What if the problem with cars was not their method of propulsion?

The European automotive industry is striving to adapt to market changes driven by the dual green and digital transition. Electrification has become the main strategy for reducing CO_2 emissions, especially in urban traffic. At the same time, the average size and weight of cars have greatly increased. Big electric cars are the trend, but are they really the solution? Could better planning and optimisation of resources help?

According to Eurostat, average passenger car occupancy for urban mobility is usually less than 1.3 persons. Therefore, it is very common in cities for heavy cars to carry a single person. To transport the weight of that one person (80 kilogrammes for instance) means moving a full 1 800 kg. This could even reach 2 500 kg for big electric or hybrid cars with heavy long-range batteries. No matter the source of power used, this can never lead to efficient and sustainable mobility. Weight rates are usually over 10 times more favourable for the average motorbike or scooter and, of course, even better for lighter vehicles such as electric bicycles or kick-scooters.

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Reducing CO_2 emissions in transport is a key goal of the European Green Deal. However, specifications for choosing a city car are often based on the rare long trips that would best be made with a rented vehicle. Meanwhile, traditional emissions tests using gas analysers focus on the percentage concentration of pollutants and overlook references to the total quantity. The low speed limits generally established in Europe today also help to reduce emissions. However, efforts to reduce emissions may be counteracted by a trend towards bigger sports utility vehicles (SUVs), which are less agile and efficient but more comfortable and useful for longer drives.

Some people find themselves spending long periods every day in traffic, so they see their cars as a prolongation of their living rooms, with comfortable seats, plenty of space and 'infotainment', including big screens. Large vehicles also account for longer traffic jams. When anti-lock braking systems (ABS) were first introduced in premium cars, accidents increased initially for that sector owing to driver over-confidence. The same effect is again being seen with modern driving assist systems. Since large vehicles are especially safe for their occupants at low speeds, this has a pernicious effect on driver attention, consequently increasing casualty figures for other road users. Every year there are fewer victims of car accidents – but not among pedestrians, cyclists and other light vehicle users. This translates into further restrictions on the use of light vehicles, then considered unsafe, to the point of banning e-scooters and restricting the use of motorbikes – while cars are allowed in crowded areas. An alternative way to interpret these casualty figures would be to consider large heavy cars a menace to other users of public thoroughfares.

The EU automotive sector has traditionally excelled at producing vehicles with internal combustion engines (ICEs). The sector accounts for around 8 % of the EU's gross domestic product (GDP) and for 12.9 million direct and indirect jobs. However, the green transition, digitalisation and global competition have fundamentally altered its business model. Electrification has become the main strategy for decarbonising the sector, mostly through the extensive use of critical raw materials such as lithium-ion batteries, which have to be quite large to propel big cars with extended ranges.

Potential impacts and developments

Japan has been restricting car size in crowded areas since 1949, with the popular 'Kei' cars representing 40 % of the Japanese car market today. This Japanese regulation began with strict limits that have since evolved

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to set engine capacity at a maximum of 660 cc, vehicle length at 3.4 metres and total weight at 700 kg. Car ownership in Tokyo is restricted to corresponding parking spaces, following the idea that public thoroughfares are for public use, not for people to use for their exclusive benefit.

The high level of European industry specialisation in producing high quality ICEs accounts for its leading position in the market. However, electric vehicles do not require the same level of know-how, opening the door to other players. China became the top global car exporter in 2023, exporting mostly to Europe and Asia. China also dominates production of almost every raw material, technology and component used to make electric vehicles. Batteries require very polluting production and recycling methods, and they need to be charged.

Given the current electricity mix and the optimistic figures available, the equivalent emissions of a large electric car in Europe are of about 4 litres/100 km – not significantly lower than the emissions from a small ICE car (or Kei car). This figure is an average that results from considering: a total equivalent rising from 84 grammes CO_2/km for some (partisan) sources to 125 g CO_2/km considering the charging process alone for others; and that petrol produces 2.3 kg of CO_2 per litre burned (i.e. divided by 23 to convert gCO_2/km to l/100 km). In terms of the efficiency in transporting one person, a simple moped could do far better, not to mention public transport. Battery production process emissions are usually underestimated, considering that China produced the highest CO_2 emissions in 2022, accounting for nearly 31 % of the global total.

Anticipatory policymaking

On 4 October 2023, the European Commission initiated anti-subsidy investigations into EU imports of battery electric vehicles from China and is already considering provisional countervailing tariffs for five years. Although replacing one means of propulsion with another is clearly not enough, modest size electric cars are undoubtedly part of the solution. Even so, most European companies still lag behind in electric vehicle innovation. A smooth transition to alternative propulsion methods should be based on securing access to affordable batteries and semiconductors, improving innovation capacities in new technologies, reducing costs, and adopting a more circular approach – particularly on critical raw materials.

No European compact car qualifies as a 'Kei' car. As a result, 40 % of the Japanese car market is closed to competition from European manufacturers, and this share is increasing. The European Union regulation classifying vehicle categories already accounts for light four-wheelers or microcars (L7) and could be extended to include considerations regarding preferential access to urban areas. The various EU emission limits, such as the new Euro 7 regulation, propose values in g/km (not just concentrations) and revise measuring standards. The EU adopted an amendment to the EU light-duty vehicles (LDV) CO_2 standards for new passenger cars and new light commercial vehicles in April 2023, in line with the EU's increased climate ambition. In July 2023, the European Commission tabled a package of three proposals for the greening of freight transport. These include CountEmissionsEU, a proposal for a single methodology to calculate greenhouse gas (GHG) emissions. However, this only refers to transport services. The European Commission also added a proposal for a regulation addressing the whole life cycle of vehicles, from design to end-of-life. With a view to ending the trend towards ever bigger and heavier vehicles, the European Parliament's Committee on Transport and Tourism is considering a proposal to overhaul the EU's 2006 agreement standardising driving licence rules between Member States.

Promoting electric cars may lead to market distortions that run counter to European industrial interests. While complementary measures such as those contemplated in the critical raw materials act take effect, and besides the obvious move towards public transport, one way to allow the EU car industry to adapt while still reducing CO_2 emissions could be to limit the size, weight and engine capacity of urban vehicles. An improved vehicle-to-passenger weight rate could hugely increase energy efficiency in urban transport.

Since light vehicles are especially suited to electrification – as increased use of bicycles and scooters can attest – and other alternative propulsion methods, it may become appropriate to let the market and European industry adapt at its own pace, with some institutional encouragement and support, to such new conditions of improved mobility efficiency.