



The Internal Combustion Engine Bubble

Media Briefing

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As climate change intensifies, governments are increasingly implementing bans on the sale of diesel and petrol vehicles, from New York to the UK to Singapore.¹ However, traditional automakers continue to lag behind in the transition to electric vehicles, and their sales targets are not aligned with the Paris Climate Agreement 1.5°C goal, new research finds.

At present, the auto industry is on track to sell approximately 400 million more diesel and petrol vehicles than would be compatible with limiting global heating to 1.5°C, according to a report published by Greenpeace Germany.² As climate regulations are strengthened to meet the 1.5°C limit, automakers will face stranded assets and shrinking market share.

[This report](#) assesses the disconnect between traditional automakers' sales targets and the volume of diesel and petrol vehicle sales that is feasible under the Paris Agreement 1.5°C limit. Researchers find that automakers must accelerate their transition to zero-emission vehicles or risk both mounting financial losses and climate catastrophe.

Key Findings, according to the report:

- ▶ Toyota is projected to sell 2.6 times the maximum number of diesel and petrol vehicles necessary to limit the global temperature increase to 1.5°C. Hyundai/Kia, Volkswagen, and General Motors are on track to sell 2.4 times, 2.1 times, and 1.6 times the number of vehicles respectively. That corresponds to an overshoot of 63 million vehicles for Toyota, 43 million for Volkswagen, 39 million for Hyundai/Kia and 13 million for GM.
- ▶ The auto industry is on track to sell 397 million (lower limit: 330, upper limit: 463) more diesel and petrol vehicles than would be compatible with limiting global heating to 1.5°C. To align with a 1.5°C carbon budget, no more than 315 million new diesel and petrol vehicles can still be sold worldwide. At present, the industry is on track to sell 712 million (lower limit: 645, upper limit: 778) diesel and petrol vehicles by 2040.
- ▶ The transport sector is on track to exceed a 1.5°C aligned carbon budget by between 45 and 64 GtCO₂, equivalent to 3.6-5.1 times China's 2021 CO₂ emissions.³ Due to the scale of the transport

1 <https://theicct.org/ice-phase-outs/>

2 Three transition scenarios were used in the report, providing a range of results: an S-curve transition scenario to battery electric vehicles (BEVs), a linear transition scenario, and a combined scenario that serves as the base case. Single numbers listed here are the base case.

3 China's total CO₂ emissions in 2021 were 12.5 Gt: https://edgar.jrc.ec.europa.eu/report_2022

sector's projected carbon overshoot, it is highly unlikely that emissions reductions in other sectors would be able to compensate.

- To align with the 1,5°C heating limit, automakers must phase out new sales of diesel and petrol vehicles, including hybrids, by 2030.
- Based on current targets published by the four automakers, researchers project that battery electric vehicles will comprise only 52% of global auto sales by 2030. If traditional manufacturers are not willing to accelerate the transition to zero-emission vehicles, they risk losing market share to new, all-electric car companies.
- Around the world, climate regulations increasingly limit the sale of petrol and diesel vehicles. As a result, traditional automakers that fail to achieve a timely transition to electric vehicles face potential stranded assets and risk a significant loss of market share. Over US\$2 trillion is at risk in market capitalization and debt across the world's 12 largest car manufacturers alone.

Expected combustion engine vehicle sales overshoot relative to a 1.5°C heating limit (as calculated in the Greenpeace Germany report)

	Toyota	VW Group	Hyundai / Kia	GM
Overshoot in % [lower bound; upper bound]	164% [144%; 184%]	118% [100%; 136%]	142% [124%; 159%]	57% [25%; 90%]
Overshoot in million vehicles [lower bound; upper bound]	63 million [55 million; 71 million]	43 million [37 million; 50 million]	39 million [35 million; 44 million]	13 million [6 million; 21 million]

Methodology

Researchers from the Institute for Sustainable Futures, University of Technology Sydney and the Center of Automotive Management, University of Applied Sciences (FHDW) Bergisch Gladbach determined the maximum number of diesel and petrol cars and vans that can be sold within a 1.5°C-aligned carbon budget based on the Institute for Sustainable Futures' One Earth Climate Model. They then projected future auto industry sales based on an assessment of battery electric vehicle sales quotas and combustion engine phase out dates announced by four major auto manufacturers: Toyota, Volkswagen, Hyundai/Kia and General Motors. Sales projections are based on three scenarios that have been modeled for each manufacturer: an S-curve transition scenario to battery electric vehicles (BEVs), a

linear transition scenario, and a combined scenario that serves as the base case.

Researchers identified a carbon budget of 53 Gt CO₂ for light-duty vehicles during the period 2020 to 2050, based on a global carbon budget of 400 Gt for the same period. A global carbon budget of 400 Gt by 2050 would limit warming to 1.5°C with a likelihood of 67%, according to the Intergovernmental Panel on Climate Change (IPCC).⁴

Greenpeace Recommendations

- ▶ Automakers must immediately end investment in internal combustion engine technology and phase out the sale of new petrol and diesel cars and vans in Europe by 2028 and across the rest of the world no later than 2030.
- ▶ The transition to BEVs must be accompanied by the design of resource and energy efficient vehicles. Automakers must use their influence to decarbonize supply chains and ensure sound environmental and social conditions.
- ▶ Investors should engage with automakers to ensure that they phase out combustion engine vehicles and take the necessary steps to comply with a 1.5°C aligned carbon budget.
- ▶ Governments must eliminate subsidies for petrol and diesel cars and fossil fuels. They should provide auto manufacturers with planning security by enacting bans on the sale of new petrol and diesel cars and vans in Europe by 2028 and in the rest of the world no later than 2030.
- ▶ A transition to BEVs in itself is not sufficient; we need practical alternatives to private car ownership. These include reducing the frequency and overall amount of travel we need to do, as well as the prioritization of affordable and accessible public transport run on renewable energy, safe and better cycling and pedestrian infrastructure and vehicle sharing services.
- ▶ It is critical that workers' rights are protected during the shift to zero-emission vehicles and that retraining and reskilling programs are central to the transition. Workers and labor unions should be respected as key stakeholders in the electric vehicle transition and should have a leading voice at the table.

4 https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf



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Current auto industry planning is not aligned with a 1.5°C compatible carbon budget and might result in millions of vehicles manufacturers can't sell

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[A full version of the report is available here.](#)