs by 2030. This will enable achieving our target of 950,000 EVs on the road by 2030. This means approximately one third of all vehicles sold during the decade will be Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV)'. Only zero emission vehicles would be available for sale after 2030.

Motor industry experts are doubtful that any widespread take-up of electric cars is feasible in the years immediately ahead. Even with the €5,000 grant and remission of vehicle registration tax, electric cars are not price competitive and manufacturers' prices are unlikely to fall significantly until production at scale becomes feasible. This may not happen until the mid-2020s and the intermediate CAP target of 180,000 on the road by 2025 is optimistic. At present the Tesla 3, a popular model in Ireland, costs €47,000 for the basic version, after subsidies. The volume new car market is located at a price point closer to €30,000.

The availability of fast chargers around the country is a serious constraint on take-up. The grant to the ESB of €10 million from the Climate Action Fund[15] last year will finance fast chargers at a total of 140 locations, which compares to 1,500 filling stations nationwide for petrol and diesel. Fast chargers can deliver about 100 kilometres of driving range in six minutes, according to the ESB. Until this level of service reaches availability comparable to the filling station network, the attractions of electric vehicles for non-urban drivers will be limited.

Vehicle registration data by county is a poor indicator of the geographical spread of car ownership and use – buyers in some rural counties, as well as fleets, often opt for a D (Dublin) registration number, distorting the figures. But data is available from CSO on car kilometres travelled by county and the Sustainable Energy Authority of Ireland has kindly provided data on the take-up by county of the €600 grant for home chargers. The pattern is as shown in the table.

[15] https://www.dccae.gov.ie/en-ie/news-and-media/publications/Documents/38/Low_Emission_Vehicle_Taskforce-Phase2Report.pdf

Table 2.1: Electric Car Ownership and Annual Kilometres by County.

County	Electric Car Ownership- % of National Total	Annual Car Kilometres- % of National Total
Dublin	37.5	21.3
Kildare	6.7	4.9
Meath	6.0	4.2
Wicklow	5.4	3.2
All Others	44.4	62.2
Total	100.0	100.0
East Region	55.6	37.7

Sources: CSO, SEAI

The take-up of electric cars in Ireland has been limited but has also been in the wrong places – average kilometres driven per car in Dublin is only 68% of the figure for Leitrim, whose drivers do the highest annual total. Moreover, Dublin has a low car ownership rate – the central area and inner suburbs have the lowest car ownership rate in Ireland. As a result, Dublin's share of national car kilometres is only 21.3%. The East region (Dublin plus the adjoining counties of Meath, Kildare, and Wicklow) has 55.6% of the country's electric cars but accounts for just 37.7% of national car kilometres. In terms of bang-for-a-buck, the subsidies to electric car purchasers are bad value – the high-mileage motorist in Leitrim or Roscommon is the best target, but the uptake in rural counties is much lower than in Dublin.

There is a chicken and egg problem – fast chargers have substantial capital cost but will deliver little revenue until electric cars are widely adopted. Adoption is inhibited by the current sparse coverage and rolling out a loss-making network is unattractive to commercial operators. One option, not considered in the CAP, would be to encourage ESB to roll out a fast charger network ahead of demand in the rural counties, recovering the losses through a regulated addition to electricity bills. There is a commitment to review policy in the draft Programme for Government just released.

If the electric car targets are unrealistic, the practical option for the years immediately ahead is the re-casting of motoring taxes in a manner designed to encourage fleet replacement with more fuel-efficient petrol and diesel models.

Agriculture in the Climate Action Plan

Ambitious targets have been set for the reduction of emissions in agriculture based on the perception that agriculture's share in total Irish emissions is unusually large, which as we have seen reflects the production-side measurement methodology. It is also based in part on the recent increase in the national herd and there have been suggestions that a lower herd might eventually become a policy objective. As with other elements in the CAP, it is not clear that the measures for agriculture will deliver least-cost emission reductions either at Irish or European level.

The EU system of milk quotas was abolished from April 2015. Prior to this date farmers had to constrain milk output to an allocated figure. The quota system had arisen initially to curb excess production enabled by intervention at politically determined prices, resulting in butter mountains, wine lakes and ultimately extensive reforms in agricultural policy. The quota abolition made it feasible for the more efficient farmers to expand production and the biggest beneficiary has been Ireland.

The EU Milk Observatory provides data[16] which permit analysis of the pattern of response to quota abolition. For the EU-28, output of cows' milk has grown at 1.3% per annum or by 5.5% over the period from the final quota year of 2014 to 2018, the most recent year for which the figures are available.

In Germany, France, Italy and the United Kingdom, four large countries which between them had been producing about 55% of the European total, the quota abolition has had little effect. There has been a significant increase in two medium-sized producers, Poland and the Netherlands, but the stand-out dairy sector has been Ireland, which has overtaken Spain with a 35% output increase in just four years.

The implication is that the quota system was holding back production in Ireland. Since the intention of the reform was to remove the quantity constraint and rely instead on market forces to re-allocate activity, the new allocation must be assumed to reflect superior economic efficiencies in those countries where output has increased fastest.

[16] https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/eu-dairy-historical-production-stocks-series_en.pdf

Table 2.2: Output of Cows' Milk in 1,000 tonnes.

Country	Output in 2014	Output in 2018	% Change
Germany	31375	32491	+3.6
France	25276	24589	-2.7
United Kingdom	14829	15188	+2.4
Italy	10500	10650	+1.4
Netherlands	12473	13881	+11.3
Poland	10603	11953	+12.7
Ireland	5801	7813	+34.7
Spain	6647	7117	+7.1
Rest of the EU	30344	32309	+6.5
Total EU-28	147848	155991	+5.5

Source: EU Milk Observatory

Any policy to restrict herd numbers in countries where output has risen significantly amounts to a reversal of quota abolition, leading to a re-allocation back to the less efficient producers, for example a decline in Ireland encouraging increased output in Spain. The alternatives, such as consumer taxes on products, would reinforce the trend towards an efficient geographical distribution of European production, an objective of the reforms to the Common Agricultural Policy.

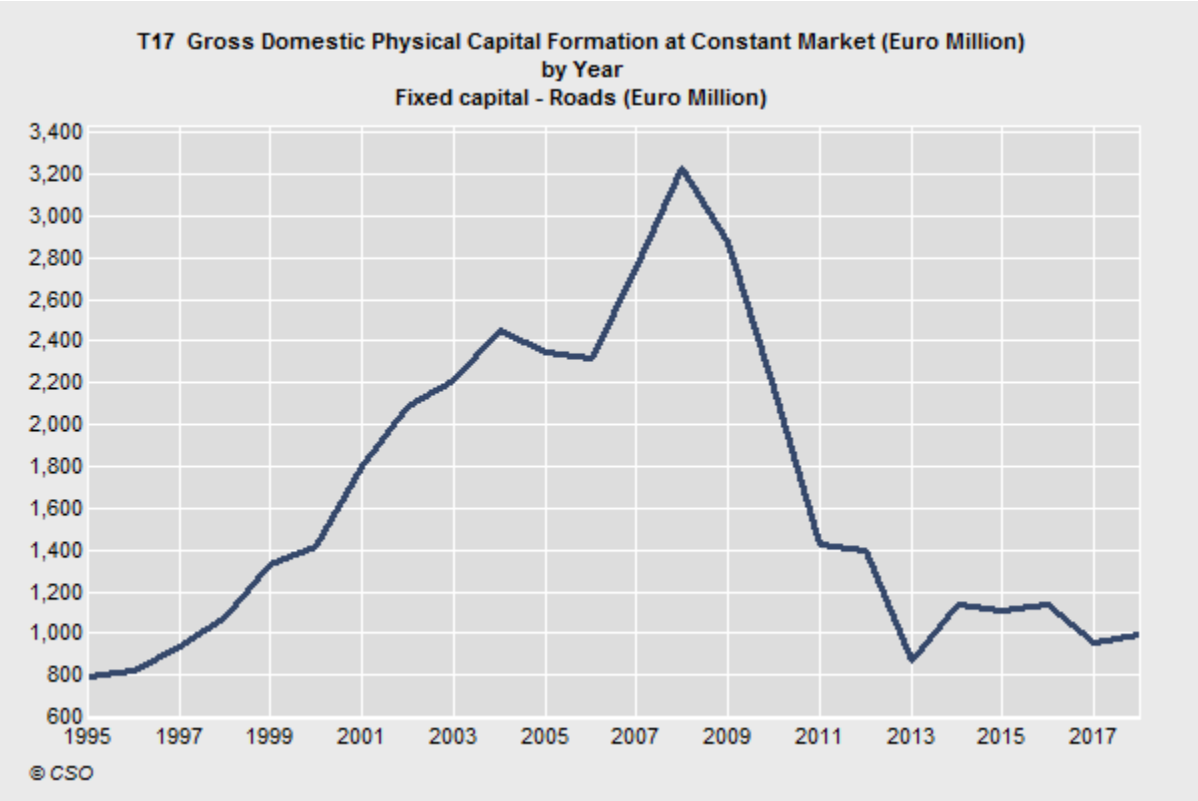
Chapter 3: Direct and Indirect Costs of Road Use in Ireland

The main components in the direct costs imposed by road users are new capital expenditures, depreciation of the network, disregarding whether it is matched by road maintenance expenditure, and the costs of traffic policing including the court and prison systems. The main indirect costs are carbon emissions, the impact on air quality and the externality costs imposed on other users when there is no market in road capacity, that is, no congestion charging regime.

In this and the following chapters an attempt is made to assess whether the aggregate payments made by road users in taxes and charges are adequate to meet these direct and indirect costs. The main conclusions are that state revenues appear to exceed direct state spending but that significant indirect costs, especially congestion and air quality costs, are not well addressed in the current design of Ireland's system of taxes and charges. The carbon tax component in fuel taxes may also understate the full shadow cost, offsetting the apparent high level of excise.

Estimating the Direct Costs of Road Use

The chart shows the extreme volatility of capital investment in the road system in recent times.



No recent estimate of direct Exchequer costs attributable to road users is available. CSO data give 'capital consumption' for 2018 at €1124 million at 2017 prices, to which must be added the capital (but not the maintenance, to avoid double-counting) devoted annually to new road construction and other forms of capacity expansion financed by the Exchequer. The Appropriation Accounts give a capital spend for 2020 estimated at €1093 million. It is clear from the chart that spending has been at an unusually low level in recent years, just as it was unusually high during the bubble period leading up to the financial crash. A figure around €1600 million would be a reasonable estimate for a 'normal' year.

The capital consumption figure is a depreciation concept and a cost regardless of whether it is met annually by maintenance spending from central and local government. Maintenance spending has been criticised as inadequate recently by motoring organisations but the CSO figure is an 'incurred' figure and is unaffected by year-to-year fluctuations.

Adding the capital formation figure to capital consumption requires justification. To the extent that newly built road schemes deliver improved journey times and a better product to users, they are a cost over and above the depreciation of the pre-existing stock of roads and should be remunerated by the beneficiaries.

According to the Appropriation Accounts, total spending on An Garda Síochána, the Courts Service and the prisons in 2020 will be €2372 million. There are also some overheads to allocate from the administrative budget of the Department of Justice. A portion of these items should be regarded as a cost arising from road users and included in our calculations. No formal study attributing these costs amongst different economic and social sectors appears to be available. The biggest component is the Garda, €1783 million out of the €2372 million total, or three quarters. The traffic policing unit has a complement of around 1,000 out of a total strength of around 14,000 but it is known that Gardaí outside this unit also devote a portion of their time to traffic-related duties. As a very crude estimate 20% of the aggregate spend on policing, courts and prisons has been allocated to roads and traffic, say €500 million, to give the following picture on direct costs:

Table 3.1: Rough Estimates of Direct Costs Imposed by Road Users for 2020, € million.

Capital Consumption	1200
Capital Formation	1600
Policing	500
Total	3300

Source: see text

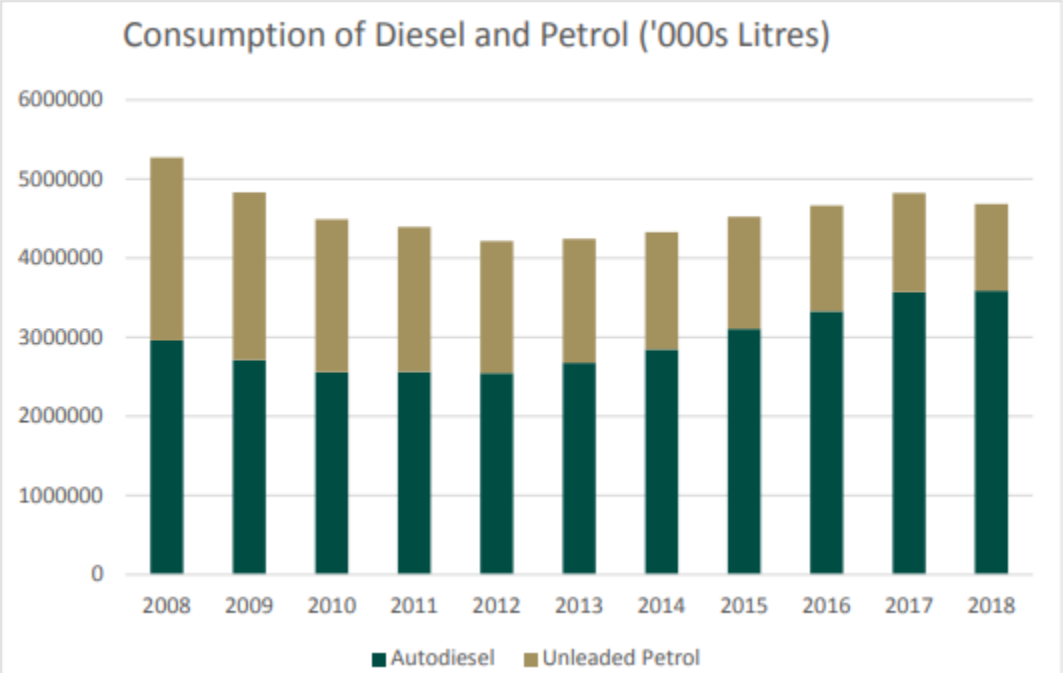
Clearly these figures need to be refined. The total of these identified direct costs falls short of the €6 billion or so paid by road users in total taxes and charges. However, these are only the direct costs.

Estimating the Indirect Costs of Road Use

There are three principal elements in the indirect costs imposed from a kilometre of road travel. These are emissions of carbon dioxide and other greenhouse gases; low-level emissions, especially those affecting air quality; and congestion, in the form of delays occasioned to other road users in places and at times of capacity inadequacy. This is not an exhaustive list – road travel can create nuisance through visual intrusion and noise for example. For tax system design, these three are the most salient.

Current unease about the role of road transport in climate change reflects the presumption that the indirect carbon cost is being under-collected. Notwithstanding the level of excise on petrol and diesel, and the carbon charge, the efforts by governments to reduce emissions from road travel is evidence that policymakers regard the current taxes as falling short of the necessary shadow price that might be imposed on carbon emissions from internal combustion engines.

The current carbon charge in Ireland is €26 per tonne carbon. Climate campaigners have argued that recent increases in the carbon charge have been too timid and there have been calls for a charge of €100 and more. If petrol and diesel faced carbon charges at the €100 per tonne level, adding about 15 cents to the retail price per litre, annual revenue would increase by up to €800 million. If €100 per tonne is the 'correct' price for carbon, there is under-recovery of up to €800 million per annum.



Source: Tax Strategy Group 2019

The switch to diesel in the car fleet has been a notable feature of Irish transport in recent years. The non-carbon emissions from diesel have begun to stimulate regulatory interventions to discourage the trend in several countries. It was noted earlier that some European countries have discontinued the discount on

diesel excise and calculations by the Tax Strategy Group suggest that equalisation would enhance revenue by roughly €400 million per annum. This too can be regarded as a component, additional to the carbon charge calculation, of under-recovery of indirect costs.

	UNLEADED	DIESEL[1]
Price without tax (€/l)	47.28	54.08
Excise duty, petrol (duty 54.18; carbon tax 4.59; levy 2.00) Excise duty, diesel (duty 42.57; carbon tax 5.33; levy 2.00)	60.77	49.90
VAT (23%) on product price and excise duty	24.85	23.92
Total taxes	85.62	73.82
Price at the pump	**132.90**	**127.90**

Source: ACEA

But even in countries, such as the United Kingdom, where diesel and petrol excise have been equalised, further interventions are under way to reduce diesel usage in cities, including a differential against diesel in the cordon charge in London. Other cities are seeking diesel-free zones in central areas and Dublin, through the ban on heavy trucks, which are accommodated in the Port Tunnel for free, has sought to reduce city centre diesel combustion through regulatory action. The Dublin Port Company has acted to ban docked cruise liners from generating on-board power, requiring them to hook up to the distribution network while in port. There is damage to air quality in towns and cities around Ireland from road traffic, but it appears that there is a special issue around diesel and Dublin. The uniformity of diesel taxation around the country prevents differential penalisation of location-specific externalities.

No estimate of the unrecovered social cost of diesel traffic in Irish cities appears to be available and the figure of €400 million arising from excise duty equalisation may be a substantial under-estimate. The two figures combined suggest that there is under-recovery of around €1200 million for these two components of indirect costs, a figure which may be conservative. If added to the first three elements of direct costs, capital consumption, capital investment and policing, the running total would be €4.5 billion, not far short of the amounts actually collected from motorists which we will suggest in the next chapter are about €6 billion per annum.

The final component of indirect costs is traffic congestion, largely un-recovered in countries around the world. Technologies to facilitate electronic road pricing, including congestion charging, are available and capable of early implementation. The absence of congestion charging means that scarce road space is rationed by queuing rather than by an efficient market in road space, in contrast to the more efficient allocation of parking space, public and private, which has proven acceptable to the public in Irish towns as well as in cities, since it was introduced in Dublin in the 1960s.

Estimating the social costs of traffic congestion in Ireland is a major undertaking. There is substantial peak-hour congestion in and around Dublin and in the other cities but also in towns and, at times, on portions of the inter-urban road network.

The only estimate available comes in a July 2017 report from the IGEES (Irish Government Economic and Evaluation Service) team at the Department of Transport and relates to the Dublin area only[17]. They concluded:

"The analysis undertaken for this report suggests estimates the cost of time lost due to aggravated congestion is €358 million in the base year (2012). This is forecasted to rise to €2.08 billion per year in 2033. The annual cost is forecasted to grow moderately up until at least 2025 but will begin to increase sharply after that."

This 2012 figure is for Dublin alone and includes only the cost of time lost. The IGEES authors conclude:

"The analysis only estimates the value of the time lost due to aggravated congestion. It does not include, for example, the impacts of aggravated congestion on journey quality as a result of driving on more congested roads or travelling via more crowded public transport, increased fuel consumption and other vehicle operating costs, or increases in vehicle emissions. Congestion also has an impact on the wider economy, and Ireland's competitiveness. All else equal, high levels of congestion will reduce the attractiveness of a location to work and live in, as well as directly affecting the cost of transporting goods and services. These costs are not captured by this study, and as such, the total costs of aggravated congestion are likely to be higher than those estimated in this report."

Traffic growth since 2012 in Dublin must have increased the IGEES estimate to €500 million at least and when allowance is made for congestion outside Dublin the national figure would be higher again. Costs of congestion other than the value of time lost are set at zero, so the full picture for the current level of costs nationally could well exceed €1 billion. The total of direct and indirect costs may thus be close to the annual revenue of €6 billion. It is appreciated that some of the figures are sketchy and indicators of orders of magnitude only, but the implication is clear – the overall level of taxes and charges on motoring is roughly in line with direct and indirect costs. The composition of taxes and charges is another matter and it will be argued in later chapters that the current pattern of taxes and charges is unsustainable.

[17] https://assets.gov.ie/13615/110debccab3346aa9a6f871f0ae660d9.pdf

Chapter 4: Revenue from Taxes and Charges on Motoring in Ireland

In European countries the main revenue source, aside from fuel taxes, is the imposition of taxes, additional to VAT, on purchases of road vehicles, and the imposition of annual ownership or 'circulation' taxes. Some countries have no acquisition taxes additional to VAT and for the majority that do, the rates vary widely, as do the annual ownership or circulation taxes.

VAT on new car purchases can, on one view, be ignored altogether, on the grounds that it is a broad tax on retail spending in general, for the benefit of the Exchequer, rather than a contribution from users to the direct or indirect costs of the road system. All the popular consumer durables (televisions, kitchen appliances, mobile phones) are liable to VAT, so VAT on cars is not really a tax targeted at the recovery of costs imposed by motorists. The main rates are 23% on goods deemed to be less essential or 'luxuries', a reduced rate of 13.5% on goods deemed 'essential' and a zero rate for many food items. The average rate of VAT is roughly 15% and a case can be made that the 8% extra charged on cars above this average can legitimately be viewed as a tax on motoring. Two calculations are shown in Table 4.1, the first ignores VAT altogether while the second includes one-third of the VAT on acquisition from Table 1.1 as a motoring tax.

Table 4.1: Revenue from Taxes on Motoring in Ireland, 2019, in € million.

	VAT as Recorded	VAT Ignored	VAT at One-Third
Vat on Purchase	0.7	0.0	0.2
Sales, Registration	1.0	1.0	1.0
Annual	0.9	0.9	0.9
Fuel	3.5	3.5	3.5
Insurance Taxes	0.1	0.1	0.1
Tolls*	0.3	0.3	0.3
Total	6.5	5.8	6.0

*Zero toll revenue is shown in the ACEA statistics – the €0.3 billion is a rough estimate, discussed below in Chapter 6.

The treatment of VAT on purchase makes a difference but VAT is not the dominant item. Road users paid about €6 billion in 2019 whatever way VAT is reckoned, a figure which will not be repeated in 2020 because of the COVID downturn. This figure is to be compared with the total direct costs, estimated in the last chapter to have been of the order of €3.3 billion.

Parking charges are substantial in Ireland – most towns and all cities now impose charges for on-street parking in the busiest areas and there is a large private industry operating off-street capacity. Parking charges are not considered here as a charge for the use of the road system, although they play an

important role in urban transport policy. The economic issues arising in parking policy are discussed in detail in Shoup (2017)[18].

The modest contribution of direct user charges through road tolling is not confined to Ireland. Most countries employ systems of motor taxation with a small component of direct charging. The point tolls used in Ireland have had revenue raising, rather than accurate cost recovery, as their objective.

[18] Donald Shoup, The High Cost of Free Parking, Routledge, 2017.

Chapter 5: Taxing Road Transport in the Long term

Road users should cover both the direct and indirect costs they impose. These costs all vary with vehicle use, yet €2.0 billion of the €5.8 in total revenue (ignoring VAT on purchase, as per the second column in Table 4.1) does not vary at all with vehicle kilometres travelled or with any other metric related to use of the road system. The €2.0 billion consists of €1.0 billion levied on acquisition, €0.9 billion in use-invariant annual circulation taxes and a small component in taxes on compulsory vehicle insurance. One-third of what road users pay is in the form of static charges, arising if the vehicle never travels or does a thousand kilometres every day.

The components that vary with usage are fuel taxes at €3.5 billion, and roughly €0.3 billion in toll charges. The toll item is a best estimate – no official figure appears to be available.

Road Tolls in Ireland

There are 11 tolling points in Ireland, the 10 shown in Table 6.1 and the East Link bridge in Dublin's docklands. Most charge just under €2 per private car, more for the busiest, the M50 in Dublin and for the Port Tunnel. Heavier commercial vehicles pay around three times the charge for cars. Allowing for the East Link, a conservative estimate for toll revenue would be about €300 million per annum.

Table 6.1: Traffic at Toll Plazas in Ireland for 2019.

Toll Charger	Total Trips YTD	Total Trips Previous Yr. Equivalent	Trip Growth %	Total ETC YTD	ETC Previous Yr. Equivalent	ETC Growth %
Dublin Tunnel	8.76M	8.41M	4%	3.28M	2.97M	10%
Limerick Tunnel	9.22M	8.79M	5%	3.88M	3.41M	14%
M1 Dundalk Western Bypass	15.37M	14.55M	6%	8.24M	7.29M	13%
M3 Clonee / Kells	12.90M	12.30M	5%	8.18M	7.52M	9%
M7 / M8 Portlaoise Motorway	8.80M	8.67M	1%	4.54M	4.31M	5%
M8 Rathcormac Fermoy Bypass	7.29M	7.09M	3%	3.48M	3.22M	8%
M50 eFlow	54.99M	53.10M	4%	36.81M	34.79M	6%
N4 Kilcock-Kinnegad Motorway	11.15M	10.66M	5%	6.05M	5.57M	9%
N6 Galway - Ballinasloe	5.13M	4.88M	5%	2.37M	2.12M	12%
N25 Waterford Bypass	3.56M	3.35M	6%	1.56M	1.39M	12%
Grand Total	137.17M	131.81M	4%	78.39M	72.59M	8%

Source: Transport Infrastructure Ireland.

The tolls are the closest approximation to a use-related charge in the Irish motor taxation system. They are however a small part of the total, about 5%, and not well designed. The accompanying map shows the location of the 11 tolling points. Three are in Dublin and the remaining eight scattered randomly around the motorway network, reflecting the involvement of private finance in the construction of many of the links rather than the more coherent scheme in France. The biggest money-spinner, the M50 in Dublin, is

tolled at just a single point even though it is effectively the Main Street of the city. There has been political resistance to any revision to the M50 tolling scheme and it was clearly designed to recover construction cost rather than to manage congestion. The M50 was first designed as an outer bypass and has been overtaken by the urban sprawl to the west of Dublin.

The only tolled facility which has time-of-day charging is the Dublin Port Tunnel, where private cars pay €3, on a tidal-flow basis inbound or outbound, in the off-peak and €10 at weekday peaks. Trucks and buses go free on the East Link but must pay at all 10 of the other tolling points.

The map brings out the arbitrary nature of the 'system' of road tolling in Ireland. There are very few tolling points. Large parts of the country have none and all tolls can be avoided through the selection of un-tolled alternatives, depriving by-passed towns of relief from congestion by heavy trucks in several cases.

There are numerous anomalies – buses go free on the Dublin Port Tunnel but not on the M50. The tunnels in Dublin and Limerick are tolled but the Lee Tunnel in Cork is free.

Fuel Taxes

The other, and by far the largest, component in use-related charging is the fuel tax. In Ireland and in most EU countries the per litre excise tax on diesel, now the most popular fuel source for private cars and the almost universal choice for trucks and buses, is lower than the tax on (unleaded) petrol. The differential does not arise with the carbon tax component, a common amount per unit carbon. Retail prices for diesel have often been 10 to 15 cents below the petrol cost and this is attributed largely to the excise differential. Closing the gap, as has been done in the United Kingdom, has been considered in recent reports of the Tax Strategy Group.

Since diesel vehicles produce externalities additional to carbon, including local emissions of particulate matter in built-up areas, there have been calls for the substitution of petrol by diesel cars in recent times to be reversed on public health grounds. The price differential favouring the Republic against Northern Ireland is greater for diesel than for petrol and stimulates fuel tourism – Ireland's emissions are a little lower than appears to be the case for this reason.

The fuel excise is incapable of differentiating between diesel mileage in urban and rural areas, even though the externalities imposed in rural areas are likely lower. Perhaps diesel should be taxed more heavily but it should be a tax designed to reflect externalities unique to diesel combustion in urban areas only, impossible without a road user charging system capable of distinguishing mileage by area and by vehicle type.

Direct charging provides a mechanism for encouraging bus-based public transport. Buses enjoy a natural advantage over the private car when there is a market price on the occupation of road space, achievable with electronic road pricing since buses occupy far less road space per passenger. They are deprived of this natural advantage over the private car under current arrangements.

The Electrification of the Road Transport Fleet

The greatest threat to the current revenue base of motoring taxes would be the success of the government's plans to replace the existing private car fleet with fully electric vehicles. Targets of close to one million electric vehicles on the road by 2030, with no internal combustion engine (ICE) vehicles for sale after that date, are contained in the Climate Action Plan released in July 2019 and discussed in Chapter 2 above. On current technology it would be impossible to collect a fuel tax on electricity and the largest component of the existing revenue base would atrophy over time[19].

In principle the lost fuel taxes could be replaced with higher taxes on acquisition such as VRT, with extra annual taxes, or with greater reliance on direct user charges in the form of more extensive tolling or a resort to full electronic road pricing[20]. Acquisition and ownership levies are static taxes, unrelated to usage

[19] It could become possible to install technology in cars which would record and transmit data on electricity consumption, but the same technology would facilitate charging systems which would be more attractive than a replacement fuel tax. New models increasingly incorporate technology, including GPS, which would facilitate electronic road pricing (ERP). The rapid replacement of the fleet with ERP-compatible cars should be a consideration in the design of taxation policy for the transition.

[20] There is an extensive economic and engineering literature on electronic road pricing, for example Georgina Santos (editor) (2004), Road Pricing: Theory and Evidence, Elsevier.

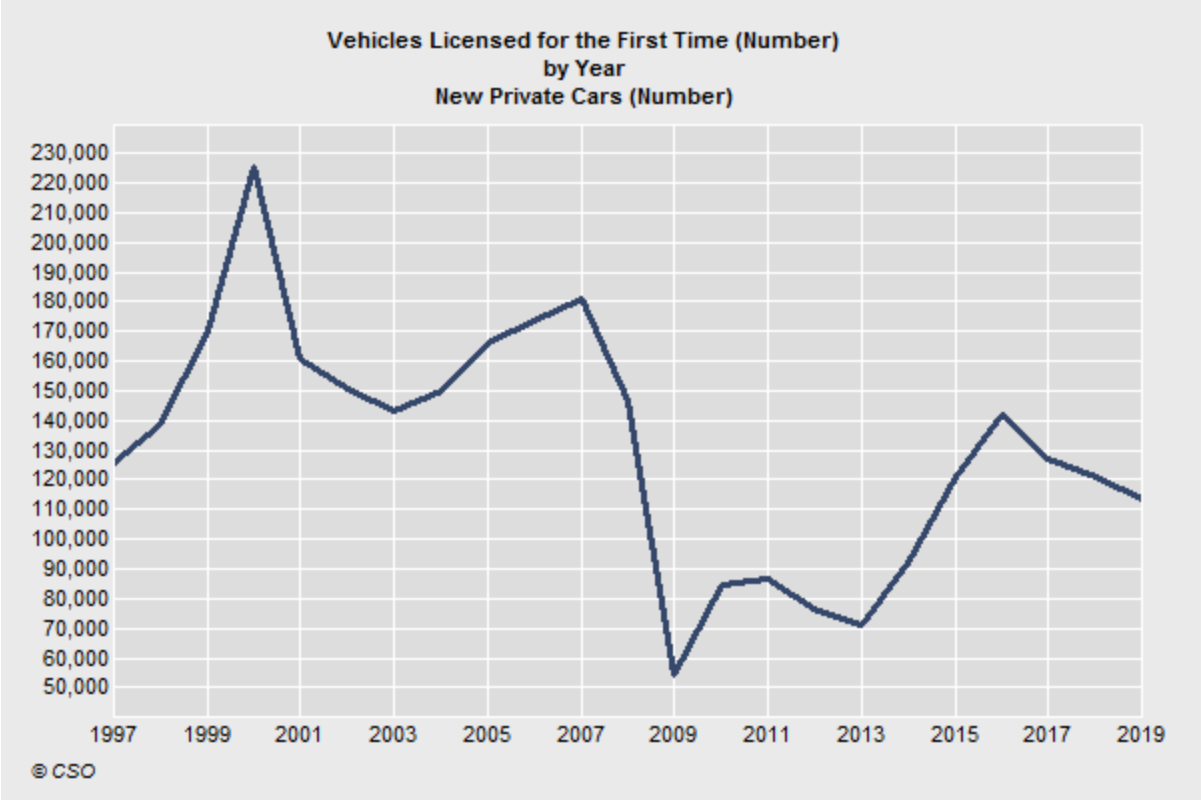
and not well aligned with either the direct or indirect costs imposed by road users. An extension of the current and limited system of point tolling is not attractive either and the narrow current revenue base could not easily be extended to fill the gap.

Moreover, the replacement of the road fleet with electric vehicles, especially in the years immediately ahead, as envisaged in the Climate Action Plan, is itself problematic. Heavier vehicles which do the highest annual mileage are likely to prove more difficult to electrify and the targets for adoption of electric cars are correspondingly ambitious. There are daunting Exchequer implications should the conversion of the car fleet to electric propulsion be achieved. In addition to VRT abatement there are subsidies from the Sustainable Energy Authority of Ireland (SEAI) of €5,000 on certain types of vehicles as well as discounts on the circulation tax and on road tolls. These schemes will dilute revenue and become unaffordable should the take-up improve as envisaged.

This implies that Ireland, and the other European countries intent on the electrification of road transport, need to consider what form the taxation of road transport will ultimately need to take. Heavy reliance on fuel taxes may not even be feasible unless consumption of electricity for road use can somehow be identified separately from other uses and taxed.

The calculations that the TCO (total cost of ownership) of fully electric vehicles will become competitive with petrol and diesel by about the middle of the current decade, central to the McKinsey scenario, appear to be based on an assumption that fuel tax on electricity will never be chargeable.

High taxes on vehicle acquisition are inconsistent with the ambition to convert the fleet to lower-carbon propulsion. If today's fleet contains too many stranded assets, high taxes on the conversion of the fleet to lower-carbon alternatives make the transition more difficult, an issue considered in the next chapter. Fuel taxes undifferentiated across geographical locations cannot penalise accurately the special problems created by, for example, diesel non-carbon emissions in urban areas.



In the sequel to the financial crash of 2008 the Irish government reduced sharply the rates of tax on transfers of property, which took the form of stamp duties on transactions in houses and other forms of real estate. Revenue from these transaction taxes had collapsed in the crash and it was thought desirable to replace them with more stable revenue sources. The same concern arises with taxes on the acquisition of vehicles. The chart shows the violent swings in new car sales which have accompanied recent economic cycles in Ireland.

A process of elimination points to reliance on direct charging for the use of road infrastructure as the main source of revenue from motor taxes in the long run. This means a move away from static taxes, which cannot reflect the costs imposed by system users, and from taxes on fuels, which may not even be feasible for electric propulsion, between them the dominant sources of motor tax revenues in Ireland. It is impossible to undertake a shift to user charging quickly but it is also not necessary – revenue can be protected through the transition even if the ultimate destination is identified as direct road user charging.

Chapter 6: Taxing Motoring Through the Transition

The current system of taxation of motoring generates roughly €6 billion in annual revenues for state authorities. It must continue to yield substantial amounts, even if carbon emissions are reduced, to cover direct and indirect costs. The switch to electric vehicles, at whatever pace it is realised, threatens to eliminate a large part of the revenue base unless some form of road-use charging can be substituted for lost fuel tax.

If there is always going to be a carbon charge, there will always be revenue from taxes on fuel for private cars, but the carbon charge, even at four times today's level, would bring in only about €800 million extra from all road vehicles, including trucks which are unlikely to electrify as quickly as cars. If the car fleet electrifies eventually, this €800 million bonus will begin to diminish. It cannot compensate indefinitely for the loss of revenue, especially if heavier vehicles come to be electrified, or powered with low-carbon liquid fuels, beyond 2030. Should electricity for cars prove to be taxable technically there are political issues - a road-user charge will seem more palatable than a tax on (largely) renewable electricity with negligible emissions.

In the years immediately ahead, it will become clear that early and widespread adoption of electric road vehicles is unlikely. Until prices come down to parity with petrol and diesel cars, many Irish motorists will regard the electric option as simply too costly, even with the government subsidies. Those subsidies are themselves unsustainable if sales of electric vehicles began to rise rapidly.

The Climate Action Plan contains the following figures for uptake of electric vehicles – MACC is a reference to the document prepared by McKinsey.

Targets for Adoption of Electric Cars.

Key Metrics (Cumulative numbers)	2017[35]	2025 Based on MACC	2030 Based on NDP	2030 Based on MACC
Passenger EVs	2,718	151,000	500,000	840,000[36]

The figure for 2025 is unlikely to be achieved, given the impact of the COVID downturn and the sharp decline that has already occurred in new car sales. The current stock of electric or partly electric cars is about 12,000. Even with the abatement of VRT and the SEAI purchase subsidy of up to €5000, electric cars are simply not available at price points which appeal to many Irish buyers, especially first-time car owners, who rarely purchase new vehicles of any type.

There has always been a structural shortage of affordable entry-level cars in the Irish market for the first-time and lower-income purchaser. There were substantial imports from Japan, one if the few right-hand drive countries, until tax changes in the 1990s favoured the United Kingdom, now the main source of used imports. The high cost of new cars means that the flow onto the market of two- and three-year-old models

is inhibited, creating an artificial demand for used imports. This is now being met with older UK models (the average age is six years) with poorer fuel efficiency than the equivalent new variant, including a high proportion of diesel cars. UK policy has begun to discourage diesel and the used surplus has a ready outlet in Ireland – all the other neighbouring markets are left-hand drive.

There is a revenue leakage on the importation of UK second-hand vehicles despite the imposition of a calculated VRT charge. The VAT is already in the price, paid to the UK authorities, aside from a small element of VAT on dealer margins. The result is that an Irish purchaser of a used UK vehicle at a specific price point is paying less tax (to the Irish authorities) than would a purchaser of a new vehicle at the same price. The difference, according to the SIMI, the motor trade representative body, is of the order of €6,000 per vehicle.

Table 6.1: Cars, New Sales and Used Imports, 2019 versus 2008.

Year	New	Used Imports	Total	% Used Imports
2008	152,562	78,045	230,607	33.8
2019	117,109	113,926	231,035	49.3
% Change	-33.2	+46.0	+0.2	…..

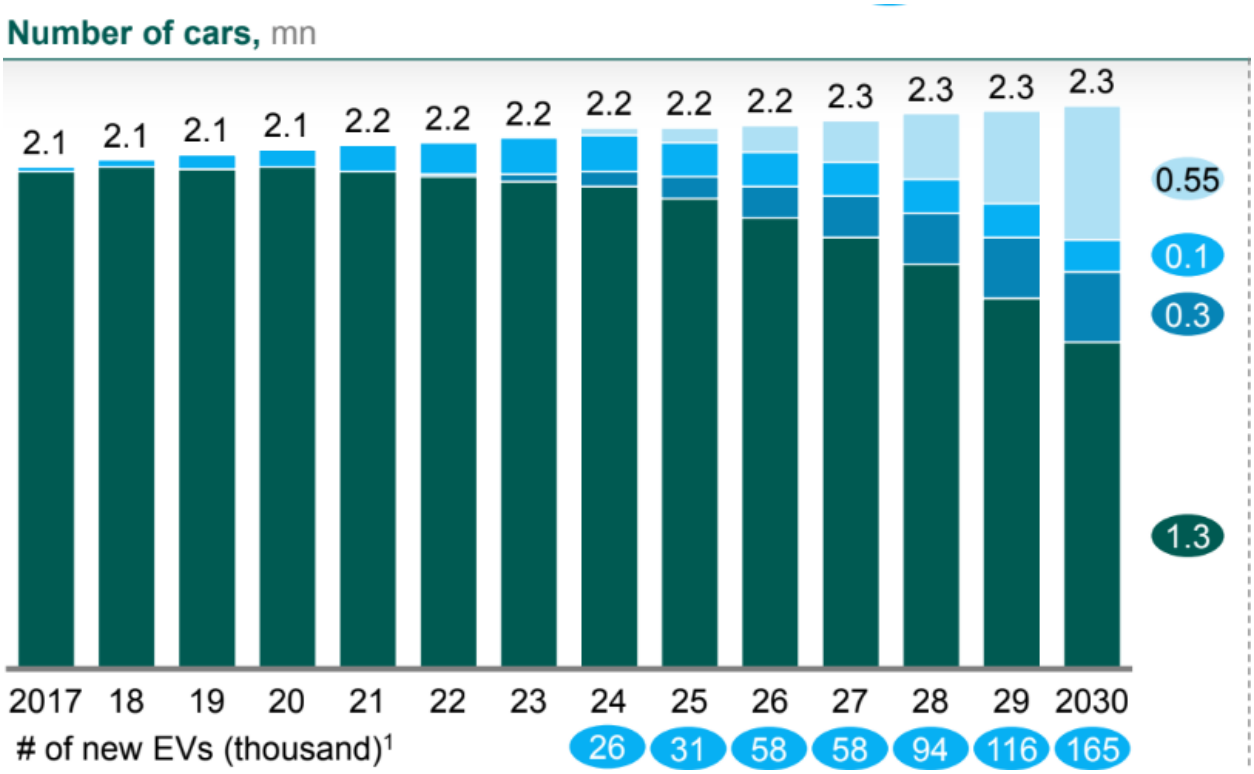
Source: SIMI

The table shows the composition of vehicles at first registration in 2008, the last year before the last sharp downturn, and in 2019, the last 'normal' year before the current one. Total first registrations were roughly the same in both pre-recession years but the composition had shifted dramatically, from one-third used imports in 2008 to one-half used imports in 2019, which, other things equal, has a depressing effect on the yield of acquisition taxes.

The likelihood, confirmed by the data on the slide reproduced below from the Department of Communications, Climate Action and Environment (DCCAE) presentation of the McKinsey report, is that the adoption in Ireland of electric passenger cars is not going to happen at an appreciable pace until 2026 and later years. Sales of BEVs (all-electric battery-powered cars with no internal combustion engine) will not become significant until then – almost all the 550,000 planned to be in place by 2030 will have been sold in 2026 and later years. The figure for BEV sales in the year 2030 is given by McKinsey at 165,000. The entire Irish new car market has only reached 165,000 units on four occasions, in the year 2000 and in each of 2005, 2006 and 2007, the final years of the bubble. The Climate Action Plan states, on page 7, that one-third of new cars sold (elsewhere, 40% of new cars sold) over the decade must be electric or hybrid, implying that the new car market would reach over 200,000 units. It reached just 117,000 in the most recent year of 2019, and there is no reason for expecting a plentiful supply of used electric imports. The document has not offered a thorough market analysis.

Even after 2026 there will be substantial sales of petrol and diesel cars up to the planned phase-out after 2030. Prior to that point almost all new car sales and used imports will be petrol or diesel. It follows that, on the strategy of the Climate Action Plan, the fleet, bearing in mind that the average age of

cars at scrappage is about twelve, will be dominated by petrol and diesel cars until the mid-2030s and heavier fleets for even longer. Detailed figures are not available since the full McKinsey report has not been released.



The higher uptake of electric cars after 2026, assumed by McKinsey and in line with the expectations of European manufacturers, will depend on price competitiveness but also on supporting infrastructure. The limited availability of fast chargers on the Irish network, discussed in chapter 2, inhibits the adoption of electric cars in those areas of the country where annual mileage is greatest, diluting the impact of electric car subsidies. The volume of carbon emissions from the Irish car fleet stretching well past the CAP end-date of 2030 will be influenced greatly by the decisions of Irish motorists over the years up to 2026. If they keep older cars on the road, or if they purchase used imports, instead of newer and more fuel-efficient petrol or diesel models, emissions will be greater than needs be.

The operating fleet will not be replaced with fully electric cars on the government's own plans until well into the 2040s, since the intention is that cars with internal combustion engines will still be available until 2030. The early adopters of electric cars are currently high-income, low-mileage motorists. Since this is unlikely to change until electric cars become price-competitive, which could be five or six years away, the subsidies are delivering limited carbon reductions, at high Exchequer cost. The incentive to purchase used imports, with no used export market, inhibits the emergence of a younger fleet with a greater preponderance of newer and more fuel-efficient vehicles on the road, especially in the high-mileage counties.

In the shorter term, when the replacement of the older vehicles in the fleet, the stranded assets, is a priority, a tax system relying disproportionately on acquisition taxes is anomalous. The anomaly is exacerbated by the attractiveness of used imports.

Once the fleet of private cars comes to be dominated by electric vehicles, and ultimately the truck and bus fleets, the case for fuel taxes as the bulwark of cost recovery will also be undermined. If onerous taxes on the acquisition of new vehicles are undesirable where fleet replacement is a priority, this points to user charges as the long-term goal towards which policy should become oriented. In the years immediately ahead direct charging for road use is not a practical option, and there is no strategic purpose in extending the point-charge tolling locations. There needs to be an interim strategy which targets two key goals. These are:

(i) The protection of revenue, and

(ii) Facilitating the maximum feasible de-carbonisation of road transport.

For the current year, a recent forecast from the Economic and Social Research Institute sees the Exchequer deficit at €28 billion for 2020, with substantial follow-on deficits in 2021 and later years. In these circumstances government will be reluctant to reduce the tax impositions in any sector. Any changes designed to transit to a new architecture for motoring taxation will face a short-term imperative to protect revenue.

While doing so the shift to low-carbon road transport needs to be facilitated. In the years immediately ahead the protection of revenue can best be accomplished through using whatever headroom is available in fuel tax competition with Northern Ireland. There could be a more rapid increase in the carbon charge, with ramifications for sectors other than transport, or gradual elimination of the diesel discount, or both. The annual ownership tax could also be temporarily increased. These measures could eventually be scaled back whenever user charging is introduced, as it may have to be when the fleet becomes extensively electrified towards the end of the decade. User charging would also see the end of point tolling on the Irish network since it would ideally take the form of electronic road pricing with congestion charging.

If the proposed enhancement of fuel tax and ownership revenues were to be deployed in mitigation of Ireland's high taxes on the acquisition of new vehicles, there would be a substitution in the fleet of lower for high-emission petrol or diesel cars during the transition. There would also be a hidden boost to revenue. There would be an improvement in VAT receipts at current VAT rates, consequent on the reduction in used imports, where the VAT currently accrues to the UK Exchequer.

The period of transition, up to the mid-2020s, would see a limited conversion of the fleet to electric vehicles, a point admitted in the Climate Action Plan and regarded as inevitable by the European manufacturers. In addition to a swivel away from acquisition taxes and their temporary substitution with fuel and ownership taxes, policymakers will need to consider the adequacy of current plans for the charging network.

Unless fast chargers are available as extensively as liquid fuel (there are 1500 filling stations in the Republic) the take-up of electric cars, even when they become price competitive, will be inhibited. It is important to bear in mind that the subsidies, which are insufficient to make inroads on consumer choices at present, will eventually have to be withdrawn. Once manufacturers' prices for electric cars become

competitive and supply readily available, the climate policy imperative of fleet conversion will prevent any significant reliance on acquisition taxes.

The final component in a policy for the transition period is therefore the preparation of a detailed scheme for an eventual switchover to a system of road user charging as the principal source of state revenue from the motoring public.

Appendix: Components of a System of Road User Charging

A system of charging road users directly for the costs associated with the provision of road space, traffic management and policing, and recovery of the costs associated with environmental externalities and congestion, is rendered both more feasible, and more urgent, by the decarbonisation imperative. The new generation of ICE vehicles and the electric cars that will ultimately replace them, are increasingly equipped with the connectedness that facilitates this transition of motoring taxation to a more coherent structure.

The components would be:

(i) Fixed charges applicable to all vehicles licensed to use the road network, likely a small component to cover administrative costs.

(ii) A per kilometre charge, possibly related to vehicle type, to cover elements of road maintenance, as would –

(iii) A charge related to tonne-kilometres.

(iv) A charge related to axle loadings, designed to attribute road construction and renewal costs to the heavy vehicles most responsible for them.

(v) A charge, differentiated by vehicle type, related to carbon emissions.

(vi) A charge, differentiated by location, to cover low-level, non-carbon, emissions affecting human health and air quality. This component would likely be negligible or zero in rural locations.

(vii) Finally, a charge to cover congestion costs, differentiated by location and time-of-day. This component would also be zero or modest on rural roads but could easily become the main source of revenue and a principal tool of urban planning.

The design of a system of electronic road pricing, including congestion charging, is a substantial task and since it appears to be the ultimate destination for motoring taxes in Ireland, the necessary research is an important task through the period of transition.

The Irish Car Carbon Reduction Alliance (ICCRA) brings together the majority of car dealers in Ireland representing almost every car brand, all of whom are also members of The Society of the Irish Motor Industry (SIMI). Our aim is to promote collaboration between industry, policy makers and motoring advocates in reaching the EU car carbon emission targets through a realistic and pragmatic approach. We are seeking to advance understanding about electric vehicle (EV) targets for Ireland to enable consumers make the transition in an affordable and timely manner.

Irish Car Carbon Reduction Alliance| www.eway2040.ie | info@e-way2040.ie | @EWay2040