Shift to zero emission transport

In 2013, almost all of Ireland's domestic passenger transport was powered by diesel or petrol. By 2020, revised government targets aim for 50,000 electric vehicles (around 3% of private cars) on the road.[9] Zero emission cars run on electric batteries or hydrogen fuel cells, which have zero emissions at the tailpipe. While non-ETS (Emissions Trading Scheme) emissions in the transport sector may decrease, emissions from power stations under the ETS may increase depending on how electricity is generated. For full carbon neutrality, see supply sector trajectories for decarbonisation options in the electricity system.

Hybrid or plug-in hybrid vehicles have both petrol/diesel engines and electric motors and are therefore not zero emission. However, they can produce 45% less CO_2 from their tail pipe compared to conventional internal combustion engine vehicles.

Internal combustion engine efficiency decreases from 6.3 to 4.3 litres per 100 km of diesel by 2050 in all the trajectories consistent with long run projections by the International Energy Agency.[10]

Trajectory 1

Trajectory 1 assumes that by 2020, 1% of cars are hybrids. By 2050, 20% of passenger kilometres are in plug-in hybrid electric cars, with batteries that can be charged from the mains, and 2.5% are in zero emission cars. Buses and trains are largely unchanged.

Trajectory 2

Trajectory 2 assumes that 2% of private cars are zero emission and that 1% are hybrids in 2020. By 2050 about 35% of passenger-km are travelled in conventional petrol or diesel engine cars, 54% of cars are plug-in hybrids and 11% are zero emission. Some 15% of buses run on compressed natural gas (CNG)[11] and 45% of buses are hybrids of electric motors and diesel engines. The electrification of passenger rail travel increases from 20% to 35%.

Trajectory 3

Trajectory 3 assumes that by 2050, 20% of passenger-km journeys are in conventional internal combustion engine cars, with 32% in plug-in hybrid vehicles and 48% in zero emission vehicles. About 20% of bus travel is in fully electric or fuel cell electric buses, 55% of buses are powered by hybrid diesel-electric engines, and 25% use diesel or CNG. 65% of passenger rail travel is electrified.

Trajectory 4

Trajectory 4 assumes that by 2050 all car travel is either powered by an electric motor or by hydrogen fuel cells. Some 85% of passenger trains are electrified and 50% of bus travel is fully electrified (25% from batteries and 25% via fuel cells), with the remainder being diesel-electric hybrids.

Interaction with other choices

Users can specify the type of zero emission car technology to come onto the market by selecting any one of the choices A to D of the 'choice of fuel cells or batteries slider.
The 'domestic transport behaviour' lever influences how much people travel and by what mode.

Where vehicles are not electrified (and even in Trajectory 4, buses are expected to be at least partially powered by liquid fuel) they can run on biofuel rather than diesel or petrol. This option can be selected in the 2050 Calculator by choosing bioenergy imports, or choosing to dedicate land to biomass and to turn that biomass into liquid biofuel.

% of car travel by:	2013	2050 T.1	2050 T.3	2050 T.2	2050 T.1
Conventional car	~100	77.5	35	20	0
Plug-in hybrid	0	20	54	32	0
Zero emission car	0	2.5	11	48	100

Figure 2. Passenger transport energy demand under shift to zero emission transport lever (TWh/yr)

Note: Trajectory 1 on 'domestic transport behaviour' and Trajectory A on 'Choice of electric or hydrogen car technology' (all battery).