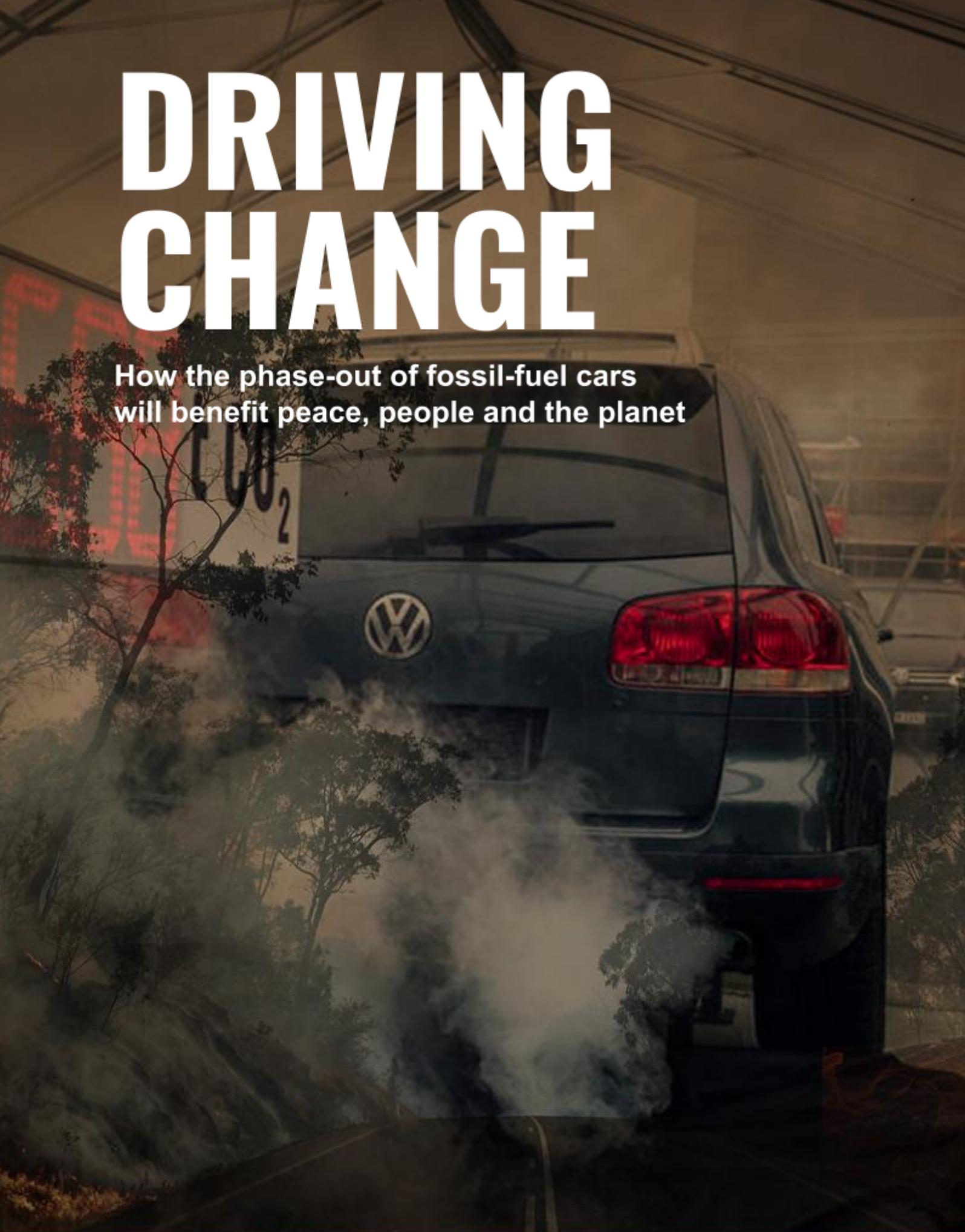


DRIVING CHANGE

How the phase-out of fossil-fuel cars
will benefit peace, people and the planet



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SUMMARY

Ahead of a decisive vote by the European environment ministers on the phase-out of fossil-fuelled cars, new analysis by Greenpeace Germany shows how a late phase-out of fossil fuel cars and weak CO₂ targets would lead to the failure of the EU's transport sector to meet the goals of the Paris climate agreement, and leave the EU hooked on oil, which will drive up energy costs for consumers by billions of euro.¹

Compared to the European Commission's proposal to ban the sale of new cars with internal combustion engines in 2035, backed by the Parliament on June 8, Greenpeace's proposal of a phase-out in 2028² would cut the EU's demand for oil by an additional 540 million tonnes and greenhouse gas emissions by 1.7 Gigatonnes of CO₂. It would also lead to savings for EU consumers of €635 billion in fuel costs.

The calculations also show that the 2030 phase-out date and stronger interim targets proposed by some progressive EU member states would still lead to additional oil savings of about 390 million tonnes and 1.2 Gigatonnes of CO₂, and cut EU customers' fuel bills by an additional €460 billion, compared to the 2035 date proposed by the Commission.

EU climate and environment ministers will define their common position regarding the phase-out of new petrol and diesel cars when they meet on 28 June. In recent months, the [car industry](#) and fossil fuel companies have lobbied heavily against a ban on internal combustion engine cars, and for the introduction of CO₂ credits to carmakers for the use of synthetic fuel that would further weaken the regulation.

Almost [two thirds of the oil in the EU](#) is used for transport. About one in four cars in the EU is powered with Russian oil, and cars and vans alone account for [14.5% of EU CO₂ emissions](#). To bring the sector in line with the goal of the Paris climate agreement to limit global heating to 1.5°C and wean it off fossil fuels, the EU must entirely phase out the sale of new internal combustion engine cars by 2028 and boost sustainable mobility alternatives such as rail, public transport and active mobility like walking and cycling.

¹For detailed calculations and analysis please see Annex

² In order to bring the EU transport sector in line with the 1.5°C climate target, no more new cars with internal combustion engines must [be sold in Europe from 2028](#).

CONTEXT

As part of its major “Fit-for-55” climate package, the EU is currently revising its CO₂ targets for cars. The EU Commission's proposal calls for a 55% reduction of the average CO₂ emissions of new cars by 2030 compared to 2021, and for a 100% reduction of CO₂ emissions from new cars by 2035 – effectively banning the sale of new cars with internal combustion engines. While the environment committee of the European Parliament proposed slightly stronger intermediate targets, on June 8 the Parliament’s plenary agreed on targets for 2025, 2030 and 2035 that are similar to the Commission’s proposal. Both the EU Parliament and Commission failed to strengthen the current 15% reduction target for 2025.

While environment ministers are expected to adopt a common position when they meet this month, there is some difference of opinion. While governments such as [Germany](#) and [Spain](#) back the Commission’s proposal, a group of progressive governments including Luxembourg, the Netherlands, Denmark, and Belgium are calling for an earlier phase-out date of 2030.

Neither of these proposals are enough to bring the EU’s transport sector in line with the Paris climate agreement goal to keep global temperature rise below 1.5°C. To achieve this, the [sale of new petrol, diesel and hybrid cars in the EU must end by 2028](#) at the latest – seven years earlier than the date proposed by the European Commission and approved by the European Parliament.

Greenhouse gas emissions from transport in the EU have risen by [over 25% since 1990](#) and [make up 30% of the EU’s total greenhouse gas emissions](#), with vans and cars alone accounting for 14.5% of CO₂ emissions. It’s the only sector in the EU where CO₂ emissions have been rising since 1990 and a radical transformation of the transport sector is needed to reverse the climate crisis.

While the climate crisis and the need to reduce transport emissions has driven the debate on CO₂ targets for cars, Russia’s war on Ukraine has painfully highlighted another problem – the EU’s dependency on oil imports. Almost two thirds [of all oil in the EU](#) is used for transport, with [almost half of oil consumption](#) due to road transport. The EU transport sector's oil dependency is bankrolling wars and conflicts – and volatile prices are hitting the lowest income households the hardest while oil corporations make record profits. While people paid skyrocketing prices at the pump, fossil fuel companies [raked in extra revenues of about €3 billion](#) from their diesel and petrol sales in the first weeks of the crisis.

As the EU faces the urgent question of how its energy supply can be secure, sustainable and independent, energy savings and energy efficiency must be the priority. A phase-out of fossil-fuelled cars and vans is essential to accomplish this. The failure of both the EU Commission and the Parliament to strengthen their positions on car CO₂ targets following Russia’s invasion of Ukraine is a mistake which is unnecessarily prolonging the EU’s dependency on foreign oil, while destroying the climate and driving up costs for people.

To build a resilient, secure and sustainable society, we must exit fossil fuels as quickly as possible. Our EU climate and environment ministers must choose this path when they meet to vote on CO₂ targets for cars.

ANALYSIS

Greenpeace Germany has analysed the respective positions on car CO₂ targets and the phase-out of new fossil-fuelled cars of the EU Commission and Parliament; the coalition of progressive EU governments; and Greenpeace's own recommendations. These different phase-out dates and interim CO₂ targets were compared according to savings in CO₂ emissions, oil consumption and costs to EU consumers.

We compared three scenarios:

- **2035 phase-out:** the proposal by the EU Commission, also backed by the European Parliament, including a 15% reduction in the average CO₂ emissions by 2025, a 55% reduction by 2030 and a phase-out by 2035
- **2030 phase-out:** the position of most progressive countries, calling for a phase-out in 2030 and more ambitious intermediate targets. Concrete interim targets have not been made public yet. For the progressive scenario, we assumed a 40% reduction by 2025, and a 65% reduction by 2027.
- **2028 phase-out:** Greenpeace's demand to phase-out new internal combustion engine cars in the EU by 2028. This is necessary to put the EU's transport sector on a trajectory compatible with limiting global heating to 1.5°C, [according to Greenpeace calculations](#). This phase-out date is complemented by annual car CO₂ targets starting with 15% by 2023 (see Annex for details).

Based on these three scenarios, we calculated what the **additional oil, CO₂ and cost savings** of the Greenpeace (2028 phase-out) and progressive governments' (2030 phase-out) positions would be compared to the EU Commission proposal (2035 phase-out).



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FINDINGS

The sheer number of cars sold in the EU – over 15 million annually, before the pandemic – and the fact that they will be in use for one and a half decades, exposes the enormous impact of an accelerated phase-out of fossil-fuel cars on the climate, oil consumption and costs to consumers.

Table 1: Additional oil, CO₂ emissions and energy cost reductions compared to the EU Commission proposal

|  | Additional reduction in fuel and oil consumption | Additional CO ₂ savings | Additional energy cost savings for consumers ³ |
|---|--|------------------------------------|---|
| 2028 phase-out scenario proposed by Greenpeace (compared to 2035-phaseout scenario) | 540 million tonnes | 1.7 Gigatonnes | €635 billion ⁴ |
| 2030 phase-out scenario proposed by progressive EU member states (compared to 2035-phaseout scenario) | 390 million tonnes ⁵ | 1.2 Gigatonnes | €460 billion |

The 2030 phase-out scenario proposed by progressive EU governments would cut oil consumption by approximately 390 million tonnes and tailpipe emissions from cars by an additional 1.2 Gigatonnes compared to the 2035 phase-out scenario as proposed by the EU Commission. An accelerated phase-out of new internal combustion engine cars would begin to have an impact on oil consumption and CO₂ emissions from 2025 onwards, which is the first year by which the interim reduction targets of the 2030 phase-out scenario differ from the 2035 phase-out scenario. Additional reductions of annual tailpipe emissions start at about 5 million tonnes in 2025. This number further increases to additional annual reductions of over 80 million tonnes of CO₂ between 2034 and 2039, which is the timespan when most of the cars affected by the more ambitious intermediate targets and the earlier 2030 phase-out scenario will be on the road. After 2039, annual CO₂ emissions will continue to decrease and cease to exist by the end of the 2040s.

³ As electric vehicles are more energy efficient than ICE cars and electricity prices in the EU are lower than fuel prices, more ambitious CO₂ targets and an earlier ICE phaseout also translate into cost savings for consumers. Calculations are based on pre-war fuel and electricity prices in the EU.

⁴ equivalent to about twice the EU's annual oil consumption

⁵ That is more than four times the annual oil consumption of Germany

The 2028 phase-out scenario, as proposed by Greenpeace, results in even bigger savings. Compared to the 2035 phase-out scenario, cumulative tailpipe emissions would be reduced by over 1.7 Gigatonnes of CO₂. Overall, oil consumption would be reduced by a total of about 635 million tonnes until the end of the 2040s. That is equivalent to about twice the amount of the EU's annual oil consumption. Total additional energy cost savings for consumers would amount to €635 billion.

With regard to total energy cost savings calculated according to the 2028 and 2030 scenarios, even higher numbers can be assumed given that Greenpeace has made a conservative estimates based on fuel and electricity prices at the start of 2022, before the beginning of the invasion of Ukraine. With the current developments in the energy sector – such as falling costs for renewable electricity generation and the increasing price of carbon – it can be assumed that the price difference between fuel and electricity will increase in the medium term, irrespective of conflicts or wars.

Table 3: Additional oil, CO₂ emissions and energy cost reductions in selected EU member states

| |  AUSTRIA | | |  DENMARK | | |
|---|---|--|---|---|--|---|
| | CO ₂ reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) | CO ₂ reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) |
| 2030 vs 2035 phaseout scenarios (progressive member states vs EU Commission & Parliament) | 32 | 10 | €10 | 26 | 8.1 | €7.2 |
| 2028 vs 2035 phaseout scenarios (Greenpeace vs EU Commission & Parliament) | 44 | 14 | €13 | 35 | 11 | €10 |

| |  FRANCE | | |  GERMANY | | |
|---|--|--|---|---|--|---|
| | CO ₂ reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) | CO ₂ reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) |
| 2030 vs 2035 phaseout scenarios (progressive member states vs EU Commission & Parliament) | 206 | 65 | €76 | 349 | 110 | €128 |
| 2028 vs 2035 phaseout scenarios (Greenpeace vs EU Commission & Parliament) | 283 | 89 | €104 | 480 | 152 | €177 |

| |  ITALY | | |  LUXEMBOURG | | |
|---|---|---|--|--|---|--|
| | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) |
| 2030 vs 2035 phaseout scenarios (progressive member states vs EU Commission & Parliament) | 118 | 37 | €48 | 5.1 | 1.6 | €2.1 |
| 2028 vs 2035 phaseout scenarios (Greenpeace vs EU Commission & Parliament) | 162 | 51 | €66 | 7.1 | 2.2 | €2.9 |
| |  NETHERLANDS | | |  SLOVENIA | | |
| | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) |
| 2030 vs 2035 phaseout scenarios (progressive member states vs EU Commission & Parliament) | 37 | 12 | €23 | 7.5 | 2.4 | €2.9 |
| 2028 vs 2035 phaseout scenarios (Greenpeace vs EU Commission & Parliament) | 51 | 16 | €31 | 10 | 3.3 | €3.6 |
| |  SPAIN | | |  SWEDEN | | |
| | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) | CO2 reduction (mio tonnes) | Reduction in fuel consumption (mio tonnes) | Energy cost reduction for drivers (billion Euros) |
| 2030 vs 2035 phaseout scenarios (progressive member states vs EU Commission & Parliament) | 93 | 29 | €22 | 30 | 9.5 | €14 |
| 2028 vs 2035 phaseout scenarios (Greenpeace vs EU Commission & Parliament) | 128 | 40 | €31 | 41 | 13 | €20 |

Please see the Annex for more detailed information about the calculations.

CONCLUSIONS & GREENPEACE DEMANDS

If EU environment ministers decide to water down the European Commission's and European Parliament's position, either by changing the phase-out date, reducing the 100% target to 90%, or by introducing loopholes such as a carbon credit system for carmakers for the use of synthetic fuels, the EU would fall even further behind on its climate goals, lose out on the benefits of energy security, and at the same time increase the cost of fuel for drivers.

Greenpeace is calling on European ministers to resist the lobbying of the car and fossil fuel industries against the ban, and to agree a phase-out for the sale of new cars and vans with internal combustion engines by 2028 at the latest across the EU, in line with the goal of the Paris climate agreement. Scientists warn that this decade will be a make-or-break for climate action. The sooner we phase-out fossil-fuelled cars and vans, the quicker we can wean ourselves off toxic fossil fuels.

The European Commission's proposal, supported by the European Parliament, for a 55% CO₂ emissions reduction target by 2030 with the introduction of 100% zero-emission vehicles by 2035, is neither strong nor urgent enough to tackle the climate crisis.

In order to [decarbonize the EU's transport sector](#) in line with the Paris climate agreement's 1.5°C goal, new internal combustion engine vehicles must be phased out no later than 2028.

When EU environment ministers meet on 28 June, they will have the power to strengthen the targets and accelerate the European Commission's proposed phase-out of new petrol, diesel and hybrid vehicles by 2035, by bringing it forward to 2028 at the latest.

They must reject any attempts to weaken the ban on internal combustion engine cars via a [carbon credit system for synthetic fuels](#)⁶ or to promote SUVs via more lenient targets for carmakers selling heavier cars. They must also strengthen the CO₂ emissions thresholds between now and 2028. In addition, governments can also ban the sale of internal combustion engine cars within their own territory at an earlier date.

The revision of the EU CO₂ emissions standards regulations must be accompanied by three reforms:

- The electricity supply for all electric vehicles must come fully from renewable and sustainable energy sources.
- A reduction in the size of the car fleet and of car use, and an increase in sustainable mobility solutions such as car pooling, public transport and active mobility like walking and cycling.
- Promoting lighter cars and taking heavy and highly polluting cars off the road

⁶ Greenpeace considers hydrogen and e-fuels (synthetic petrol or diesel on the basis of hydrogen) for cars a wrong solution for several reasons, including their inefficiency and harmful impacts on the climate and the environment. According to Transport & Environment, [e-fuels only reduce the CO₂ emissions of a car bought in 2030 by just 5%](#), on average, over its lifetime compared to petrol. Burning synthetic fuels would also pump toxic NOx emissions into the air, tests have shown, while running a car on e-fuel is far more expensive compared to an electric vehicle. Producing e-fuels is also much less efficient than powering a battery electric car.

ANNEX

Calculations

We compared the three scenarios outlined above and calculated the relevant EU CO₂ targets leading up to each respective phase-out date. The Greenpeace demand to phase-out internal combustion engine cars by 2028 has been supplemented with annual CO₂ reduction targets which increase year on year, starting with 15% in 2023. The CO₂ emissions from the cars and vans in the EU in 2021 according to the Worldwide Harmonised Light Vehicle Test Procedure (WLTP)⁷ served as the base value for converting the relative targets into absolute targets in grams per kilometre (see Table 3). The base value can be provisionally calculated as follows:

$$95g \times \left(\frac{\text{average emissions as measured according to the WLTP}}{\text{average emissions as measured according to the NEDC}} \right)^8$$

The final base value and consequent absolute targets will be published by the EU Commission by October 31, 2022. We have used the European Environment Agency's (EEA) data for 2020 to calculate a baseline value of 115g.

Table 3: Car CO₂ target values of the different scenarios

| | 2035 Phase-out scenario (EU Commission & Parliament) | | 2030 Phase-out scenario (progressive member states) | | 2028 Phase-out scenario (Greenpeace) | |
|-------------|--|--|---|--|--|--|
| | Relative reduction of car CO ₂ target | Expected absolute car CO ₂ target in g/km | Relative reduction of car CO ₂ target | Expected absolute car CO ₂ target in g/km | Relative reduction of car CO ₂ target | Expected absolute car CO ₂ target in g/km |
| 2035 | -100% | 0 | | | | |
| 2030 | -55% | 51.7 | -100% | 0 | | |
| 2028 | -15% | 97.6 | -65% | 40.2 | -100% | 0 |
| 2027 | -15% | 97.6 | -65% | 40.2 | -85% | 17.2 |
| 2026 | -15% | 97.6 | -40% | 68.9 | -65% | 40.2 |
| 2025 | -15% | 97.6 | -40% | 68.9 | -45% | 63.2 |
| 2024 | | 115.0 | | 115.0 | -25% | 86.1 |
| 2023 | | 115.0 | | 115.0 | -15% | 97.6 |

⁷ The Worldwide Harmonised Light Vehicle Test Procedure (WLTP) laboratory test measures fuel consumption and CO₂ emissions from passenger cars.

⁸ NEDC stands for New European Drive Cycle which served as the basis for standardised testing for the EU car CO₂ targets before being replaced by the Worldwide Harmonised Light Vehicle Test (WLTP). To account for this transition and the varying accuracy of the test procedures the EU institutions came up with this formula.

For the further calculation we made the following assumptions:

- [Car sales will return to pre-COVID levels by 2025](#). We assumed annual sales of 15 million vehicles in the EU, 315,000 vehicles in Austria, 220,000 vehicles in Denmark, 2.3 million vehicles in France, 3.5 million vehicles in Germany, 1.9 million vehicles in Italy, 54,000 vehicles in Luxembourg, 390,000 vehicles in the Netherlands, 390,000 vehicles in the Netherlands, 70,000 vehicles in Slovenia, 1.2 million vehicles in Spain and 350,000 in Sweden.
- We furthermore assumed that the [average annual mileage will return to pre-COVID levels](#) with 13,699 km in Austria, 15,982 in Denmark,⁹ 12,223 km in France, 13,600 km in Germany, 8,464 km in Italy, 12,849 km in the Netherlands, 14,670 km in Slovenia,¹⁰ 10,591 km in Spain, [and 11,710 in Sweden](#). We could not obtain data for Luxembourg and assumed 13,000km.
- The average lifetime of the vehicles is assumed to be 15 years – a conservative assumption as many [studies assume the average vehicle lifetime in Europe to be 17-18 years](#).
- We assumed efficiency improvements of one percent per year for both combustion engines and electric cars

For the calculation of cost savings we referred to [fuel](#) and [electricity](#) prices from the beginning of 2021 – before the extreme price hikes due to the energy crisis around the Russian invasion of Ukraine (Austria petrol: 1.40 euro, diesel: 1.38, electricity: 0.23 euro per kilowatt hour; Denmark petrol: 1.80 euro, diesel: 1.55, electricity: 0.34 euro per kilowatt hour; France petrol: 1.63 euro, diesel: 1.54, electricity: 0.20 euro per kilowatt hour; Germany petrol: 1.72 euro, diesel: 1.57, electricity: 0.32 euro per kilowatt hour; Italy petrol: 1.72 euro, diesel: 1.59, electricity: 0.24 euro per kilowatt hour; Luxembourg petrol: 1.48 euro, diesel: 1.38, electricity: 0.20 euro per kilowatt hour; Netherlands petrol: 1.98 euro, diesel: 1.62 euro, electricity: 0.14 per kilowatt hour; Slovenia petrol: 1.32 euro, diesel: 1.37 euro, electricity: 0.17 euro per kilowatt hour; Spain petrol: 1.48 euro, diesel: 1.35, electricity: 0.28 euro per kilowatt hour; Sweden petrol: 1.76 euro, diesel: 1.97 euro, electricity: 0.26 per kilowatt hour). The electricity prices are average household prices. It is significantly cheaper for households with their own photovoltaic solar systems to charge electric vehicles, while the prices at fast charging stations are higher.

We first calculated the emissions savings for the 2030 phase-out scenario compared to the 2035 phase-out scenario (and then did the same for the 2028 phase-out scenario). To do this, we multiplied the difference between the values for the absolute annual CO₂ targets by the number of cars sold as well as the annual mileage, and added them up according to the assumed vehicle lifetime.

The calculation for the additional costs for drivers is more complex and is worked out in several steps. First, we determined the number of battery electric vehicles that also have to be registered in order to reach the respective absolute targets:

⁹ Denmark was not part of the same European study that served as the source for mileage in most member states. Hence, the average mileage had to be computed on the basis of [two publications](#) from the Danish statistics office.

¹⁰ Slovenia was not part of the same study that served as the source for mileage in most member states. Hence, the average mileage had to be computed on the basis of [two publications](#) from the Slovenian statistics office.

Number of internal combustion engine cars = absolute CO₂ target x number of all new registrations / average fleet emissions of internal combustion engine cars in the EU

Number of battery electric vehicles = number of all new registrations - number of internal combustion engine cars

The average fleet emissions (WLTP) of all newly registered internal combustion engine cars (petrol and diesel) in the EU in 2020 are 145g CO₂.

Our scenarios do not consider plug-in hybrids for two reasons. On the one hand, it is unclear whether plug-in hybrids will still play a significant role in 2025. Recent reports warn that demand for them could fall significantly and that even [the residual values of used plug-in hybrids could plummet](#). On the other hand, there is a particularly wide gap between the official CO₂ emissions and on-road CO₂ emissions in the case of plug-in hybrids. The [actual emissions are on average two to four times as high as the manufacturer's specifications](#), mainly because these models are driven far less frequently in electric mode in everyday use than in the test cycle. Since electricity costs are far lower than fuel costs, plug-in hybrids would incur total costs that are far too low on paper and thus distort the cost calculation. In addition, the EU Commission is working on a [proposal on how the calculation of consumption values for plug-in hybrids should be revised](#). This could come into effect by 2025. If one assumes that plug-in hybrids are used for half the time in electric and half in combustion engine mode from 2025, taking plug-in hybrids into account would not make any significant difference when calculating the additional costs.

We determined the fuel and electricity consumption based on annual registration numbers for combustion engines and electric cars taken from the [EEA database](#). Since fuel consumption and CO₂ emissions from new registrations differ among EU member states we have taken into account the respective national averages when making calculations for member states. According to WLTP, this was 148g for all combustion engines (petrol and diesel) newly registered in Austria in 2020. Denmark had an average of 135g, France of 134g, Germany of 155g, Italy of 139g, Luxembourg of 160g, the Netherlands of 136g, Slovenia of 143g, Spain of 140g and Sweden of 153g. According to the WLTP, new electric cars registered in Austria in 2020 had an average consumption of 17.2 kWh per 100 km. This was 16.7 in Denmark, 16.9 in France, 16.5 in Germany, 15.2 in Italy, 17.3 in Luxembourg, 17.0 in the Netherlands, 16.1 in Slovenia, and 17.7 in Sweden. Spain did not report average electricity consumption for its newly registered BEVs so the European average of 17 kWh per 100 km was used. We assumed an annual improvement of one percent for both values. The calculations for fuel costs were based on the CO₂ content of a litre of petrol (2.33 kg) or diesel (2.64 kg) and the respective shares in new vehicle registrations (e.g. 65% of the combustion engine registrations in Germany in 2020 were petrol, 35% diesel), using the aforementioned annual mileage and fuel prices. The total electricity costs for newly registered battery electric vehicles have been calculated accordingly using the average electricity consumption, annual mileage and price of electricity. The sum of the respective fuel and electricity costs result in the total annual energy costs for each of the scenarios which we compared.