Why the EU needs a zero emission vehicle sales target and what it should look like

Policy options for the upcoming cars and vans CO2 emission regulation

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Summary

The forthcoming Commission proposal on CO2 standards for light duty vehicles needs to create a single European market for electro-mobility by setting a sales target for zero emission vehicles. With a Chinese EV quota coming in 2019, and the Californian scheme accelerating ZEV sales until 2025, policy makers now need to ensure Europe accelerates its transition to this key new technology to ensure its industry remains globally competitive and ZEVs are manufactured in the EU and not imported from China. Key elements of the ZEV Mandate should be: An ambition level for 2025 of 15-20% to ensure that the transport sectors' climate targets are met. This is meeting car makers' own announced average EV share for Europe in 2025[1] (20%).

- A sales target of 35-50% by 2030;
- BEVs should be awarded a credit of 1.0 so long as they have a minimum range of 150km on the WLTP test; Sales of electric quadricycles (L8 category) should be counted toward the target with a weighting of around 0.4;
- Plug-in Hybrids should have a minimum range of 50km electric range and be awarded 0.4 credits reflecting their real world use in electric mode. The credit should increase up to 1.0 for a PHEV with a 150km range. However, there should be a cap on the total contribution of PHEVs';
- The system should permit trading between companies to enable carmakers to choose their compliance strategy.

A ZEV mandate will kick manufacturers into action both supplying and attractively marketing ZEVs both of which they are presently failing to do. In doing so it will: provide investment security for utilities, infrastructure managers and the automotive supply industry including emerging European industry for lithium ion cells; creating jobs in a transformed value chain, and in the process putting the EU on a path to clean up the toxic air in its cities and decarbonising cars and vans to meet climate goals.

[1] https://www.transportenvironment.org/press/slow-electric-car-uptake-due-lack-choice-availability-and-marketing-spend-%E2%80%93-report

1. Why zero emission vehicles?

Road Transport emissions, currently one fifth of the EU's total Co2 emissions and have risen 20% since 1990. To achieve 2050 climate goals transport emissions need to be reduced by around 95%.[2] To reach this goal passenger cars must be zero carbon by 2050 (as aviation is significantly more difficult to decarbonise). With around a 15 year vehicle lifetime new cars will need to have zero tailpipe emissions by 2035. France and the UK recently announced their goal to achieve the same objective by 2040. If new cars are to be zero carbon by 2035 substantial progress must be made by 2030.

It is wholly unrealistic to expect advanced biofuels or Power-to-X to produce synthetic petrol or diesel to deliver the volumes of fuel needed to propel a sizable proportion of EU cars and vans by 2030. The European Commission suggest 3,6% of advanced biofuels by 2030, which is already higher than what T&E considers sustainable.[3] To make sufficient PtX to power the current fleet of cars is estimated to require 4.5 x 10^6 GWh of energy equivalent to 1.4 times the size of the current EU electricity generation.

EU member states have agreed to reduce CO2 emissions from non-ETS sectors (largely road transport, agriculture and housing) by an average of 30% from 2005 levels by 2030. But the targets are differentiated with western European countries in which the majority of new cars are sold averaging a 35% reduction and some as high as 40%. Transport represents around a third of these emissions and cars will need to make a disproportionate contribution to the reduction due to the slow turnover in the housing stock and challenges of decarbonising agriculture and freight (aviation and shipping are not part of the Non-ETS goals). T&E recommends emissions from new cars are therefore reduced by -25% levels by 2025 and -45% by 2030 from current targets of 95g Co2/km in 2021; and that vans are reduced by 40% by 2030.[4]

To ensure post 2030 climate goals are met cars will need to continue to be decarbonised and this cannot be achieved solely through more efficient combustion engines and low shares of advanced biofuels. ICCT (2016) finds that even with CO2 standards in place for cars, vans and trucks in 2025, GHG reduction will only reach 22% emission reduction of the needed 30% in 2030.[5] To achieve the emission reductions needed, study by Element Energy looking at the cars and vans market confirms that Zero Emission Vehicles will be needed from 2022, even if CO2 targets of 75g Co2/km and 50g Co2/km in 2030 are met.[6] Car makers will thus increasingly rely on selling zero emission vehicles to comply with their targets for 2025, 2030 and beyond. Today, upfront costs for EVs are still too high, and more EV supply is needed to increase choice and economies of scale. The recent wave of market announcements of new EV models shows that European manufacturers are finally taking up the race with Chinese competitors. What is less clear is whether carmakers intend to manufacture electric cars in significant numbers in the EU or to focus on exporting them back from China or from the US where they are making substantial investments. The best way to guarantee ZEVs are manufactured in the EU is to set industrial policy creating a significant market that will be supplied locally.

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[2] https://www.transportenvironment.org/publications/europe-needs-slash-its-transport-emissions-94-2050-effort-sharing-regulation

[3] https://www.transportenvironment.org/sites/te/files/2017_06_Advanced_biofuels_target.pdf

[4] In an attempt to reduce road transport emission, the EU has set legally binding targets for Co2 emissions for both new cars and vans (510/2011) at 95g for passenger cars and 147g in 2020 for vans. Both targets were achieved early in 2013 and car makers are on track to comfortably meet the 2020/21 targets as well.

[5] Assuming LDV standards equivalent to 78g/km by 2025 and 60g/km by 2030, 3%/year reduction for HDV.

[6] Towards a European Market for Electro-Mobility, report by Element Energy, October 2016, assuming that all emission reductions to reach 2030 goals come from cars and vans. This study uses the EU Commission's forecast for growth in vehicles from 225M in 2005 to 315M in 2030. The model assumes new car sales and fleet turnover from 14M (now) to 18M in 2030 as the EU automotive market is recovering. Due to the increased stock turnover the current emission reductions (historically 600M t equivalent to 30% will now be reduced to 400 Mt Co2 equivalent in 2030). Currently, EU vehicles emit 150g /km in real life – and thus fall 50g short to achieve goal of 30% in 2030.

2. ZEV requirements around the world

California was the world's first region to introduce a 'Zero Emission Vehicles mandate' to accelerate EV uptake. As a result, California is now the world's third largest market (after China and Europe) leading the way in the US with plug-in car sales, accounting for 184,657 of the 407,378 battery and hybrid electric cars sold in the United States between January 2011 and January 2016. Its success in this respect has resulted in it being rolled out to nine other States, encompassing 28% of the US car market. From 2018 onwards, the mandated credit level is set to ramp up from 4.5% in 2018 to 22% in 2025, 16% of which must be from ZEVs.

Aiming at deploying 7 Million 'New Energy Vehicles[7]' in 2025, i.e. about 20% of the market, the Chinese government is introducing a similar quota in 2019. The Chinese Ministry of Industry and Information Technology (MIIT) requires 10% of credits given to EV producer or importers to be electric or plug-in, and 12% in 2020. New Energy Vehicles are counted against this score depending on the range the car can drive electrically.[8]

Since the Chinese ZEV targets were in discussion, the European, in particular German car industry, had heavily lobbied trying to water down the requirements. They are however also ramping up production and choice in the Chinese market: Volkswagen for instance announced 13 new BEV and PHEV models by 2020 and another 10 until 2025.[9] Similar to Europe and the US, all car makers selling more than 50.000 units in China are also subject to CO2 limits, with targets of 3.3-7.3 Liters/100km and gradually increasing until 2020. These CAFC (Corporate Average Fuel Consumption) targets are subject to strong sanctions - possibly withdrawing type approval if it can be proven that car makers did not seek to meet targets. The Chinese government expects that CAFC standards, together with the ZEV targets, to save 3,546.7 tons of fuel (equivalent to 114 million tons of CO2 emissions).

3. How would a ZEV mandate benefit the EU?

To accelerate a European EV market the EU Commission needs to follow the lead of California and China and introduce a European sales mandate for ZEVs. Such a policy would have many benefits:

Crucially the mandate creates certainty for business trying to develop the market. It will increase ZEV supply and increase the likelihood these vehicles will be built in the EU as creating sufficient market volume that will be met through local production. In contrast a niche EU market is more likely to be met from imports by China. The shift to clean powertrain in the coming decades is one of the most challenging disruptions the car industry is facing.[10] By manufacturing ZEVs in Europe battery packs and cells will also be manufactured in the EU eliminating the risk of shipping large quantities of batteries that would be costly, dangerous[11] and risk supply disruption. Several battery manufacturers made public their intention to develop battery cell production in the EU.[12] In the absence of a strong push for ZEVs the European automotive industry will become a laggard dependent on diesel technology the rest of the world has no interest and that cannot be zero emission.

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[7] According to the Chinese Industry Ministry, NEVs refer to those vehicles with new-type power systems, completely or mainly driven by new energies. These include plug-in hybrid electric cars (PHEV, extended-range electric cars included), battery electric vehicles (BEV), and fuel cell electric cars (FCV)

[8] For BEVs, credits are calculated as follows: 2 credits for a range between 80km and 150km; 3 credits between 150km and 250km; 4 credits between 250km and 350km; 5 credits for more than 350km

[9] http://www.autonewschina.com/en/article.asp?id=16349

[10] https://www.rolandberger.com/publications/publication_pdf/roland_berger_israel_automotive_and_smart_mobility_final_131216.pdf

[11] http://europe.autonews.com/article/20170102/ANE/161219895/automakers-hunt-for-battery-cell-capacity-to-deliver-on-bullish-ev

[12] LG Chem announced a new production facility in Wroclaw, Poland: the new facility, which LG Chem will be investing around 1.3 billion złoty ($340 million) into, will cover all aspects of battery production (from electrode to cell to modules and battery packs). Likewise, Samsung announced a new plant for the second half of 2018 north of Budapest, Hungary.

A ZEV mandate at EU level would give investors more certainty and would benefit the ecosystem around zero emission vehicles, without imposing a disproportionate burden on car manufacturers and including some flexibility, as it is set as an average across the entire EU market, i.e. all Member States. It provides the basis for building a European EV supply chain. The recent shift of the debate shows that many companies are investing.[13] T&E analysis has found that even a net increase in employment can be expected by 2030 from the transition to electric vehicles.[14]

A ZEV mandate will also modernize the EU's electricity grid. Smart charging of electric vehicles allows consumers to avoid charging during peak times making use of lower carbon, cheaper electricity and increasing the demand for ancillary (grid balancing) services. As price of renewables keep decreasing, additional storage options for solar and wind energy must be found. A predictable ZEV share helps electricity companies to estimate how many ZEVs will be connected to the grid providing a potential in storage capacity and flexible demand, supporting investments in a smarter grid.

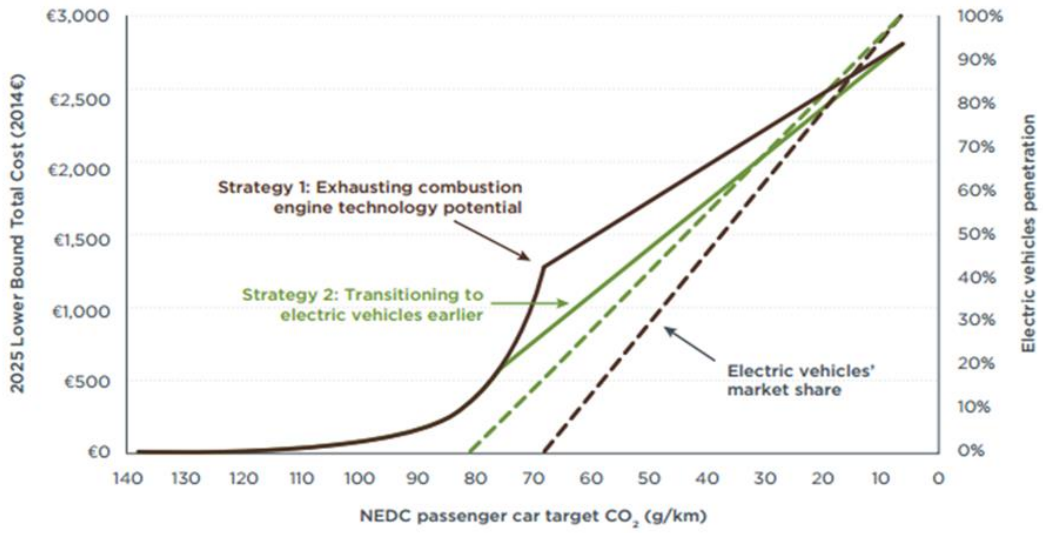
Increasing ZEV supply also **supports Member States in rolling out of recharging infrastructure** as demand for a denser network will increase and business cases for infrastructure build up will emerge more quickly. This reduces the need for public investment and encourages private schemes. While fast charging infrastructure should be set along countries' core highways to ensure larger distances, normal charging infrastructure should be set up in non-residential buildings such as workplaces and parkings to allow charging during working hours, through provisions in the Energy Performance of Buildings Directive.

A ZEV mandate would put the EU on track to meet its climate objectives. The introduction of a European ZEV mandate in addition to CO2 standards in 2025 would set a clear course towards transport decarbonisation, helping the EU meet its climate goals. As part of Member States' obligations to reduce emissions in buildings, agriculture and transport, a ZEV mandate at a minimum of 15% would help many Member States fulfil their emission targets in the transport sector which are likely to exceed 30%.In its Low Emission Mobility strategy (July 2016), the European Commission set out the first elements of a comprehensive European strategy for e-mobility urgently, including the intention to "*analyse the impact of different ways to incentivise low- and zero-emission vehicles in a technology neutral way, such as setting specific targets for them.*"[1] In reaction, the European Parliament's Environment Committee has signalled support of developing a "Zero-Emission Vehicles (ZEV) and ULEV mandates that impose a stepwise increasing share of zero- and ultra-low-emission vehicles in the total fleet with the aim of phasing out new CO2-emitting cars by 2035", along with its renewed its commitment to an ambitious 2025 CO2 fleet average target (own-initiative report on Low Emission Mobility, report by Environment Committee).

Zero Emission Vehicles are becoming the cost-effective way to deliver emissions reductions from cars. Research from ICCT (2016) finds that below a CO2 fleet average of 80g/km it is more cost-effective for car makers to achieve the emission reductions through selling zero emission vehicles (and more efficient combustion engine vehicles).

[13] Daimler has already announced it will produce its new electric vehicles in their existing German plants by integrating them with serial production of cars with combustion engines. Volkswagen will begin the production of the ID in 2019 in Germany as well (in Zwickau, Saxony).

[14] https://www.transportenvironment.org/publications/how-will-electric-vehicle-transition-impact-eu-jobs



Total incremental cost (including indirect costs but excluding taxes) of reducing CO_2 emissions of the average passenger car in the EU by 2025 in a lower-bound scenario, comparing full deployment of combustion engine technologies before transitioning to electric vehicles to a least-cost strategy of transitioning to electric vehicles earlier.

This means in return that selling ICEVs below this average becomes more expensive for car makers without investments into electrification. To help car makers make smart investment choices that save money in the long term, Europe now needs a tool that helps build the market for ZEVs.

A ZEV mandate would help tackle air quality and noise in cities. The introduction of a ZEV mandate at EU level would also help address Europe's air pollution crisis and tackle noise issues. It is estimated[15] that in Rome and Hong Kong in 2020, with electric vehicles accounting for just 20% of city centre traffic, the concentrations of nitrogen dioxide can be reduced by as much as 45%. Noise would also be reduced lowering the 1.8% of heart attacks it contributes to.[16] Electric vehicles emit between 2 and 5 dB less than a conventionally fuelled vehicle at speeds lower than 30km/h.[17] Better Zero Emission vehicle choice also helps drivers and cities benefit from Low Emission Zones.

4. 15-20% of ZEV sales for Europe in 2025 - an achievable target

The EU has set a target to reduce non-Emissions Trading Scheme CO2 emissions by 30% from 2005 levels by 2030, as part of the EU's 2030 Climate and Energy Package. Transport currently represents 35% of this, and emissions reductions from this sector will be required at this level to meet the overall target. According to the Element Energy's study, which takes into account all efficiency improvements available to car makers, a minimum share of 10% Zero Emission Vehicles will have to be sold by 2025 to achieve a -25% reduction in new car CO2 emissions (equal to ca. 71g CO2 based upon the current NEDC system). A 35% reduction by 2025 requires 20% ZEVs.

[15] modelling study by Renault-Nissan alliance, Ariatechnologies, and Arianet

[16] World Health Organization press release and report available at http://www.euro.who.int/__data/assets/pdf_file/0008/136466/Burden_of_disease.pdf

[17] https://www.toi.no/getfile.php/mmarkiv/Forside%202015/compett-foredrag/Lykke%20-Silent%20Urban%20Driving.pdf

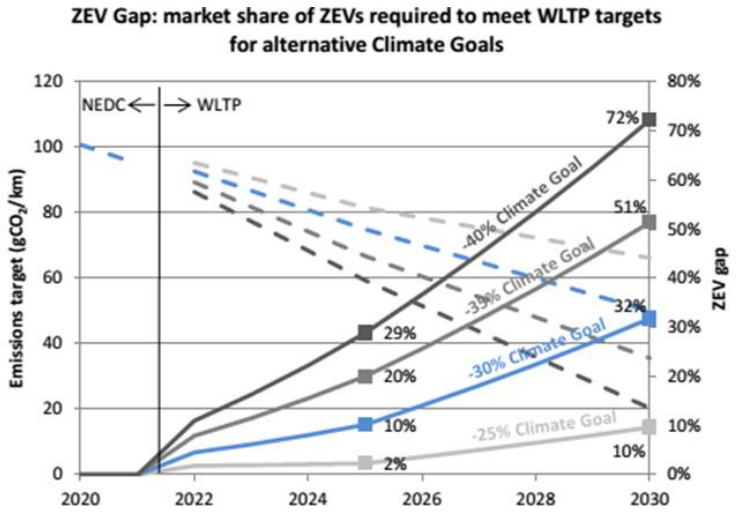


Figure 34: The ZEV Gap (solid lines) for the WLTP target trajectories (dotted lines) needed to meet -25%, -30%, -35% and -40% Climate Goals for cars

A target of 15%-20% by 2025 is realistic in the context of a series of recent commitments to electrification announced by OEMs that cumulatively also suggest 20% sales by 2025[18].

However, to meet these commitments, car makers need to increase EV supply and choice for customers in the European market. There are just 20 battery electric vehicles (BEVs) on sale in Europe compared to 417 conventionally fuelled models (petrol and diesel). Furthermore many of these models are simply not available for sale in showrooms while others have long waiting times due to a lack of manufacturing capacity. So far European carmakers have not made sufficient efforts to selling electric vehicles and allocated only very small marketing budgets. Data from marketing analytics specialists Ebiquity analysed by T&E shows that on average across Germany, France, UK, Spain, Italy and Norway only 2.1% of carmakers' marketing budget was spent on zero-emission vehicles (ZEVs) and 1.6% on plug-in hybrid models.

5. How should a European ZEV target be designed?

The EU Commission proposal should set a ZEV sales mandate for all European car makers to which CO2 standards apply (excluding niche manufacturers). Thus, OEMs selling more than 10,000 conventionally-fuelled cars a year should be included in the scope of a European ZEV mandate crediting system, giving credits to car makers for sales of ZEVs based on the following criteria:

All BEVs with a minimum range of 150km as measured on the WLTP cycle should count as 1 credit towards a car makers' ZEV target. This is in contrast to the excessively complex system used in California which differentiates for vehicles' electric range and has undermined the regulation. Rewarding long EV ranges (as has been done in California) rewards larger and heavier batteries to provide longer range, and does not drive EVs to be more energy efficient. It also runs the risk of the regulation being diluted to supply of a small number of longer range EVs. Consumer preferences will anyway encourage longer range models for those customers that need such vehicles. To keep a European ZEV mandate simple, applicable and as a tool to create sufficient BEV range in the first instance, no differentiation between credits for BEVs is suggested. A BEV with a range less than 150km would receive a credit of less than 1 as explained below, typical for today's EVs.

PHEVs (with a minimum electric range of 50km) could be included in a ZEV Mandate, but counted as less than 1 credit.[19] The real world emissions for PHEVs are dependent on the proportion of driving

[18] https://www.transportenvironment.org/sites/te/files/publications/2017_09_Carmakers_goals_EVs_report_I.pdf

carried out on electric power and experience from the Netherlands suggests drivers are currently only using PHEVs electrically about 35% of the time.[20] Recent data suggests this may be increasing slowly but there remains a significant gap between the electric use of PHEV and BEV models. T&E proposes that a typical PHEV model on the market today (which has an electric range of around 50km) should be allocated 0.4 credits towards a ZEV sales target.[21] But the absolute number of credits should depend upon the range of the PHEV such that a PHEV with a 150km WLTP range (the same as the minimum for a BEV) would receive 1 credit. OEMs will be required to earn a specific number of credits based upon their total sales of conventional vehicles and the sales target percentage. In this way the PHEVs can contribute to closing the ZEV gap, but their higher emissions mean that a higher market share is needed. As in California there should also be a maximum ceiling to cap how much PHEVs can contribute to the mandate.

Incentives for Electric quadricycles (electric L-Category Vehicles) should also be included. Small four-wheeled micro-cars, known as quadricycles, have the potential to electrify a portion of total vehicle kilometres travelled, particularly in urban areas. The EU regulates such vehicles as category L, alongside mopeds, motorcycles and motor tricycles. The most popular electric example of this type of vehicle is the Renault Twizy, with more than 16,500 sales in Europe since its release in 2012. In recent years these vehicles are becoming increasingly more popular and their electric versions offer significant benefits in air pollution, noise and CO2 reduction if replacing vehicle mileage. To encourage sales of these vehicles, a reduced credit value, weighted in the calculation of CO2 emissions, could be introduced. Based on the best estimates of their capability to replace ICEV vehicles mileage, and the associated CO2 reductions, a credit value of 0.35-0.45 would be appropriate, according to Element Energy. This is higher than in the California ZEV Mandate, which values these vehicles (referred to as Neighborhood Vehicles) at about 10% that of a standard BEV. A fixed credit limit according to sales estimates could help not to overly reward them as their limited range and speed means they are not able to fully decarbonise light duty transport.

OEMS should be allowed to trade ZEV credits to meet overall emission goals. Decarbonisation is required from the entire automotive industry, and so the regulation should look not to unduly penalise certain OEMs that choose not to supply ZEVs. The current CO_2 standards allow OEMs to form pools over which their average emissions are calculated (pooling). This can be achieved in a ZEV target system by allowing the trading of credits between OEMs. An OEM that generates surplus credits can earn revenue by selling them, as well as benefitting from the reduction in their average emissions. Meanwhile, a non-compliant OEM must both purchase credits and improve their vehicle efficiency.

Non-compliance requirements should be similar to the current regulation. The scheme should be subject to the similar fines as apply in the current CO2 limits for passenger cars. If the average CO2 emissions of a manufacturer's fleet exceed its limit value in any year, the manufacturer has to pay an excess emissions premium for each car registered. From 2019, the cost will be €95 from the first gram of exceedance onwards. Counting every ZEV not sold as a combustion engine vehicle at an average emission of Xg/km (where X as required from 2025). For example with a 75g/km target, the excess premium would be 95€x75g = 7125 € per ZEV not sold. To avoid these sanctions, car makers should be allowed to buy ZEV credits from competitors with ZEV oversupply through a trading mechanism.

Super-credits don't work. Current incentives for electric cars, so-called Super-credits, is a multiplier scheme (accounting cars rating less than 50g Co2/km as 2 cars in 2020, 1.67 in 2021 and 1.33 in 2022). The system has had very limited impact on the market to date - although the anticipated increase in models in

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[19] Credits should be given to PHEVs with a minimum range of 50km on WLTP and could be expressed as a g/km equivalent.

[20] https://www.transportenvironment.org/sites/te/files/Towards%20a%20European%20Market%20for%20Electro-Mobility%20report%20by%20Element%20Energy.pdf

[21] As for combustion vehicles, real world CO2 emissions of hybrids need to be measured and a proposal to monitor PHEV's CO2 emissions should be part of the forthcoming transport package. According to the average electric range driven resulting from the monitoring the credit score can be adjusted.

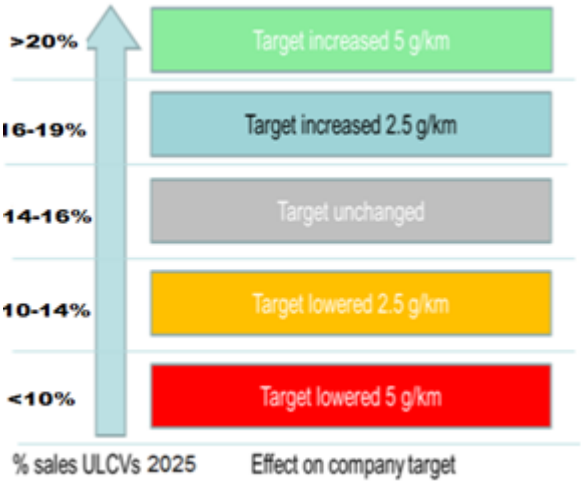
2020 and 2021 may in part be stimulated by the system. The problem with Super-credits is that they enable car makers to sell less EVs because of the multiplier effect. Super-credits were initially intended to bring EVs into the market, but have two key flaws:

1. They weaken the CO2 target and the overall regulation by creating "hot air" by multiple counting of low emission vehicles;
2. Once EVs are needed to achieve the targets they actually enable less of them to be sold.

Research[22] suggests that after 2021 this instrument should be replaced with a more appropriate market tool - a ZEV target. For example, in 2030 it is estimated that BEVs/PHEVs would require a market share of 32-43% to meet a 50 gCO_2/km target, depending on the BEV - PHEV ratio. However, if 1.33 Super-credits are available per EV in 2030, a third less BEV/PHEVs are required. Super-credits do not, therefore, facilitate the long term goal of electrified and zero-emission transport, but in fact reduce the need to deploy EVs to meet a given target while increasing overall stock emissions by allowing carmakers to sell more gas guzzlers. In addition, as the market share of ZEVs is expected to continue to rise, Super-credits are likely to cause a larger gap between the actual average emissions and that submitted for compliance against the target. This may compromise the transport sector's CO2 reduction targets set in the Effort Sharing Regulation that is based upon actual fuel consumed. Retaining the current super-credit regime is estimated to increase emissions by 1.3 %, and lead to 31 Mt. of additional CO2 from 2020 until 2030.[23]

6. A Flexible ZEV target - pros and cons

A ZEV sales target could also be combined with the future CO2 Standards to give car makers more flexibility how to deliver CO2 emission reductions. This could be done to set a sub-target for every company to supply 15% of Zero Emission Vehicles in 2025. Companies overachieving the target would receive a bonus reduction in their fleet average CO2 target. Companies underperforming would be expected to achieve a lower fleet average CO2 target. Trading allowances would encourage new entrants and specialist suppliers. To encourage sales of PHEVs and Light Electric vehicles, could count towards the target as explained above.



[22] https://www.transportenvironment.org/sites/te/files/Towards%20a%20European%20Market%20for%20Electro-Mobility%20report%20by%20Element%20Energy.pdf

[23] Experience from the first Super Credits scheme from 2012-2015 (rating ULCVs as 3.5 in 2012 decreasing stepwise) shows that the impact has been small with only Nissan and Renault alleviating more than 2g from their emissions targets through the scheme in 2014. In addition, even if Super Credits were ignored, all manufacturers still met their Specific CO_2 Targets. This suggests that the scheme does not offer a large enough incentive to develop ultra-low carbon vehicles when the targets can comfortably be met with conventional vehicles regardless. New evidence from this study reveals that if Super Credits were used to comply with the -30% reduction goal, the scheme would allow car makers to indicate WLTP emissions 2g CO2/km higher than the needed 2030 target, and 3-4 gram CO2/km than the needed 2030 target.

The risks of such a mechanism are that the CO2 average is lowered and may lead to insufficient CO2 reductions and jeopardize road transport's overall decarbonisation goal if the mandate is set too low and was widely exceeded by the market. Element Energy estimate that if the target is increased by 2 gCO2/km for every 1 percentage point that the mandate is exceeded, then consistently exceeding the mandate by 5 percentage points would result in emissions reduction 2005- 2030 of 25.9%. This is considerably lower than the 30% required, and equivalent to an additional 24.6 Mt of CO2 per year in 2030. To manage the risk, the 'bonus' car makers can earn through accounting ZEV sales in this design option should be capped.

The advantages of a flexible solution are that because ZEV are accounted for in their CO2 average, car makers can 'offset' sales of heavy and more polluting premium cars against sales of electric cars. This may be particularly important for OEMs in the premium sector.

Conclusion: 2025 CO2 standards have to work hand in hand with a ZEV mandate

The automotive industry will change more in the next 5 to 10 years than the last 50.[24] One of these transformations is to electric powertrains that are essential for vehicles to also be increasingly shared and automated. With opportunities to cost effectively improve the efficiency of the internal combustion engines limited; this shift is also needed to decarbonise transport. The debate is no longer whether, but how quickly this change occurs and crucially where first. It has begun in China and parts of the US and parts of Europe too - but progress is heterogeneous. A ZEV mandate set on EU level is one of the tools needed to ensure the single market works EU-wide - and therefore cannot be replaced by Member States targets. It is needed to make the automotive industry in Europe globally competitive and the forthcoming car and van CO2 proposals is the ideal opportunity. The Commission should:

- Set sales targets for zero emission vehicles at 15-20% in 2025 and 35-50% for 2030; for both cars and vans
- Require fleet average CO2 emissions from new cars to be reduced by 25% by 2025 and 45% by 2030 for cars; 25% and 40% for vans.

Further, Member States and Cities need to set infrastructure and accelerate EV adoption through

- Deploying a sufficiently dense and performing charging infrastructure network, along highways, at core points in cities and in non-residential buildings
- Accelerate the deployment of zero emission vehicles in bus fleets and other commercial fleets.

Further information

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[24] Mary Barra https://www.weforum.org/agenda/2016/01/the-next-revolution-in-the-car-industry/