March 2025

Policy Brief

The Drive to Net Zero: Japanese Automakers' Current Emissions and Opportunities

GREENPEACE

1. Introduction: Climate Change and the Auto Industry

According to the Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), the global surface temperature in 2011-2022 was 1.09 ℃ higher than the pre-industrial level, not far from the global target of limiting the rise to below 1.5 ℃[1]. It is imperative that all stakeholders on the planet, including governments and corporations, set and achieve ambitious emissions reduction targets.

The transport sector accounts for about 14% of global greenhouse gas (GHG) emissions, of which the majority come from the road sector[2]. Japan has a number of large automakers that still sell millions of internal combustion engine (ICE) vehicles every year. These companies bear a heavy responsibility for controlling and reducing their emissions.

This policy brief selects eight of Japan's best-selling carmakers – Honda, Isuzu, Mazda, Mitsubishi, Nissan, Subaru, Suzuki and Toyota – and analyses their reported emissions. These companies' combined sales accounted for 90% of total passenger vehicle sales in Japan in 2024[3]. This policy brief reviews the companies' own calculations and reporting and discusses the most significant emissions, namely, Scope 3 Category 11, "emissions from the use of sold products". Category 11 emissions refer to the emissions caused by the combustion of petrol and diesel throughout the lifetime of vehicles sold by the companies and is the largest share of GHG emissions of the auto industry.

This policy brief shows that major automakers with large numbers of ICE and hybrid vehicle sales produce high total emissions, often exceeding the levels of annual emissions by some major economies such as Australia, Italy, and the UK. The Japanese auto companies' unmitigated emissions could be seen as an impediment to global efforts to achieve net zero by 2050 if these companies fail to bring about tangible reductions from their business activities in the next few years.

In the absence of global standards, Japan's automakers can make their own interpretation in relation to their emissions assessments, making it difficult to make comparisons between companies and to track changes from one year to the next.

---

[1] IPCC, 2021. Climate Change 2021: The Physical Science Basis. https://www.ipcc.ch/report/ar6/wg1/

[2] World Resources Institute, Where Do Emissions Come From? 4 Charts Explain Greenhouse Gas Emissions by Sector. https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors

[3] The data published by the Japan Automobile Dealers Association. https://www.jada.or.jp/pages/364/

The year 2024 was the hottest year on record. The rising global temperatures are contributing to natural disasters across the world. The automakers must act immediately and responsibly to respond to this situation. Greenpeace urges the eight Japanese automakers to upgrade their GHG emissions reduction targets and take all necessary measures to meet them. Steps to decrease emissions include, for example, further development of advanced technologies such as battery electric vehicles and shift of business to the provision of mobility services. In reducing emissions from road transport, the overall size of the fleet must be decreased. A future that prioritises zero-carbon mobility should involve far fewer private cars than at present, efficient, extensive and affordable public transport services, car sharing incentives, and dedicated spaces for walking and cycling. We urge the Government of Japan to reassess its vehicle policies with the prospect of banning the sale of ICE vehicles, including hybrids, in Japan by 2030 but preferably earlier.

2. Self-reporting of emissions by automakers

2.1 Overall emissions

The Greenhouse Gas Protocol was developed by the World Resources Institute and World Business Council for Sustainable Development in the 1990s. It provides standards and guidelines about accounting and reporting GHG emissions. Emissions are classified into three 'scopes'. Scope 1 measures the direct emissions from sources owned or controlled by the company, such as fuel combustion in the manufacturing process. Scope 2 refers to indirect emissions from the use of purchased energy, such as electricity, steam, heat, or cooling. Scope 3 covers all other indirect emissions that occur in the company's value chain, including both upstream and downstream emissions[4].

The automotive sector is a crucial industry for addressing the climate crisis because of the considerable scale of its emissions. Large portions of car manufacturer emissions are attributed to the use phase of their sold vehicles (Scope 3 Category 11 'Use of sold products') and to the procurement of products such as steel and batteries (Scope 3 Category 1 'Purchased goods and services'). But the most significant climate impact takes place during the usage phase of ICE vehicles[5].

Calculating vehicle emissions poses challenges. The lifetime emissions for an ICE vehicle depends on two variables: the fuel efficiency and the lifetime mileage[6]. Auto manufacturers use widely variable estimated average total distances that a vehicle covers in its lifetime, and this is one of the important variables. Currently,

[4] See Greenhouse Gas Protocol website: https://ghgprotocol.org/
[5] New Climate Institute and Carbon Market Watch, 2024. Corporate Climate Responsibility Monitor 2024, p.69.
[6] Transport & Environment, 2022. Oil companies in disguise: On a ticking "carbon bomb" called "Scope 3 emissions" mandatory reporting' and why investors should avoid car stocks and cars' ESG ratings.

the automotive sector's Scope 3 calculations lack global standards and there is room for interpretation by individual companies.

Nevertheless, in recent years, the auto industry has been putting effort into calculating and reporting their emissions in response to various international disclosure rules and standards such as the International Financial Reporting Standards (IFRS) and European Commission's Corporate Sustainability Reporting Directive (CSRD). In Japan, it is expected that the existing climate-related disclosure scheme for listed companies will become more stringent in the near future.

The eight Japanese companies covered by this policy brief have been disclosing their annual emissions for the past several years in their sustainability reports. Their year-by-year total emissions from 2018 to 2023 are shown in Figure 1, below.

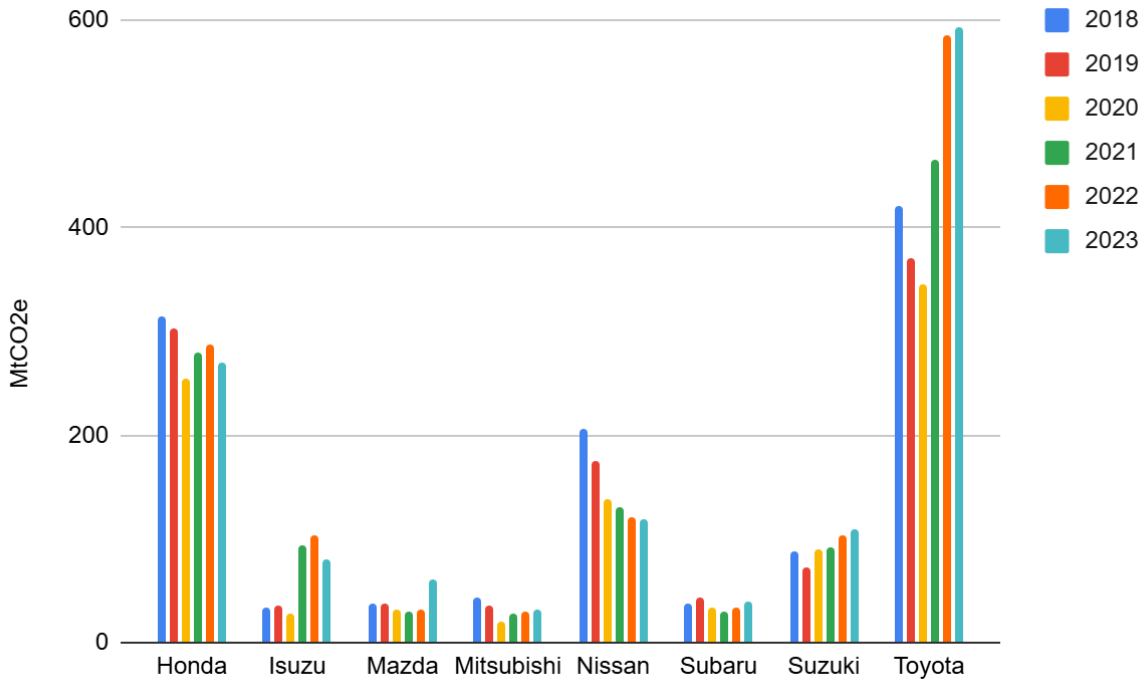

Figure 1: Japanese automotive companies' own reporting: total greenhouse gas emissions from 2018 to 2023. *y-axis*: $MtCO_2e$, million metric tons of carbon dioxide equivalent[7].

[7] In this report, all greenhouse gas emissions are presented in units of "t-CO_2e" for consistency. However, some automakers compile their statistics using only CO_2 instead of total GHG emissions, and certain manufacturers use different measurement approaches across various categories. (e.g. Toyota calculates Scope 3 Categories 1 and 11 based on total GHG (CO_2e), but reports CO_2 only for its remaining categories. As a result, the aggregated figures shown here may be underestimated relative to actual GHG levels. We ask readers to keep in mind these methodological differences when interpreting the data.

By far the largest greenhouse gas emissions were from Toyota, whose total emissions in 2023 amounted to 592.89 million metric tons of carbon dioxide equivalent (million t-CO_2e). The second largest was Honda at 270.53 million t-CO_2e, which was followed by Nissan at 118.43 million t-CO_2e. The overwhelming majority of vehicles produced and sold by the eight companies in this report were ICE vehicles including hybrids, with a small portion of battery electric vehicles (BEVs). The Japanese car makers' BEV sales ratios are, on average, far lower than their American, European, and South Korean counterparts[8].

Toyota's annual carbon footprint (592.89 million t-CO_2e) was larger than those of countries such as Australia, Italy, and the UK whose 2023 emissions were 571.84 million t-CO_2e, 374.12 million t-CO_2e, and 379.32 million t-CO_2e, respectively[9]. Furthermore, the company's 2023 emissions reached 1.5% of the world's total CO_2 emissions[10].

The overall scale of emissions generally corresponds to the number of ICE vehicle sales. However, there are some caveats: changes in emissions from one year to the next do not necessarily mean changes in production or sales. The changes are more likely to be attributed to modifications in the companies' emissions accounting policies.

Several observations can be made from the three largest companies' passenger vehicle sales and emissions for 2018-2023[11].

Data sources:
Honda ESG Data Book 2024, https://global.honda/en/sustainability/report.html
Isuzu Sustainability Report 2024, https://www.isuzu.co.jp/world/company/sustainability/report.html
Mazda Sustainability Report 2024, https://www.mazda.com/en/sustainability/report/
Mitsubishi Sustainability Report 2024, https://www.mitsubishi-motors.com/en/sustainability/esg/report/index.html
Nissan Sustainability Data Book 2024, https://www.nissan-global.com/EN/SUSTAINABILITY/LIBRARY/SR/2024.html
Subaru Sustainability Website, https://www.subaru.co.jp/en/csr/report/index_2023.html
Suzuki Sustainability Report 2023, https://www.globalsuzuki.com/corporate/environmental/report/
Toyota Sustainability Data Book October 2024, https://global.toyota/en/sustainability/report/sdb/

[8] A report by Greenpeace East Asia assessed the world's 15 major car makers based on the proportions of Zero Emission Vehicles in their total units sold in 2022 and for the period from 2018 and 2022. The proportions of the three Japanese car makers, Honda, Toyota, and Suzuki, were less than 1%. Nissan's proportion was 2.98%. See Greenpeace 2023, Automobile Environmental Guide 2024 Edition: A comparative analysis of decarbonisation efforts by global automakers.

[9] European Commission Joint Research Centre and IEA, 2023. GHG Emissions of All World Countries 2023, JRC/IEA Report.

[10] The global emissions in 2023 was 37.2 Gt in 2023, International Energy Agency (IEA) CO_2 Emissions in 2023, https://www.iea.org/reports/co2-emissions-in-2023

[11] Vehicle sales figures used in this briefing are obtained from the relevant companies' production and sales reports.

Toyota was the largest or the second largest car company in the world in terms of sales from 2018 to 2023, selling roughly 10 million cars each year, except for 2020 when the company produced around 8.7 million units. But the emissions reported by the company fluctuated widely during this period as seen in Figure 2, below.

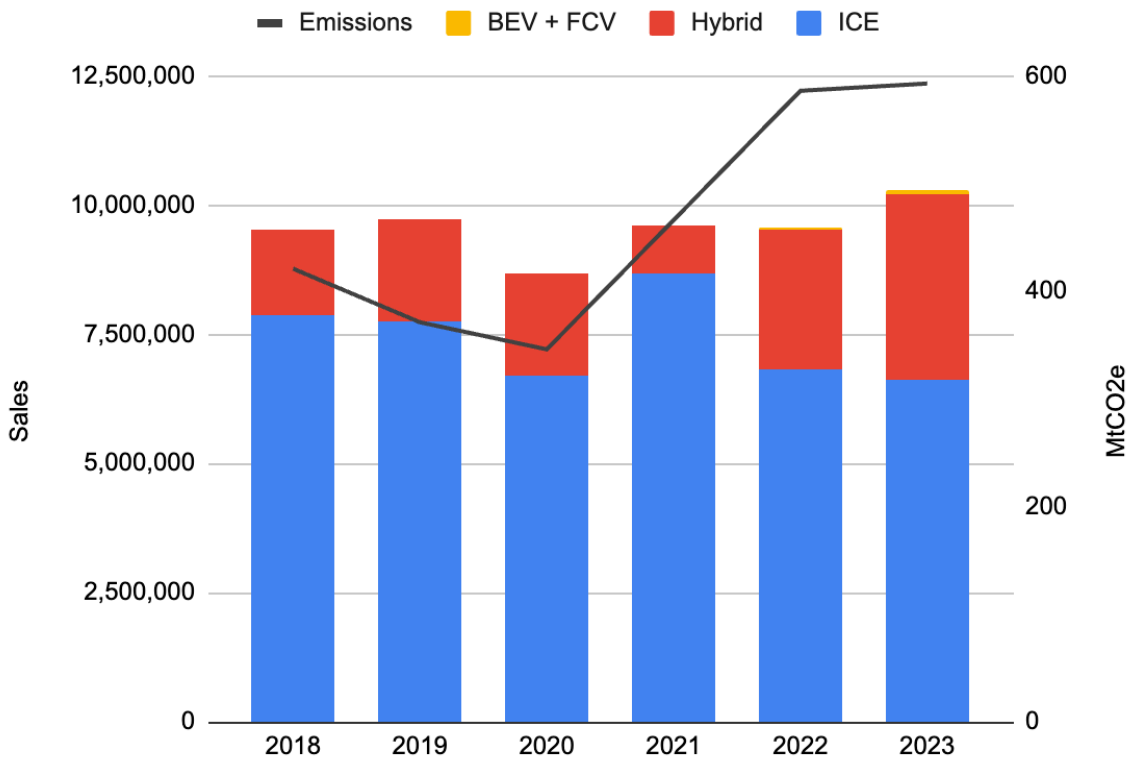

Figure 2: Toyota's passenger vehicle sales and reported emissions by year. $MtCO_2e$, million metric tons of carbon dioxide equivalent; BEV (battery electric vehicle); FCV (fuel cell vehicle); ICE (internal combustion engine).

In 2020, emissions of many automobile companies dropped significantly, because productions and sales fell due to the COVID-19 pandemic. In 2021, Toyota's reported emissions increased by 35% from the previous year, and by 26% in 2022 from 2021. The latter increase was caused by the change in the calculation method, not because of change in sales. The accuracy of the company's emissions reporting improved after it joined SBTi (Science Based Target Initiative) in 2022.

Two observations, detailed below, can be made from Figure 2.

First, as the annual numbers of sales from 2018 to 2023 were roughly at around the same level (except for 2020), and because fuel economy usually improves by time, it is reasonable to conclude that the annual total emissions between 2018 and 2021 were larger than the company's reported figures.

Second, according to the company's public data, in 2018, 99.97% of cars sold were ICE vehicles of which hybrid represented 17.58%. In 2023, 98.95% were still ICE vehicles of which 34.65% were hybrids. This suggests that despite the fact that the hybrid ratio more than doubled, the total absolute emissions increased significantly from 2018 to 2023[12]. Toyota claims that hybrid vehicles are more environmentally friendly, but as the number of sales grows, the total emissions continue to increase.

Honda, Japan's second largest auto company, saw its total passenger vehicle sales fall from 5.2 million in 2018 to 4.0 million in 2023, which is a decrease of 23%. For the same period, the reported emissions decreased from 315.29 to 270.53 million t-CO_2e, a decrease of 14% (Figure 3).

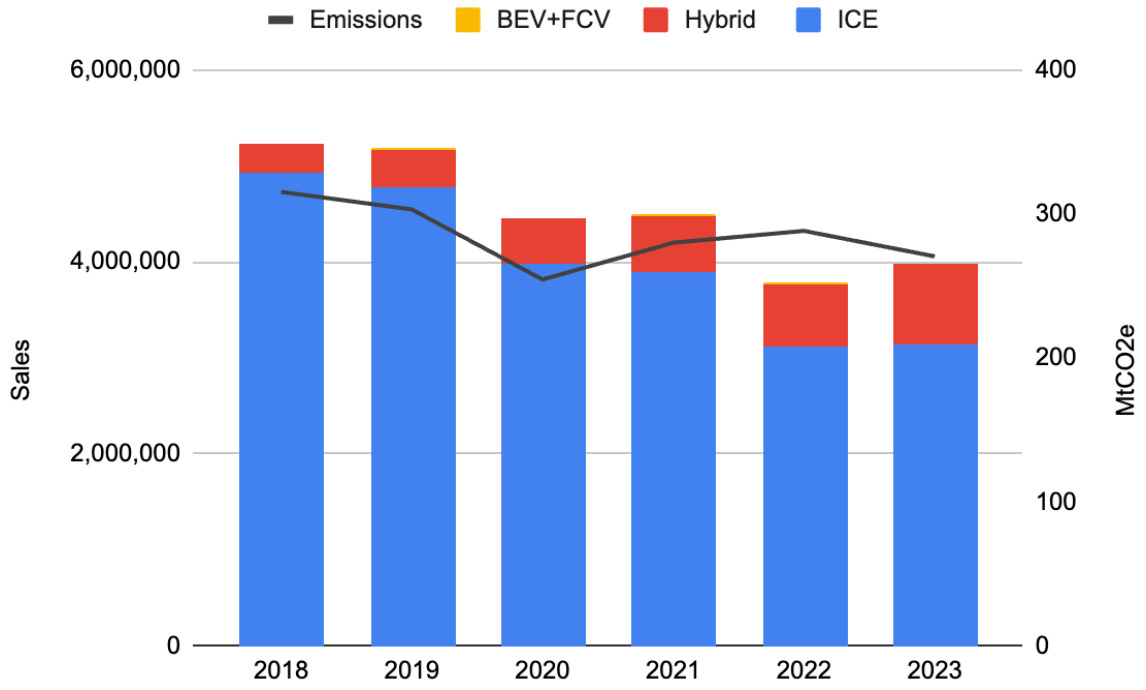

Figure 3: Honda's passenger vehicle sales and reported emissions by year. MtCO_2e, million metric tons of carbon dioxide equivalent; BEV (battery electric vehicle); FCV (fuel cell vehicle); ICE (internal combustion engine).

In calculating and reporting emissions, Honda includes emissions "of all motorcycles, automobiles, power products and aircraft sold worldwide under the Honda brand name"[13]. This means that the company's reported emissions are not comparable with the figures disclosed by other automotive companies.

[12] Toyota website: Sales, Production, and Export Results for 2023, https://global.toyota/en/company/profile/production-sales-figures/202312.html
[13] Honda ESG Data Book 2024 (n 7), p.149.

Additionally, in its latest sustainability report, the company notes that in 2022, the scope of calculation was "extended from about 90% of global sales volume to approximately all in total."[14] This suggests that the company's annual emissions over time are not comparable.

Although Honda's hybrid sales ratio may have increased over the period, it is not possible to ascertain whether or not the increased hybrid sales have made any difference to the company's total emissions.

Nissan's reported data show that its total emissions sharply decreased from 2018 to 2020, and then more gradually from 2020 to 2023. During this period, the company's total sales decreased from 5.5 million to 3.4 million. Figure 4 shows that the annual sales and annual emissions are roughly matching each other.

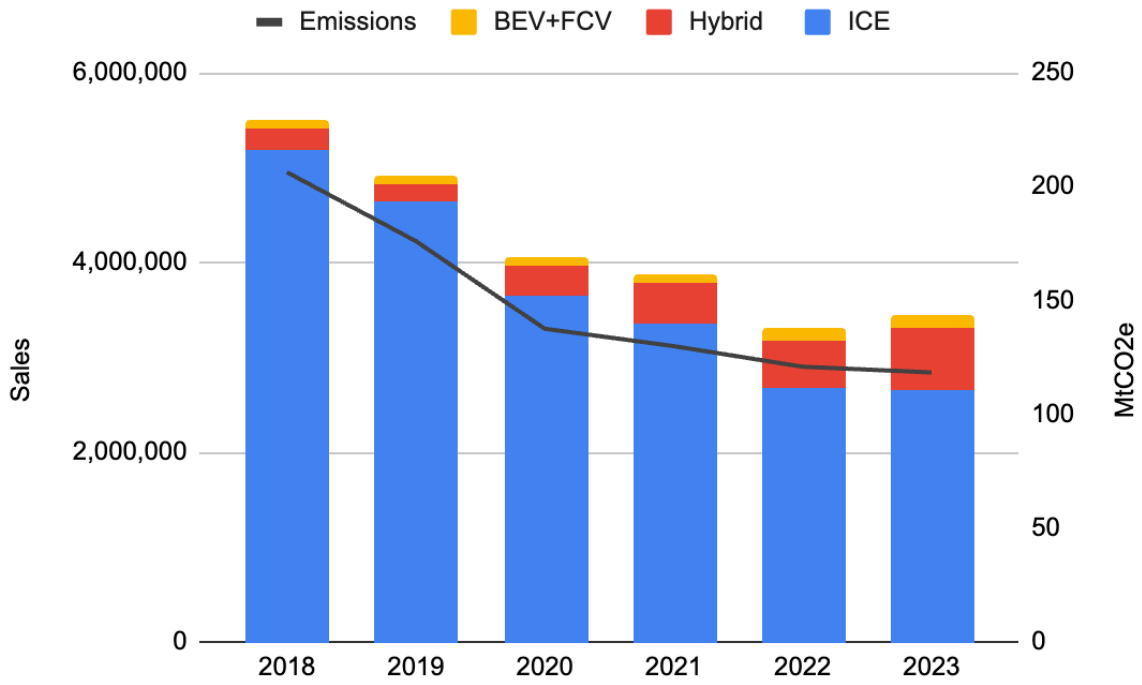

Figure 4: Nissan's vehicle sales and total emissions by year. $MtCO_2e$, million metric tons of carbon dioxide equivalent; BEV (battery electric vehicle); FCV (fuel cell vehicle); ICE (internal combustion engine).

Nevertheless, this does not mean that the company's reported emissions are fully adequate. Nissan's sustainability report states that in calculating emissions, only direct emissions are considered, suggesting that it uses the 'tank-to-wheel' approach[15]. Tank-to-wheel refers to a method to calculate the energy used and

[14] Honda ESG Data Book 2024 (n 7), p.148.
[15] Nissan Sustainability Data Book 2024 (n 7), p. 62.

greenhouse gasses emitted from the point at which the fuel is transmitted to the vehicle to the moment of its discharge, disregarding emissions caused by extraction and processing of fuels. The Nissan report also states that lifetime mileages are set based on published country-specific data, but it does not give any more information. Carbon Tracker's 2024 report points out that Nissan (together with Renault and Mitsubishi) 'incorrectly consider[s] full and mild hybrid vehicles to be cleaner than ICEs', suggesting that the company's actual emissions are likely to be larger than the company's reported figures[16].

For the other companies' reported emissions presented in Figure 1, the following observations can be made.

Mazda's reported emissions doubled from 31.4 million t-CO_2e in 2022 to 61.0 million t-CO_2e in 2023, despite the fact that the total sales of passenger vehicles decreased slightly[17]. There are two suggested reasons for the increase in reported emissions. First, the company decided to cover global sales to calculate its emissions. Until 2022, Mazda's reports covered emissions in only major markets. Second, the company decided to adopt the balanced and holistic well-to-wheel approach rather than the tank-to-wheel approach in calculating its emissions[18].

Isuzu's reported emissions increased from 2020 to 2021 by 240%, as the company expanded its scope to include a group company which produces auto parts. The company sold 384,000 cars in 2021 and 444,000 in 2022 globally, which is an increase of 14%[19].

These automotive case studies indicate an absence of industry-wide calculation guidelines for auto companies to follow, leading to inconsistencies in individual companies' year-by-year data and also between the companies. Some companies cover cars sold only in major markets, other companies cover all the cars sold in all markets.

A study by the New Climate Institute analysed the climate strategies of 51 global companies, one of which was Toyota. The study points out that light-duty vehicle manufacturers including Toyota under-report the use-phase emissions of sold cars [20]. One reason to infer that emissions are underreported by auto companies, even

---

[16] Nomisma and Carbon Tracker, 2024. Oil companies in disguise 2024 edition: CO_2 matters – on emissions reporting, ESG ratings and stock market prices in the car sector, p. 22.
[17] Mazda Integrated Report 2024, p.16. https://www.mazda.com/content/dam/mazda/corporate/mazda-com/en/pdf/investors/library/integrated-report/ir2024e_all.pdf
[18] Mazda Sustainability Report 2024, p. 117. The explanation is found on the linked data sheet.
[19] The figures obtained from Marklines.
[20] New Climate Institute and Carbon Market Watch, 2024, Corporate Climate Responsibility Monitor 2024, p. 69. https://newclimate.org/resources/publications/corporate-climate-responsibility-monitor-2024

those with high calculation and reporting standards, concerns fuel economy. As the world becomes more aware of the impacts of climate change, the public interest in vehicle fuel economy has been growing. A number of programmes and tests have suggested that fuel economy in real-world conditions is much lower than car makers' laboratory test results. A recent test programme in Australia found that some vehicles tested consumed as much as 31% more fuels in real-world driving than in the laboratory tests reported by car companies[21].

In recent years, a number of automobile companies operating at the global level have proclaimed their commitments to the Paris Agreement. The reality is, however, that carbon emissions reduction targets are not necessarily aligned with 1.5℃ pathways. There are some cases in which a company commits to becoming carbon neutral by 2050 without showing any deep emissions reduction plans[22]. Many companies set intensity-based targets for Scope 3 emissions, using metrics of per unit of output. Setting reduction targets enables companies to define emissions reduction objectives while factoring in growth in total sales. If production and sales volume increases significantly, the overall carbon footprint will grow further.

2.2 Scope 3 Category 11 emissions

An increasing number of companies are implementing measures to reduce GHG emissions. For instance, Toyota started to operate a 25 megawatt (MW) wind power facility at its Tahara Plant in Aichi, Japan, in 2023. The company aims to make all its factories carbon neutral by 2035. The effect of such measures is seen in its Scope 2 emissions reduction. According to Toyota's Sustainability Data Book (October 2024), the Scope 2 emissions in 2021 were 3.39 million t-CO_2e, which decreased to 2.87 million t-CO_2e in 2023. The reduction may not be entirely attributable to the newly installed wind turbines and there might be other reduction sources. Nevertheless, this example shows that it is possible to reduce Scope 2 emissions by procuring or self-generating renewable energy.

However, the reduction of Scope 3 Category 11 emissions is different, as long as the vehicles a car company sells burn fossil fuels. Scope 3 Category 11 emissions usually represent the cumulative amount of CO_2 that will have been emitted by sold vehicles in a given year as a result of their use from the time of purchase until the time of disposal. ICE vehicles generate the majority of emissions during the combustion cycle associated with driving, whereas BEVs emit zero carbon in operation. The companies covered by this briefing sold a high proportion of ICE vehicles in 2023: Toyota at 98.95%; Honda at 99.52%; Nissan at 96.30%[23].

---

[21] Australian Automobile Association website, "Tests reveal popular cars using 30% more fuel than advertised", https://www.aaa.asn.au/2025/02/tests-reveal-popular-cars-using-30-more-fuel-than-advertised/

[22] New Climate Institute and Carbon Market Watch, Ibid.

[23] These ratios were calculated based on the companies' production and sales data. Hybrid and plug-in-hybrid vehicles are considered to be ICE vehicles.

Figure 5, below, shows GHG emissions data of the three Scope scores of the eight individual automakers for the year 2023. It presents the proportions of combined emissions of Scope 1 and 2 (in blue), emissions of Scope 3 Category 11 (in red), and Scope 3 emissions excluding Category 11 (yellow).

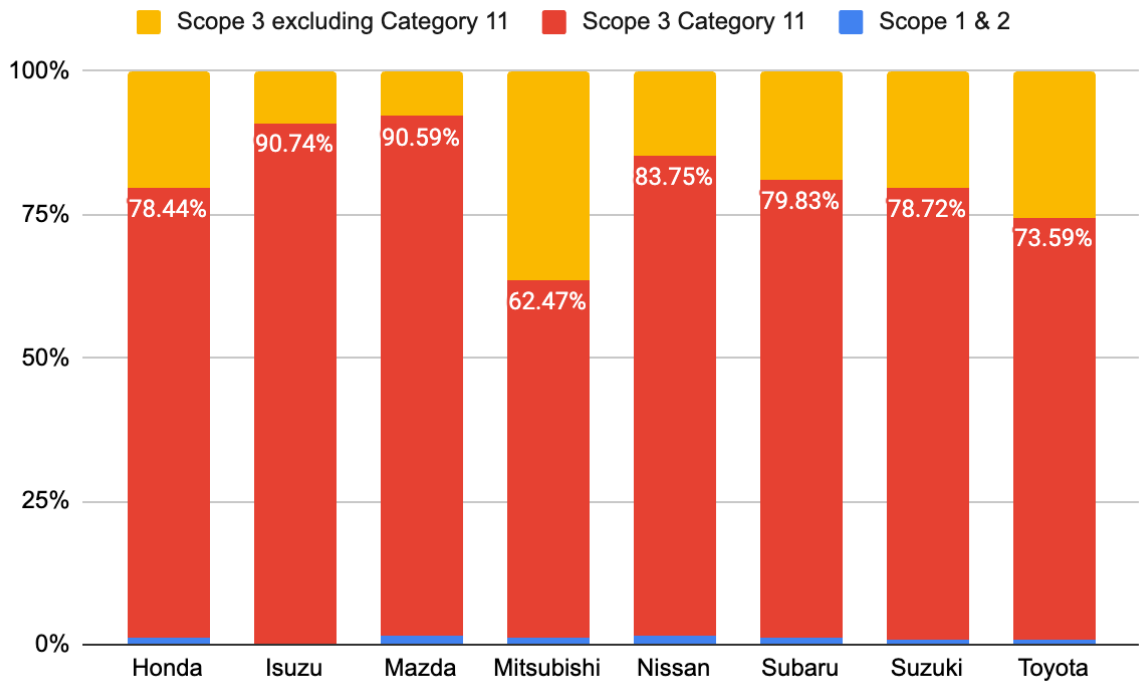

Figure 5: Greenhouse gas emissions by scope for eight Japanese car makers (2023).

For all the car makers, the proportions of Scope 1 and 2 emissions are small, less than 2%. The overwhelming majority of carmakers' emissions are from Scope 3, and particularly from Category 11, the lifetime emissions of vehicles sold by the companies.

However, the proportions of this category of emissions range from 62.47% of Mitsubishi to 90.74% of Isuzu. The proportion of Scope 3 Category 11 of Toyota, the largest manufacturer in terms of sales, is the second lowest at 73.59%. Some studies suggest that on average, normalised values of Scope 3 Category 11 emissions are likely to be in a range between 80% and 90%[24].

[24] Transport & Environment, 2022, 'Oil companies in disguise: On a ticking 'carbon bomb' called 'Scope 3 emissions' mandatory reporting' and why investors should avoid car stocks and cars' ESG ratings.' p. 11.

For both Mazda and Mitsubishi, about one-quarter of their sales were hybrid vehicles in 2023. Hybrid vehicles require batteries and in the case of Mitsubishi, the percentage of Scope 3 Category 1 (purchased goods and services) emissions was at 25% of the total Category 3 emissions, whereas for Mazda it was only 6%. From the descriptions of the two companies' sustainability reports, it was not possible to discern factors creating this difference. Further investigation is needed to find out whether or not emissions accounting policies and methods adopted by the two companies differ considerably.

It is worth noting Tesla's emissions data here, because the company exclusively manufactures electric vehicles. The company started to report its emissions figures in 2021 and emissions including Scope 3 in 2022. Tesla sold around 1.8 million vehicles globally in 2023 and its total emissions reached 50 million t-CO_2e[25] . Simply put, the company produced around one-fifth of the number of vehicles made by Toyota with around 8% of Toyota's total emissions (592.89 million t-CO_2e) in the same year. Figure 6 shows Tesla's Scope 1, 2 and 3 emissions.

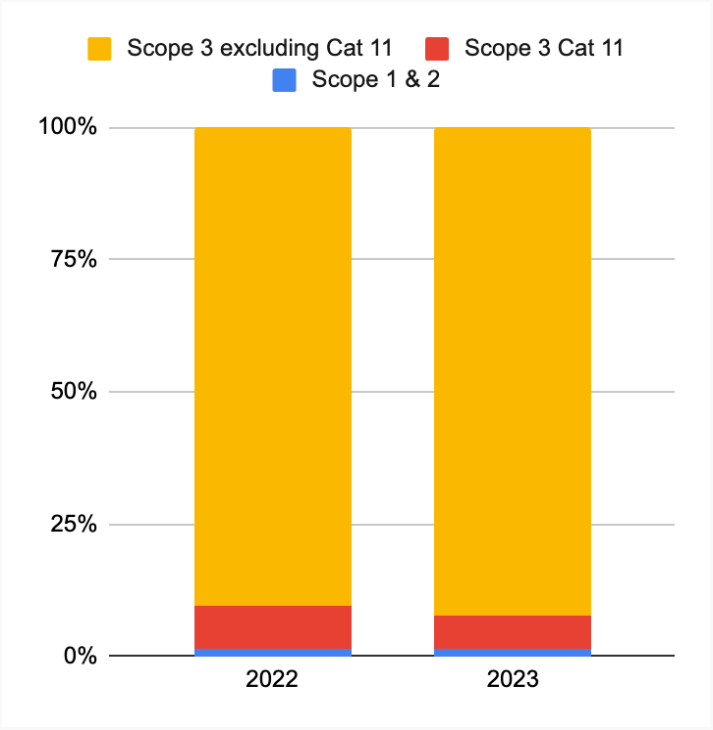

Figure 6: Tesla's greenhouse gas Scope 1, 2 and 3 emissions distribution in 2022 and 2023.

The overwhelming majority of Tesla's emissions for 2022 and 2023, came from Scope 3 Category 1 (purchased goods and services). They are mainly from mining

[25] Tesla Impact Report 2023, https://www.tesla.com/impact

metals and manufacturing batteries[26]. Electric vehicles produce far lower emissions in the use phase but their emissions largely come from production and supply chains.

By proportion, EV supply chains produce more emissions than the ICE supply chains, but not in absolute terms. The lifetime emissions of ICE vehicles are far larger, because they continue to burn fossil fuels for the entire average lifespan of more than 12 years, sometimes reaching nearly 20 years or even longer when they are exported to less-regulated countries as used vehicles[27]. As more of the world's manufacturing processes adopt renewable energy, BEV manufacturers' Scope 3 emissions are expected to decrease. One of the most effective ways for car manufacturers to reduce lifecycle emissions is to increase the BEV ratio of the cars they manufacture. This is the rationale behind policies introduced by a number of governments to bring about a powertrain shift from ICE to BEV to achieve decarbonisation in the road sector.

3. Conclusion and recommendations

This policy brief has analysed eight Japanese auto manufacturers' reported emissions and suggests that the large companies, Toyota in particular, emit a considerable amount of CO_2 and are responsible for a large portion of global carbon emissions. The comparison between Toyota's sales record and reported emissions demonstrates the unmatching fluctuation in emissions figures due to changes in the company's emissions accounting policies. There is a likelihood that Toyota had been underreporting its emissions before the changes were made. The Japanese automotive industry has potential to improve its emissions reporting and disclosure to ensure transparency in how it is meeting its emissions goals.

In 2023, at the G7 summit hosted by Japan, the Japanese government did not support the Zero Emission Vehicles target. A report by InfluenceMap suggested that this was the consequence of advocacy for an extended role for ICE-powered hybrid vehicles conducted by Japan's auto industry association[28]. Japan has a 2035 target of 100% electrification in new car sales but this includes hybrid vehicles. The inclusion of such vehicles in the 'electric vehicle' category is an outlier, as most of the other G7 nations aim to ban the sales of ICE vehicles, including hybrids, by 2035. The International Energy Agency's 2023 updated version of the Net Zero Global Roadmap Report notes that governments across the world need to move quickly to signal the end of sales of new ICE cars with the aim of achieving the emissions reduction required[29].

---

[26] Tesla Ibid.
[27] United Nations Environment Programme (UNEP) 2020. Used Vehicles and the Environment – A global overview of used light duty vehicles: flow, scale and regulation.
[28] InfluenceMap, May 2024, Automakers and Climate Policy Advocacy: A Global Analysis.
[29] International Energy Agency, 2023 update, Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach, https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach

Governments and automakers should be concerned about the fact that each year of delay leads to millions more ICE cars on the road emitting carbon directly into the atmosphere in coming years. Both carmakers and policymakers need to focus on the impact of emissions more sharply than before. There is no easy solution, but by understanding the carbon emissions the Japanese auto industry produces, we can start to identify solutions to prioritise and implement. Greenpeace calls upon Japanese carmakers and policymakers to consider the following:

Carmakers:

(1) The Japanese automakers should put effort into improving their ways of calculating Scope 3 emissions and ensure transparency in their calculation methods. Without accurate Scope 1, 2 and 3 data, it is not possible to set accurate greenhouse gas emissions reduction targets.
(2) Japanese automakers should consider setting absolute emissions reduction targets in addition to intensity-based targets within a defined timeframe as part of a credible sustainability plan.
(3) Given that electrification of passenger vehicles is inevitable, the Japanese automakers should carefully deliberate on which powertrain must be prioritised to allocate research and development resources.

Policymakers:

(1) The Japanese government should recognise that the delay in electrification by Japanese automakers can incur significant economic risk for the nation. As more climate-related regulations are introduced in major markets, it will become increasingly difficult for Japanese car makers to sell their ICE vehicles.
(2) The Japanese government should adopt ambitious vehicle regulations, forcing powertrain change more rapidly and effectively to follow other major G7 nations that have scheduled a ban on the sales of new gasoline and diesel cars, including hybrids, by 2035 at the latest.
(3) The government should encourage the general public to choose sustainable mobility such as public transport, bicycles, and walking, by providing incentives and through deregulations.

Disclaimer
This report is written by Greenpeace East Asia (hereafter referred to as “GPEA”) to assist public education and scientific research, to encourage press coverage, and to promote the awareness of environmental protection. Readers are asked to carefully read and fully understand the copyright statement below, and agree to be bound by the following terms.

This report is only for the purposes of information sharing, environmental protection, and public interests. Therefore, it should not be used as a reference for any investment or other decision-making process. If so used, Greenpeace is exempt from any liabilities arising from such use.

The content of this report is based on officially published information that GPEA independently obtained during the time of research (up to 15 February 2025). GPEA does not guarantee the promptness, accuracy, and integrity of the information contained in this report.

Author
Mariko Shiohata

Valuable input were provided by
Heather Choi, Benjamin Gehrs, Yooinn Hong

Data compilation was supported by
Aoi Kurogi