Impact on our carbon budget arising from the growing trend in car sales towards heavier and larger vehicles such as SUVs

Opening statement for Oireachtas Joint Committee on Environment and Climate Action

Professor Hannah Daly,
Environmental Research Institute, University College Cork
September 26th, 2023

I thank the Committee for the opportunity to provide evidence on the topic of car sales trends and their impact on the achievement of our carbon budgets. I am a Professor in Sustainable Energy at the School of Engineering and the SFI MaREI Centre at University College Cork, where I research options across the Irish energy system to deliver rapid decarbonisation. I am here as an independent academic, and do not speak on behalf of any institution or funding body I am associated with.

Even with the enactment of the far-reaching targets outlined in the Climate Action Plan, including electrifying private cars and reducing demand, the transport sector is set to significantly overshoot the Sectoral Emissions Ceiling allocated to it in the first two carbon budget periods[i]. Carrying forward this overshoot to subsequent periods will require increasingly infeasible decarbonisation trajectories post-2030[ii]. Therefore, mitigation measures must be enhanced and accelerated.

Carbon budgets are fossil fuel budgets. While it's important to set targets for "clean energy" measures – EVs, public transport, biofuels etc – it is cumulative fossil fuel use that ultimately matters for climate change, and for our legislated carbon budgets. While mitigation measures are starting to be deployed, greenhouse gases are rising. We are running just to stand still.

To illustrate why: Blending of biofuels is growing, but petrol and diesel volumes have also grown so far this year, and are nearly back to pre-pandemic levels. The sale of full battery electric vehicles grew by 60% so far this year, relative to the same period last year, and EVs now represent 18% of new car sales, which is a positive trend. However, despite this, the sale of fossil fuelled cars is also growing, in fact, by more than EVs[iii]. Meanwhile, even though public transport usage is growing, total car traffic volumes are as high as ever[iv]. According to the last census, nearly four times more children and students travel to school, childcare and college by car to compared to 1986, and rates of walking, cycling and public transport use have fallen significantly since then[v]. Car dependency is extremely high, and is a leading driver of GHG emissions in transport.

The type of cars being sold is another important driver. Cars are getting bigger and heavier, which is offsetting efficiency gains from technology improvements.

The average mass of new vehicles sold in Ireland increased by 25% in the past two decades: cars are now 300 kg heavier than they were in 2001. The mass of individual car models is growing[vi], and sales are shifting towards larger and heavier vehicle types, such as Sports Utility Vehicles (SUVs).

Larger cars increase energy consumption and CO_2 emissions in several ways: The greater mass requires more energy to move; the size and shape cause less favourable aerodynamics– the large frontal area creates more air resistance (drag); and greater material requirement creates larger embodied carbon emissions at the manufacturing stage. Efficiency improvements in new passenger cars have stalled since 2014, partially due to this trend.

We estimate that had vehicle mass remained at 2001 levels, the CO_2 intensity (the greenhouse gases emitted per kilometre) of new passenger cars would be 10% lower than they currently are, all else being equal. Over the lifetime of a car driving 300,000 km, this amounts to an extra 1,500 litres of fuel, aggravating cost-of-living, energy import dependence, and greenhouse gas emissions: this extra weight causes an additional 3.5 tonnes of CO_2 emissions from a typical vehicle, and an additional carbon taxation burden on drivers.

There is a compelling argument to include weight and vehicle footprint in the calculation of VRT for both fossil fuelled and electric vehicles. Preliminary analysis we undertook in UCC found that introducing a policy measure to cut the CO_2 intensity of new fossil fuelled vehicles from 2024 would reduce the cumulative emissions from the transport sector by 5.5 $MtCO_2$ in the period to 2035, which would contribute substantially to addressing the projected overshoot of legislated Sectoral Emissions Ceilings.

While greater GHG savings can be achieved from addressing the weight of fossil fuelled cars, the **increasing weight in EVs is also of concern**. Currently, Irish vehicle taxation does not distinguish between EVs on the basis of efficiency, weight or size, which is a missed opportunity. Heavier EVs are less efficient and consume more electricity, putting additional strain on power generation and renewable electricity deployment. Our analysis shows that a continued trend towards heavier EVs could create additional electricity demand equivalent to the electricity generated by 200 MW of wind capacity, more than the capacity added in 2022.

Speed is key to accruing carbon savings: enacting a policy to reduce the weight of new cars sold in 2024 has 28 times more impact than implementing that policy in 2030. It is fairer and more effective to apply taxation at the point of initial sale, rather than over a car's lifetime. The new car market from now determines the second hand car market for the next two decades.

There are additional grounds for modifying the taxation of both electric and fossil fuelled vehicles to include weight and vehicle footprint on the grounds of road safety, given the additional hazard for vulnerable road users greater, while walking and cycling is being promoted, as well as the space larger cars take in urban areas, and their greater noise and air pollution.

In conclusion, there is real urgency to expand the range of mitigation measures in the transport sector. The increasing size and weight of passenger cars has various negative implications for fuel consumption and public health, which can be addressed through taxation.

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[i] The EPA "With Additional Measures" scenario projects that the transport sector will overshoot its legislated Sectoral Emissions Ceiling by 7 million tonnes of CO_2 in the period between 2021 and 2030, around 8 months of current transport emissions. This assumes the achievement of targets in the 2023 Climate Action Plan, including ambitious decarbonisation and travel demand reduction and mode shift. However, existing policies are projected to fail to deliver on those targets, and the transport sector is on course to overshoot its emission ceiling by 23 million tonnes, which is more than two years of current transport emissions. Even this scenario requires around half a million electric vehicles in the car stock in 2030, and virtually all car sales electrified by that time.

[ii] Assuming that the transport sector is allocated a SEC of 26 $MtCO_{2e}$ for the provisional third carbon budget period (2021-35) on the basis of its share of 2022 total GHG emissions (17%) the annual decarbonisation rate required during CB3 is

- 3%, if the sector meets it allocated SEC for CB 1 & 2
- 21% if transport follows the EPA "With Additional Measures" trajectory to 2030, and
- 80% if it follows the EPA "With Existing Measures" trajectory to 2030.

[iii] In the period January-August 2023, 92,493 passenger cars with an internal combustion engine were sold, 9,883 more than in the same period in 2022. In 2023, 20,214 EVs were sold, 7,555 more than during Jan-Aug 2022.

[iv] https://www.cso.ie/en/releasesandpublications/ep/p-tb/transportbulletinseptember2023/trafficcountdata/

[v] https://data.cso.ie/table/FY079

[vi] For example, the VW Golf has nearly doubled in weight since the original model, to nearly 1500 kg, and the Land Rover Discovery increased from 1900 kg in 1990 to 2600 kg now. Since 2001, the mass of new diesel cars grew by 7%, to ~2000 kg, while the mass of petrol cars grew by 13%, to ~1300 kg. The mass of new BEVs grew by 23% since 2014, to ~1800kg, and the mass of PHEVs grew by 7% to ~2000kg

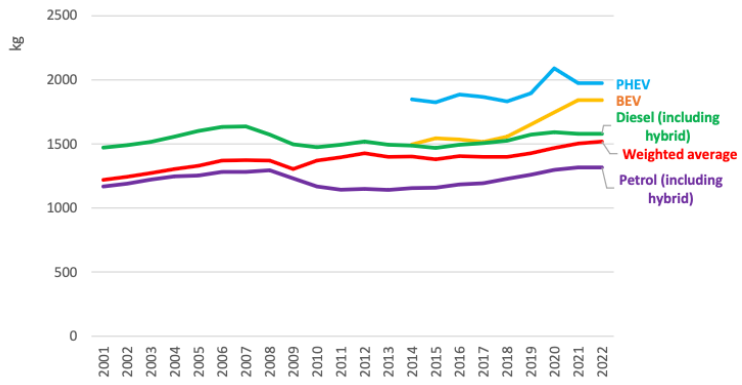

Figure 2: Average mass of new passenger cars in Ireland by fuel and engine type. Source: ICCT European Vehicle Market Statistics, based on EEA data. Vehicle sales data from CSO (TEA17, TEA27)