

Auto Environmental Guide 2022

GREENPEACE

Auto Environmental Guide 2022

A comparative analysis of decarbonisation efforts by global automakers

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Executive summary

Since the release of the Auto Environmental Guide 2021, the global auto industry has continued to face challenges as the race towards electrification and decarbonisation continues. The target of carbon neutrality by 2050 is increasingly being accepted by governments, manufacturers, and consumers, but the pathways towards this target vary greatly between countries and manufacturers, with some racing ahead and others continuing to languish. The climate emergency is the most critical challenge of our time. In recent years, unprecedented heatwaves and wildfires, heavy rains and floods, diminishing biodiversity, melting ice caps and collapsing ecosystems have provided important reminders of just how far into the danger zone we have already plunged.

For the first time in the past five years, the sale of zero-emission vehicles (ZEVs)ⁱ as a share of the overall auto market has more than doubled. Meanwhile, the European Union (EU) is finalising a regulation to phase out internal combustion engines in cars by 2035, with some countries legislating for an even earlier timeline. Although the pace of growth in battery electric vehicle (BEV) sales seems rapid, there is still a long way to go if we are to stay within the 1.5°C goal agreed in Paris to save us from the worst impacts of climate change.

As vehicles electrify, their supply chain emissions (Scope 3 - category 1 purchased goods and services emissions) in particular purchased goods and services emissions,¹ take on an increasingly important role. The shift to vehicles using batteries for electricity storage means that supply chain decarbonisation and resource reduction and efficiency become increasingly pivotal to reach zero emissions across the whole life cycle of a vehicle.

The Auto Environmental Guide 2022 maintains the criteria under three main pillars: (1) internal combustion engine (ICE) phase-out; (2) supply chain decarbonisation; (3) resource reduction and efficiency. In response to increasing concern about the carbon footprint of supply chains, criteria for Scope 3 purchased goods and services emissions and steel decarbonisation are added under pillar (2).

Key findings across the board

- For the first time in the past five years, sales of ZEVs as a share of the overall market have more than doubled. In 2021, global ZEV sales surged significantly, from 2,052,750 in 2020 to 4,598,061, with their share of the market increasing from 2.66% in 2021 to 5.72% of global auto sales. Although the global stock of electric cars has now surpassed the 10 million mark, 99% of the total global fleet is still burning fossil fuels. For the main markets, the percentage of ZEV sales was well under 10% in the first half of 2022, with the exception of China.² The market share of BEVs in Europe has increased from 4% in 2020 to 6% in 2021;² that in China rose from 6% in 2020 to 11.3% in 2021, with 2.9 million BEVs sold, 170% of last year's figure.³
- The percentage of ZEV sales for seven out of ten companies increased by at least 50% in 2021, compared to 2020. The highest percentage of ZEV sales are at 8.2%, indicating that none of the auto companies are transitioning rapidly enough to reach the goal of keeping the Earth within a 1.5°C global annual average temperature rise.
- All companies demonstrated increases in their ZEV sales, but some relied heavily on the Chinese market. General Motors and Honda sell a significant percentage of their ZEVs in China, with 96% and 83%, respectively, by the first half of 2022. In the same period, General Motors sold a mere 3.01% of ZEV in the United States (US), while Honda only sold 2.35% in Japan.
- For almost all automakers, sales of ZEVs in the US are quite low. Even automakers such as General Motors, Honda, Mercedes-Benz, and Stellantis, which all have a considerable presence in the US, fall short when it comes to ZEV sales.

ⁱ A zero-emission vehicle (ZEV) is an electric car that does not produce exhaust emissions of pollutants or carbon when it operates. In this report, only BEV and FCEV are regarded as ZEV, while PHEV is not.

- There is a general lack of commitments to decarbonise steel and upstream materials. In general, the top automakers are not paying enough attention to cutting the carbon footprint of their steel supplies or Scope 3 purchased goods and services. None of the ten automakers set decarbonisation targets specifically for steel, even though the material accounts for at least 60% of the weight of a vehicle and 50% of the carbon footprint from materials manufacturing.⁴
- Sports utility vehicles (SUVs), which, on average, consume about one-quarter more energy than medium-size cars, release more greenhouse gases (GHGs) during use and drive the increase in the automotive industry's demand for steel, rank among the top causes of energy-related carbon dioxide emissions growth over the past decade. SUVs account for 46% of the global market share of private cars in 2021, up from 42% in the previous year.⁵ From our analysis, all but one carmaker's SUV sales continued to grow from 2020 to 2021.
- Negative climate lobbying remains active. Despite investors' protests last year, Toyota continues to have a poor level of climate policy engagement at home and abroad, most notably in June 2022 pushing the Japanese government to ensure allowances were made for hybrids in its upcoming economic policy, allowing them to be counted equally alongside ZEVs.

Key findings from comparative analysis of the companies

- Overall, the ten companies fall into three leagues of performance. General Motors, Mercedes-Benz and Volkswagen performed comparatively better in the chart; Ford, Hyundai-Kia, Renault and Stellantis are all average performers; whereas Honda, Nissan and Toyota share the lowest ranking.
- Nissan and Toyota are the only two companies whose five years compound annual growth rate of the percentage of ZEV sales and 2021 percentage of ZEV sales are both lower than the global average. This means that they are the only two companies in the top ten that are transitioning to ZEVs more slowly than the overall global transition rate.
- Although Toyota made a U-turn in its position on ZEVs in December last year, the move was late and it had already lost to its counterparts in terms of ZEV sales. Nissan and Honda were ranked in 5th and 6th place in last year's evaluation but have dropped to the bottom of the ranking because of lack of improvement in their percentage of ZEV sales. The percentage of Honda's ZEV sales is 0.35%, just higher than Toyota's at 0.18%. Nissan's ICE phase-out plan and the growth rate of the percentage of ZEV sales are the weakest among all the automakers. Honda and Toyota are also doing significantly less than other companies in supply chain decarbonisation.
- As Honda and Nissan drop in the ranking, Ford has caught up to 4th place with significant growth in their sales of ZEVs, improvements that make their ICE phase-out plans more ambitious, and fair practices in supply chain decarbonisation.
- Although Renault has the second highest percentage of ZEV sales, it loses points for its growth rate and ICE phase-out plan, causing it to fall from 3rd place to 6th this year. It is also doing relatively little on supply chain decarbonisation with no specific actions to reduce the carbon footprint of steel and weak renewable energy commitments in its own operations.
- Hyundai-Kia has fallen to the 5th place from 4th last year. Its pace of ICE phase-out is not impressive, however, it is doing relatively better than many other companies on steel decarbonisation. It should be emphasised that almost half of Hyundai-Kia's sales of passenger cars are SUVs, with sales that rose from 33% in 2018 to 49% in 2021, the highest among all companies. Hyundai-Kia might be more aware of its carbon footprint from steel, but the company is pumping up the production of it and the related GHG emissions through its SUV-heavy business strategy.
- The growth of Volkswagen's ZEV sales in 2021 is impressive, yet it loses points for its targets for ICE phase-out and materials decarbonisation.
- Even though General Motors and Mercedes-Benz reach the top of the list, their ZEV sales are a long way from what is needed to decarbonise road transport 100% by 2030. Only 1% of General Motors' sales in the US were BEVs and zero BEVs were sold in Europe in 2021. General Motors needs to show more action on a global scale instead of boosting its ZEV sales by marketing low-cost cars in only one market.

What the automotive companies need to do immediately

1. Speed up ICE phase-out

The top car manufacturers should take robust actions on the climate emergency, at a level of ambition that matches their advantage of scale and global market penetration. We demand that leading global automakers end the sale of ICE vehicles in their main markets (US, China, Korea, and Japan) before 2030. For Europe, this needs to happen by 2028. Meanwhile, such a transition should ensure that workers' voices are heard and their benefits are protected.

2. Promote renewable energy charging and resource reduction

Automobile companies should strive to promote renewable energy charging and increase its generation. The automakers also need to build the capacity required to reuse and recycle batteries, with the goal of reducing resource consumption, carbon emissions and other environmental impacts, and improving the efficiency of repurposing and recycling.

3. Fast-track steel decarbonisation

Steel comprises the largest part of a car's carbon footprint at the manufacturing stage, contributing to half of cradle-to-gate emissions.⁴ Automobile companies should start taking action to decarbonise steel by auditing and disclosing the carbon footprint of their materials, committing to purchasing low-carbon steel, setting steel carbon reduction targets, producing fewer SUVs, and investing in fast-tracking the technological development of zero-carbon steel.







4. Ensure just transition

Automakers and policy makers must leverage all the tools at their disposal to manage the phase-out of ICE vehicles, while engaging early and often with workers, unions and labour organisations and other stakeholders. They have the responsibility to plan for robust investments and policies that will ensure a 'just transition' to protect workers and surrounding communities' economic, social and physical health and well-being. Policies for industrial transition need to be implemented together with bold investments and an expansion of social safety net programmes and commitments to ensure that workers have a voice.

5. Rethink mobility and reduce private car ownership

We should beware of the peril of a growing market for cars in the name of phasing out ICE vehicles and economic stimulation. The phase-out of ICE vehicles must be accompanied by a reduction in the overall size of the fleet to achieve a meaningful climate impact. Ultimately, the true zero-carbon mobility future should involve far fewer private cars, more efficient public transport systems, more car sharing options, the redesign of cities to make space for walking and cycling. Automakers will need to fundamentally rethink their business model, which at the moment is set on profiting from selling more cars at an ever faster pace, while governments need to devise economic strategies to steer the world towards a sustainable, zero-emission future.

Scorecard

 Rank (change from last year)	 Companies	 Overall score (out of 100)	 2021 ZEV sales %	 Phase-out of ICE vehicles	 Supply chain decarbonisation	 Resource reduction and efficiency	 Deductions
1	General Motors	38.5	8.18%	24.98	14	0.5	-1.0
▲ 5	2 Mercedes-Benz	37.0	3.82%	21.03	14	3.0	-1.0
▼ 1	3 Volkswagen	33.3	5.21%	20.76	12	1.0	-0.5
▲ 4	4 Ford	23.5	1.40%	15.47	8	0.5	-0.5
▼ 1	5 Hyundai-Kia	22.3	3.49%	11.85	11	0.5	-1.0
▼ 3	6 Renault	20.3	6.69%	14.27	6	0.5	-0.5
▲ 2	7 Stellantis	19.3	2.86%	13.81	6	0.5	-1.0
▼ 3	8 Nissan	13.4	2.20%	6.41	5	2.5	-0.5
▼ 3	9 Honda	12.8	0.35%	9.78	3	0.5	-0.5
10	Toyota	10.0	0.18%	7.48	3	0.5	-1.0

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Introduction



1.1

Global developments in 2021

Since the release of the Auto Environmental Guide 2021, the global auto industry has continued to face a number of challenges in the ongoing race towards electrification and decarbonisation. The target of carbon neutrality by 2050 is increasingly accepted by governments, manufacturers, and consumers as a baseline, but the pathways towards this target vary, greatly with some countries and manufacturers racing ahead whilst others continue to languish. Three key areas of particular note are supply chain constraints, the rapidly expanding market for zero-emission vehicles (ZEVs), and developments in the political sphere.

Supply chains

Since the outbreak of COVID-19, global supply chains have continued to be stretched, and over the past 12 months a number of incidents have further exacerbated these problems. The blockage of the Suez Canal by the container ship Ever Given in March 2021 at a cost to the global economy of an estimated \$400m per hour,⁶ highlighted one of the inherent weaknesses of a lean business model. The problem is repeating itself as a result of both the Russian invasion of Ukraine, and the ongoing global shortage of semiconductor chips. The former demonstrates the trouble with trying to place sanctions on a country that supplies 30% of the global platinum-group export market,⁷ and 40% of European gas supplies.⁸ The latter hits closer to home for the auto industry, because automakers have been forced to scale back production as a result of the chip shortage.

From Q2 2020, pandemic-induced lockdowns and restrictions caused a drop in demand for automakers, leading them to cancel orders, whilst increasing chip demand for consumer electronics.^{9,10}

Although not yet facing constraints in supply, the growth of the electric vehicles (EVs) market has also led to significant rises in the price of metals, with the cost of lithium increasing more than 300% in the past five years.¹¹

A growing market

All of the supply chain issues are, at heart, driven by an ever-expanding market and demand for EVs. The global sales of zero-emission vehicles (ZEVs) surged significantly, from 2,052,750 in 2020 to 4,598,061 in 2021, with their share of the market increasing from 2.66% in 2020 to 5.72% in 2021 of global auto sales. The growth is led overwhelmingly by the Chinese market which boasted 2.9 million battery electric vehicles (BEVs) registrations in 2021, 170% of last year's figure.³ And yet whilst the global EV market continues to grow, makers in Japan are struggling to keep up Toyota's bZ4X was recalled due to safety issues less than two months after launch.¹²

As cars electrify there is growing interest from electronics manufacturers in entering the auto space, with Foxconn promising vehicles to be delivered in the first half of 2023,¹³ and Apple similarly saying they will deliver fully self-driving cars by 2025.¹⁴

The political landscape

As the market continues to grow, the political landscape similarly is changing apace, despite noted pockets of recalcitrance. Europe has led the way on progressive auto policy, with the European Union (EU) announcing the Fit For 55 package as part of the European Green Deal, aiming for a 100% reduction of carbon dioxide (CO₂) emissions in new vehicles from 2035, effectively banning the internal combustion engine (ICE) and shifting the EU exclusively to ZEVs.¹⁵ This comes on top of the proposed Euro 7 regulations, which would apply more stringent emissions regulations to new vehicles from 2025, a measure that's expected to prevent some 42,000 premature deaths.¹⁶ In the United State (US), the Biden administration announced in June 2022 a raft of proposed EV-related investments as well as a target for 50% of new vehicle sales to be EVs by 2030.¹⁷

In the past year, promising progress was made in developing legislation that addresses carbon leakage in international trading, such as the EU Carbon Border Adjustment Mechanism (CBAM) and the US CBP's Green Trade Strategy.¹⁸ These developments could bring extra motivation for the automakers to decarbonise their supply chain, such as steel, more progressively.

At the other end of the spectrum, Japan has been slowing down the progress of the G7, requesting that sales targets be removed from the G7 communique.¹⁹ This came soon after Liberal Democratic Party politician Akira Amari publicly admitted that the Japanese government would need to make sure that government policy was amenable to Toyota's preferences, lest they incur the automakers ire.²⁰ Toyota has similarly threatened to pull manufacturing out of the United Kingdom (UK) in response to the government's proposed green policies.²¹



1.2

Updates to the Guide 2022

Following on from last year's report, some new criteria have been added to reflect the areas of growing urgency, due to insufficient attention from the major automakers.

For more background on the evaluation criteria, please refer to the *Auto Environmental Guide 2021*.²²

Steel decarbonisation

Many of the major automakers are committed to zero emissions, however, only very few have started to take action to decarbonise their steel supply.

According to the International Energy Agency (IEA), for every metric ton of steel produced, approximately 1.4 metric tons of carbon dioxide equivalent (CO₂-eq) are created,²³ meaning that steel production alone accounts for nearly 8% of global emissions.²⁴ Steel comprises approximately 60% of the average vehicle body, with some 900kg of steel in the average car,²⁵ and 20% more in sports utility vehicles (SUVs).²⁶ Greenhouse gas (GHG) emissions from the production of iron and steel used for both ICE vehicles and BEVs makeup 53% and 47% of the vehicle's raw materials carbon footprint, respectively.⁴ Some research indicates that steel production can account for 9% of a car's life cycle assessment.²⁷

Furthermore, SUVs rank among the top causes of energy-related CO₂ emissions growth over the past decade.⁵ Apart from consuming more energy, larger cars drive up the demand for steel. For this reason, SUV sales have been considered in the evaluation for steel decarbonisation.

With commitments to net zero emissions becoming increasingly common from automakers, one obvious source to start supply chain decarbonisation is with steel. Companies such as Volvo and BMW are signing agreements with steel suppliers to produce cars made of low-carbon steel as early as 2026.^{28,29} Some steelmakers, like JFE and Nippon Steel, have already started experimenting with hydrogen-based green steel production.³⁰ Decarbonisation of steel production and supply is a crucial part of the overall decarbonisation of the automotive value chain.

Scope 3 purchased goods and services emissions: Disclosure and targets

According to the automakers' calculations for their own models of ICE vehicles, Scope 3 purchased goods and services emissions account for around 18% of carbon emissions in an ICE vehicle's life cycle.^{31,32} As vehicles electrify, their Scope 3 upstream emissions, in particular purchased goods and services emissions,¹ take on an increasingly important role. Automobile companies are not increasing their efforts in this emission category accordingly. The transition to ZEVs results in lower GHG emissions over the whole life cycle of a vehicle, due to the lack of emissions during use. A greater percentage of the total life cycle emissions is represented by materials such as steel and batteries, with ZEV manufacturing typically emitting more than ICE vehicle manufacturing.³³ In this context, proactive disclosure from automakers about their Scope 3 purchased goods and services emissions, how their manufacturing materials are sourced and used, and setting progressive targets, becomes increasingly important.

Renewable energy charging

The source of the electricity used to charge BEVs is the basis for a large part of total emissions, and is determined largely by the carbon intensity of the energy grid. Companies are making efforts to provide renewable energy charging to their consumers.ⁱⁱ

Notwithstanding that numerous pieces of research have indicated that regardless of a grid's carbon intensity, BEVs almost always have the lowest life cycle emissions,^{34,35} Thus, promoting the use of renewable energy to provide decarbonised electricity for charging is another important measure automakers can take. As such, looking at what measures automakers are taking to ensure that their consumers have access to renewable energy is another metric by which their overall decarbonisation efforts can be assessed.

The transition to BEVs will increase the share of electricity consumption from 0.2% of global power to 4% by 2030.² Automobile companies should strive to increase the generation of renewable energy to meet this increasing demand. Therefore, the additionality of renewable energy capacity of the options provided by the automotive companies is one of the factors to be considered in this evaluation category.

ii Tesla claims to be providing 100% renewable energy from their global Supercharger network, and achieved through a combination of onsite resources and annual renewable matching. Volkswagen plans to build 21,500 quick-charging stations globally and provide renewable energy exclusively.



Methodology



2.1 The manufacturers

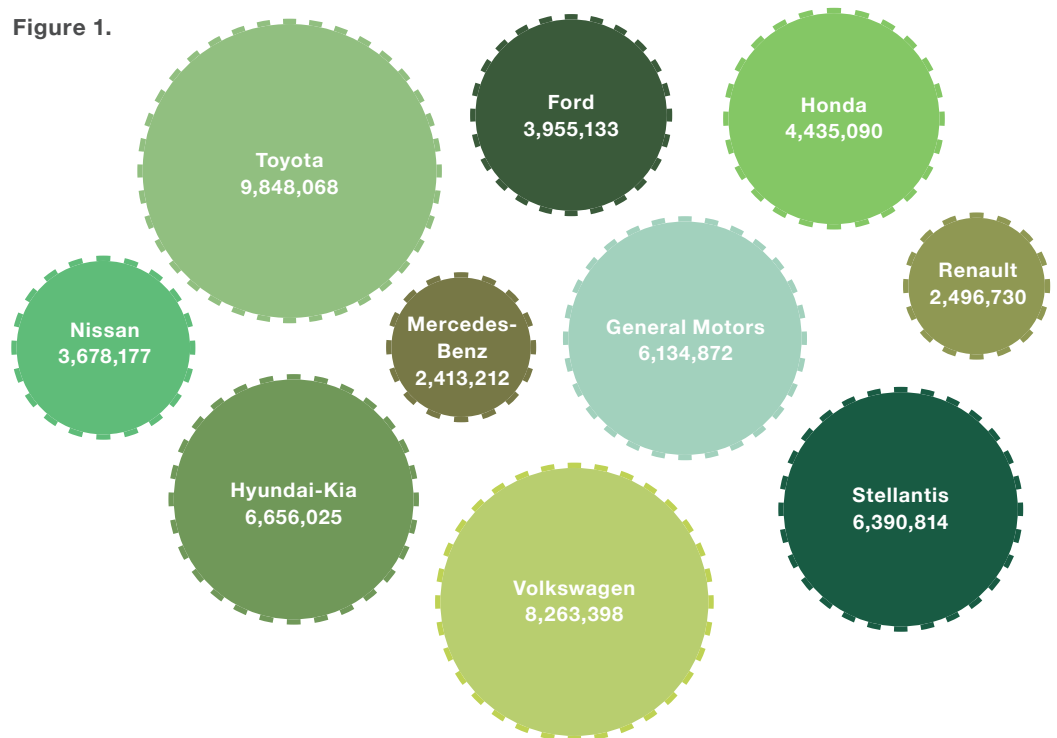
This report evaluates the performance of the top ten carmakers in the world, selected according to their sales of these companies in 2021. The companies and the number of vehicles sold in 2021 are shown in Figure 1. In order to be consistent in the evaluation, available data on sales was from Marklines.ⁱⁱⁱ These data were retrieved in July 2022. Unless otherwise specified, all sales data in this report is from Marklines. It is worth noting

that the data from Marklines can be slightly different than the sales data provided by the companies. Sales data for joint ventures have only been included when the company owns more than 50% shares of the joint venture, except for joint ventures in China where foreign companies had not been allowed to hold over 50% stakes.^{iv}

Figure 1.

Figure 1.

The top ten auto companies and number of vehicles sold in 2021 (Source: Greenpeace compilation based on data from Marklines).



2.2 The guidelines

Companies were ranked according to

1. Their performance on **phase-out of ICE vehicles (77%)**;
2. Their performance on **supply chain decarbonisation (18%)**; and
3. Their performance on **resource reduction and efficiency (5%)**.

The scoring of the three pillars is weighted according to their life cycle emissions. The contribution of tank-to-wheel GHG emissions during the life of an ICE vehicle ranges from 70% to 80% of life cycle emissions,³³ therefore scores for companies' performance on **phasing out ICE vehicles** are allocated 77% of the points. Scope 3 purchased goods and services emissions account for around 18% of carbon emissions in an

ICE vehicle's life cycle,^{31, 32} therefore 18% of the points go to performance on **decarbonising the supply chain**, while 5% goes to **resource reduction and efficiency**.

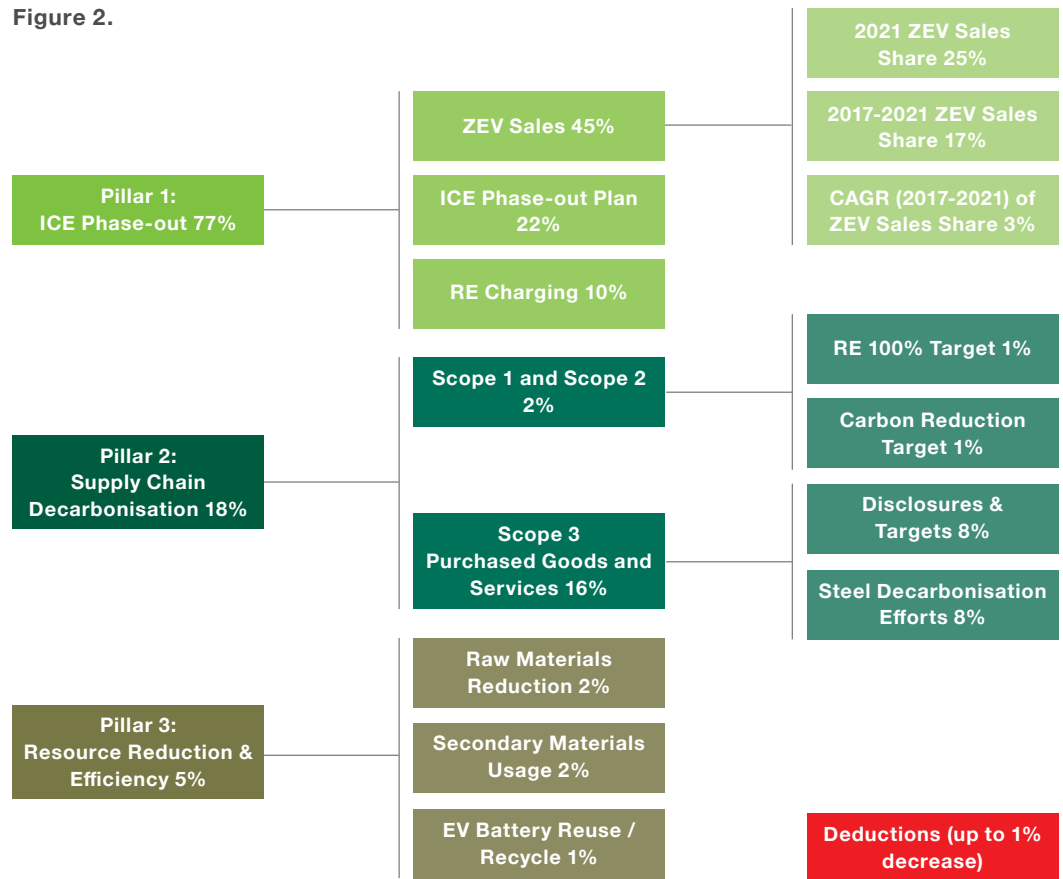
Based on the scoring rubric, the total possible score is 100 points. Each of the three sections, 'ICE phase-out', 'supply chain decarbonisation', and 'resource reduction and efficiency', are made up of multiple criteria which, when combined, add up to 100 (see the flow chart shown in Figure 2). An additional ranking scheme for the deduction of points due to certain violations or misconduct is included. Up to 1 point can be deducted.

iii Marklines sales data was collected only for passenger vehicles such as SUVs, trucks, vans, and others.

iv Under Chinese law, the previous restriction of limiting foreign enterprises ownership in joint ventures to 50% has in recent years gradually been lifted.

Figure 2.

Flow chart of scoring rubric criteria.



2.2.1 ICE phase-out: 77% of total score

Share of ZEV sales (42%)

For this criterion, the car companies are ranked according to the percentage of BEVs and fuel cell electric vehicles (FCEVs) in relation to the total units sold in 2021 (25%) and over the past five years, 2017 to 2021 (17%). The share (proportion) of ZEV sales is then divided by a target value which represents how close the automaker is to the goal, or ideal benchmarker. For the 2021 calculations, a target value of 20% is used; for the five-year calculations, a target value of 18% is used. Target values represent where automakers should be using a linear growth rate to reach the goal of 100% ZEVs by 2050. The resulting ratios are converted to a 25- or 17-point scale to match the weight of the criterion. The equation used is shown below.

$$\text{ZEV proportion score} = \frac{(\text{observed proportion of ZEV sales})}{(\text{target proportion of ZEV sales})} \times X$$

In the equation, X correlates with the weight of the criteria (25 for the proportion of ZEV sales in 2021 and 17 for the proportion of ZEV sales in 2017-2021)

ZEV Compound Annual Growth Rate (CAGR) 2017-2021 (3%)

For a comprehensive assessment, the compound annual growth rate (CAGR) for the proportion of ZEVs sold between 2017 and 2021 is employed as an indicator to evaluate the companies' progress on the phase-out of ICE vehicles. The CAGR of ZEVs accounts for 3% of the overall score. A higher CAGR represents fast growth or expansion of ZEV production and vice versa. The compound annual growth rates are calculated as follows:

$$\text{CAGR} = \left(\frac{V_{\text{final}}}{V_{\text{initial}}} \right)^{1/t} - 1$$

In the equation, V_{final} =2021 CAGR value, V_{initial} = 2017 CAGR value, and t = time in years

Additional points are awarded to automakers based upon how much greater their CAGR is compared to the global rate. The automakers' respective CAGR value is compared with the global CAGR of 63% to help define which automakers are growing their ZEV market faster or slower than the global market. Automakers' whose CAGR from both the current evaluation and last year's evaluation is below the global CAGR receive 0 points. On the opposite spectrum, those whose CAGR from the current and last year's evaluation are both above the global CAGR, where the current one is also higher than last year's, receive 2 points. All other cases receive 1 point.

ICE phase-out plan (22%)

For this criterion, the publicly announced targets of the companies to phase-out ICE vehicles are evaluated. Only commitments published on the company's official channels are assessed. Targets that specify plans for BEVs and FCEVs are assessed, but targets including plug-in-hybrid electric vehicle (PHEV) and hybrid electric vehicle (HEV) plans are excluded (including those who only cite a goal for 'electrification'). A perfect score of 22 is awarded for a goal of 100% ZEV globally before 2030. In all other cases, points are deducted based upon the following scoring rubric:

Using the scoring mechanism, the overall factor for each region will be calculated as shown by the following equation:



Regional Factor = (target year factor x target region factor x target ZEV % factor)

The regional factor will be calculated for each respective target. The sum of them will be multiplied by the total score, 22, as shown in the following equation:

Score = 22 x (Sum of all Regional Factors)

In addition, automakers who have demonstrated improvements in their ICE phase-out plan over the past year receive a boost to their score and will either earn an increase of 0.5 or 1 points depending on the aggressiveness of their improvement.

It should be noted that the method used to calculate Toyota's ICE phase-out score required an extra step. Toyota has not released an ICE phase-out date but rather a goal for the number of ZEVs it will sell annually by 2030. Thus, the projected total number of cars to be sold in 2030 was calculated and using their target EV sales, an estimated global percentage was used to calculate its score.

Renewable energy charging (10%)

Each automaker has been scored on a scale of 0-10 points, using published material on renewable energy EV charging options, programmes, and initiatives being implemented. Then, using a similar scoring mechanism as for the ICE phase-out plan, the following factors are used:

1. Sources of renewable energy. They are rated according to the additionality of renewable energy capacity of the option, such as facilitating charging with renewable energy in the local grid, which would receive a higher point score than purchasing unbundled renewable energy certificates.
2. Geographical coverage. Companies that provide options in more countries/locations receive higher scores.
3. Accessibility. This is to evaluate whether renewable energy options are accessible to a broader base of customers or only to limited customers.

Using the scoring mechanism, the overall factor for each project is calculated as shown by the following equation:

$$\text{Project Factor} = (\text{renewable energy source factor} \times \text{geographical coverage factor} \times \text{accessibility factor})$$

The project factor will be calculated for each respective project and multiplied by the total score, 10, as shown in the following equation:

$$\text{Score} = 10 \times (\text{Sum of all Project Factors})$$

2.2.2

Supply chain decarbonisation: 18% of total score

Scope 1 and Scope 2 (2%)

By checking the official reports from automakers, Scope 1 and Scope 2 emissions targets were analysed according to the following two metrics:

1. Renewable energy 100% commitment (1%)
2. Carbon reduction targets (1%)

Automakers are awarded full points if they commit to 100% renewable energy by 2035 and if they set a target of at least a 50% emissions by 2030.

Scope 3 purchased goods and services: Disclosure and targets (8%)

In relation to Scope 3 category 1, or an automaker's purchased goods and services, the disclosures and targets are analysed according to the following metrics:

1. Scope 3 category 1 emissions data (3%)
2. Scope 3 category 1 reductions targets (5%)

The relevant information was sourced from automakers' official reports and from disclosure to the Carbon Disclosure Project (CDP). Full points are awarded to automakers that disclose their Scope 3 category 1 emissions data. In regard to the Scope 3 category 1 reductions targets, points are awarded only to those with a relatively ambitious goal to reduce carbon emissions with clear targets outlined. Companies with partial target information or less ambitious goals are awarded partial points and automakers with no mentioned goal or target regarding Scope 3 category 1 are given 0 points.

Steel decarbonisation efforts and commitment (8%)

Also in relation to Scope 3 category 1, the steel decarbonisation efforts of automakers are analysed by awarding points based on the following series of steel-related questions:

1. Does the company specifically mention steel in regard to decarbonisation in their official sustainability report? (1%)
2. Does the company have specific goals or targets related to steel decarbonisation? (1%)
3. Does the company disclose any Scope 3 steel GHG emission information or annual steel use? (1%)
4. Does the company report the use of scrap steel? (1%)
5. Reduction of the percentage of SUV sales (1%)
6. Does the company partner or invest in low-carbon steel? (3%)

Criteria 1-4 are scored either 0 or 1, where 'no' equates to 0 points and 'yes' equates to 1 point. Criterion 5 utilises Marklines data to calculate the percentage of SUV sales relative to total sales. Lastly, criterion 6 has a scale of 0, 1.5, or 3. Automakers are awarded full points if clear evidence demonstrates a partnership or investment in low carbon steel technological transition as an effort to phase out coal-based blast furnaces, such as the employment of direct reduced iron or electric arc furnace technologies. Only 1.5 points are awarded if there is evidence of some types of partnership or investment in steel decarbonisation but it does not include the aforementioned technologies. Zero points are given to automakers with no history of this. It should be noted that partnerships and investments over the previous five years are considered and both primary and secondary sources are used.

2.2.3

Resource reduction and efficiency: 5% of total score

Resource reduction and efficiency (4%)

This criterion includes analysis of performance regarding the automakers target on raw materials reduction (2%) and their secondary materials usage (2%). To score 2 points, the automaker should meet the following two conditions:

1. Set ambitious and holistic targets or initiatives on raw materials (metals).
2. Set quantifiable targets.

EV battery reuse and recycling (1%)

Another criterion of resource efficiency is the evaluation of an automakers' performance on EV battery reuse and recycling. Half a point is given if an automaker invests in building capacity for EV battery reuse and recycling and another half point is given if its investment or capacity is quantifiable.

2.2.4

Deductions: up to 1 point from total score

Up to 1 point from the total score is deducted according to an automaker's violations against environmental regulations and/or its lack of support for Paris-aligned climate policies. For instance, if an automaker has been fined for violating emission regulations or environmental standards, the score is reduced by 0.5 points. It should be noted that, for the purposes of this scoring mechanism, only violations between August 2021 and July 2022 are considered. Grades assigned by LobbyMap in its Performance Band are used to determine support for Paris-aligned climate policies.³⁶ If an automaker has a grade lower than B, its score is reduced by 0.5 points.

When considering mergers and acquisitions, it is necessary to explain the scoring process for the following companies.

Stellantis

As PSA and FCA were merged into Stellantis early in 2021, the information about their performance from 2017 to 2020 was collected separately and added together for the evaluation. The information for 2021 was collected by searching for Stellantis only. In the overall rating, the performance of these two companies is integrated as a whole and presented as Stellantis Group. Specifically, in the section on phasing out ICE vehicles, the BEV sales of the two companies were put together for the years 2017 to 2020 and the proportions and CAGR were calculated using the combined sales.

Hyundai-Kia

In this report, Hyundai and Kia are evaluated as a whole because they share technologies, vehicle platforms, and development strategies to a great extent. Additionally, as Hyundai and Kia have different ICE phase-out commitments, their scores are calculated separately and added together: the scores were weighted 60% and 40%, respectively, according to their market share.

Nissan & Renault

Although the Renault Group, Nissan Motor Co., Ltd. and Mitsubishi Motors Corporation formed an alliance in 1999, the strategic partnership between the three companies is not a merger or an acquisition. The decision making of these companies is also independent. This report considers Nissan and Renault as independent car manufacturers.

3

Evaluation

3

3.1 Overall results

In 2021, global sales of ZEVs surged dramatically, from 2,052,750 in 2020 to 4,598,061, with the percentage of global auto sales increasing from 2.66% to 5.72%. This is still a long way from Greenpeace's demand that leading global automakers end the sale of ICE vehicles in major markets (US, China, Korea, and Japan) before 2030. For the EU, this needs to happen by 2028. This is the key to achieving the low-carbon transformation of road transportation and preventing the most damaging effects of climate change.^{v, 37, 38, 39}

Since Greenpeace East Asia's first evaluation, released November 2021, the top ten automakers have increased their share of ZEV sales compared to 2020. The improvements made by each of the ten automakers vary widely, however, even the best performers still did not achieve a passing score, revealing that none of the ten biggest automakers are making the necessary adjustments to keep the Planet's temperature increase within 1.5°C.

3.1.1 Across the board

The ten auto companies fall into three leagues of performance. General Motors, Mercedes-Benz and Volkswagen performed comparatively better in the chart; Ford, Hyundai-Kia, Renault and Stellantis are average performers; whereas Nissan, Honda and Toyota share the lowest ranking.

Nissan and Toyota are the only two companies whose compound annual growth rate of the percentage of ZEV sales and 2021 percentage of ZEV sales are both lower than the global average. This means that they are the only two companies in the top ten that are transitioning to ZEVs more slowly than the overall global transition rate.

Although Toyota made a U-turn on its position on ZEVs in December 2021, the move was late and the company had already lost ground to their counterparts in terms of ZEV sales. Nissan and Honda were ranked in 5th and 6th place in last year's evaluation and have fallen to the bottom of the ranking because of their lack of progress with ZEV sales. The share of Honda's ZEV sales is only 0.35%, just higher than Toyota's 0.18%, and Nissan's ICE phase-out plan and growth rate of the percentage of ZEV are the weakest of all the firms analysed here. Honda and Toyota are also performing significantly worse than other companies in supply chain decarbonisation.

While Honda and Nissan dropped in the ranking, Ford has caught up to 4th place due to significant growth in its sales of ZEVs, as well as updating and increasing the ambition of its ICE phase-out plan and fair practices in supply chain decarbonisation.

Although Renault has the second highest sales of ZEVs as a percentage, it fails to score for its ZEV growth rate and ICE phase-out plan and falls from 3rd place to 6th as a result. Renault is also achieving relatively little on supply chain decarbonisation; it has no specific actions on reducing the carbon footprint of steel and its renewable energy commitment for its own operations is weak.

Hyundai-Kia dropped from 4th place to 5th this year. The pace of its ICE phase-out is not impressive, but is better than the others in steel decarbonisation. Yet, almost half of Hyundai-Kia's sales of passenger cars are SUVs, with sales that rose from 33% in 2018 to 49% in 2021, the highest among all companies. Hyundai-Kia is increasing its carbon footprint from steel because it is expanding the production and the related GHG emissions through its SUV-heavy business strategy.

The growth of Volkswagen's ZEV sales in 2021 is impressive, yet it loses points for its targets for ICE phase-out and materials decarbonisation.

Even though General Motors and Mercedes-Benz reach the top of the list, its ZEV sales are a long way from what is needed to decarbonise road transport 100% by 2030. Only 1% of General Motors' sales in the US were BEVs; zero BEVs were sold in Europe in 2021. General Motors needs to show more actions on a global scale instead of boosting its ZEVs sales by marketing low-cost cars in only one market.

^v ICCT agrees that sales of EVs need to reach between 35% and 75% of the global market by 2030, with higher levels in major markets, to achieve the Paris Agreement objectives to limit the increase in global annual average temperatures to "well below" 2°C this century.³⁷ Similarly, Bloomberg NEF states that global sales of new ICE vehicles across all segments need to be phased out by 2035 to stay on track for the Net Zero Scenario.³⁸ Even the IEA, an organisation that has been relatively conservative on energy transition, suggests that halting global sales of new internal combustion engine passenger cars by 2035 could benefit a shift away from fossil fuels.³⁹

3.2 Phase-out of ICE vehicles

As many countries and regions have introduced more stringent emissions regulations or market access standards, automotive manufacturers have come under pressure to decarbonise their fleets. As a result, some companies have formulated plans to deal with stricter laws and rules, however, none of the plans are progressive enough to match the ambition of global ICE phase-out by 2030.

3.2.1 ICE phase-out plan

Mercedes-Benz, Ford, and General Motors achieve the highest scores in this section based on their agreement of the declaration to reach 100% ZEVs by 2035 in all major markets.⁴⁰ On the other hand, Hyundai-Kia, Renault and Nissan are left far behind.

At the end of 2021, Ford, General Motors, and Mercedes-Benz all signed the COP26 declaration to achieve 100% ZEVs by 2035 in major markets (and globally by 2040).⁴⁰ While the commitment to this declaration is an improvement for all three companies, considering their respective current ZEV sales are far below the target, more action must be made to show the world that these are not just words. Honda is another company that has announced a global ICE phase-out date: 100% by 2040.⁴¹ Honda's ZEV sales do not support its target because ZEVs comprises only 0.35% of total sales.

Overall, six out of ten automobile groups – Hyundai-Kia, Nissan, Renault, Stellantis, Toyota and Volkswagen – do not have a global ICE phase-out date. This means that they have not shown the aspiration to achieve 100%

decarbonisation even though several of them pledge to do so. Furthermore, two of the ten automobile groups, Nissan and Toyota do not include a 100% phase-out target in any market. Stellantis, Renault, and Volkswagen only include a 100% target for the European market.

It is also notable that both Nissan (other than the US market) and Kia's goals are for electrification, which includes PHEVs, therefore no points were given for these targets. Lastly, Toyota does not have any ICE phase-out date, but has instead set a target to sell 3.5 million ZEVs by 2030.⁴² Based on this goal, the percentage of ZEVs as a proportion of projected sales was calculated and estimated to be only 30% ZEVs in 2030.

In terms of improvements on the ICE phase-out plans from the previous year, Ford and Mercedes-Benz made substantial strides by announcing ambitious brand level goals for the first time. Toyota and Stellantis also made small improvements to their plan in the past year. These companies are awarded bonus points for their improvements. The remaining automakers did not substantially improve their ICE phase-out plans.



3.2.2 ZEVs as a fraction of sales

For the first time in the past five years, sales of ZEVs as a share of the overall market has more than doubled. That said, only 4.6 million units of ZEVs were sold in 2021, compared to global vehicle sales of 80.4 million units. Although the global stock of electric cars, when including PHEVs, has now surpassed the 10 million mark, 99% of the total global fleet is still burning fossil fuels. For the main markets, the percentage of ZEV sales was well under 10% in 2022, with the exception of China.²

Figure 3.

Global sales of all ZEVs from 2017 to the first half of 2022 as the number of units sold and as a percentage of all units sold (Source: Greenpeace compilation based on data from Marklines).

Figure 3.

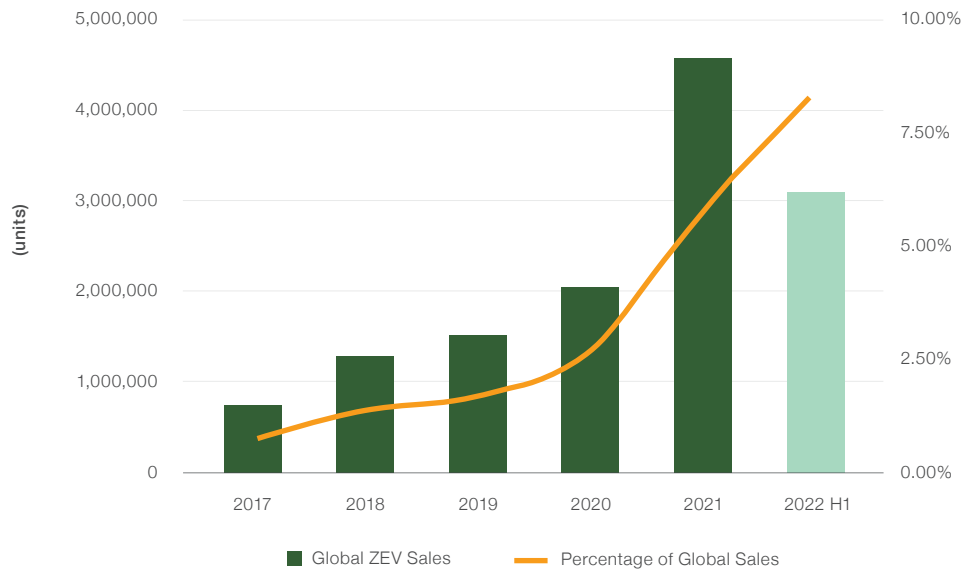
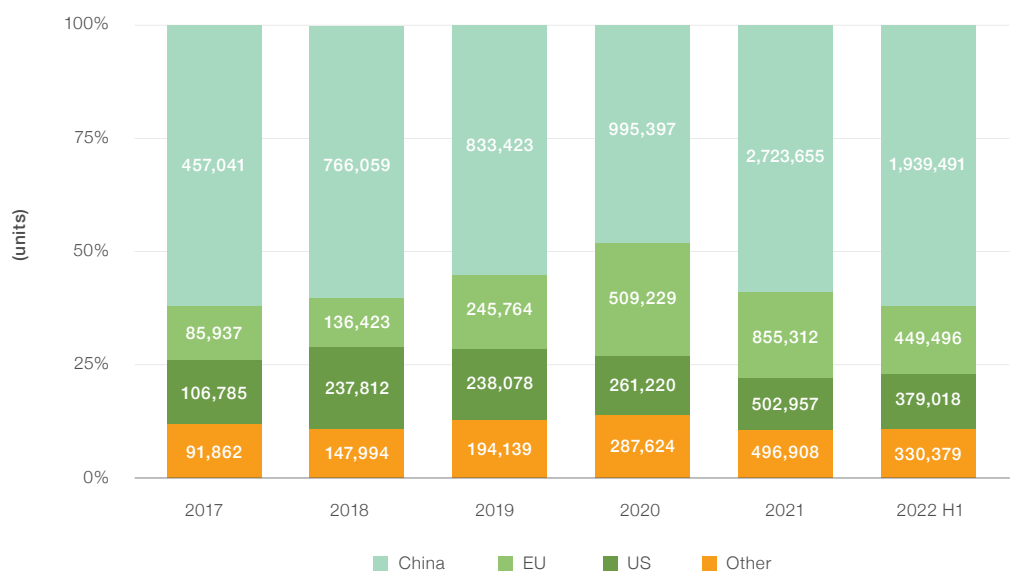


Figure 4.

Regional share of ZEV sales from 2017 to the first half of 2022 (Source: Greenpeace compilation based on data from Marklines).

Figure 4.



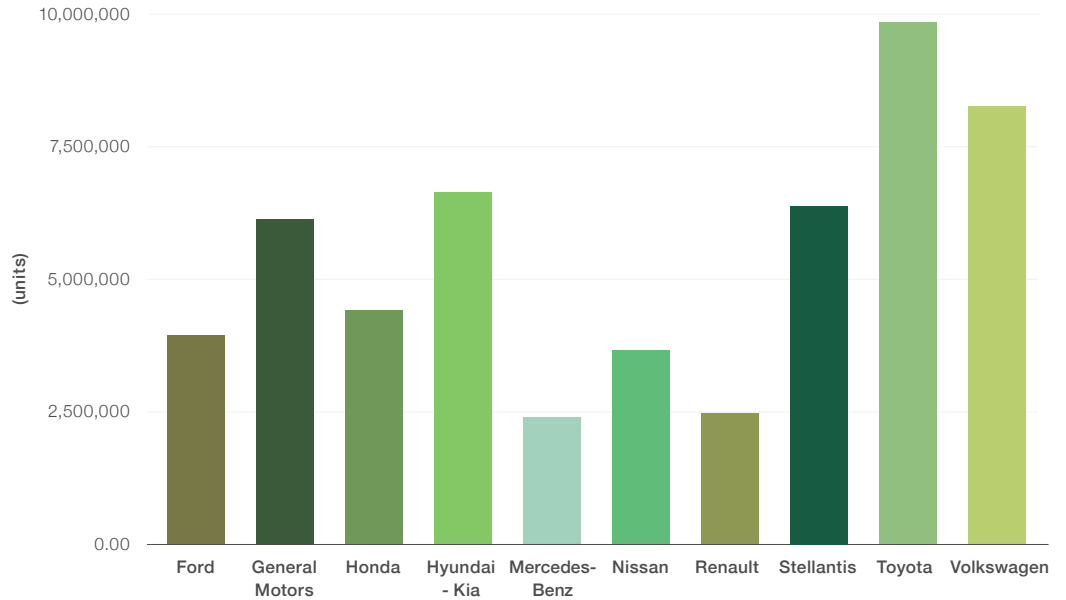
Comparative analysis of ZEV sales by company

Considering the global sales of each automaker, Toyota sold the largest number of automobiles in 2021 at a value of 9,848,068 units. Mercedes-Benz and Renault have a similar market size and are the smallest automakers of the ten, both selling slightly less than 2.5 million units.

Figure 5.

Global sales of all vehicles by company in 2021 (Source: Greenpeace compilation based on data from Marklines).

Figure 5.

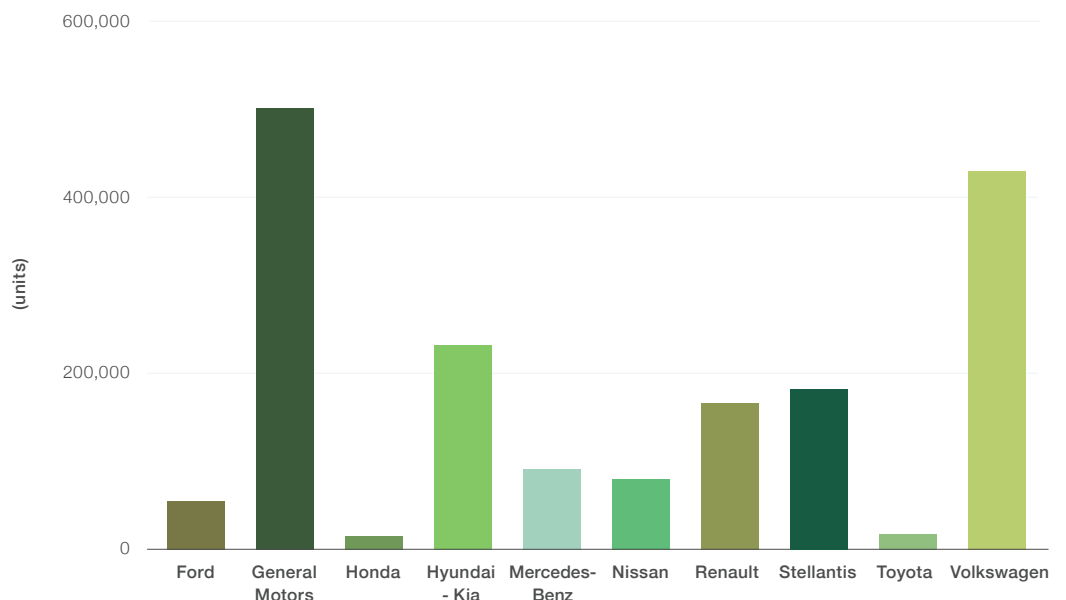


Although Toyota is the overall market leader for all vehicles, its sales of ZEVs is one of the smallest among the ten automakers. Toyota and Honda have the lowest share of the ZEV market, selling just over 17 and 15 thousand, respectively. General Motors and Volkswagen sell the most ZEVs by absolute number, selling just over 500,000 and 430,000 units, respectively. The majority of General Motors' ZEV sales are within the Chinese market (which is discussed in the next section).

Figure 6.

Global sales of ZEVs (EVs and FCEVs) by company in 2021 (Source: Greenpeace compilation based on data from Marklines).

Figure 6.



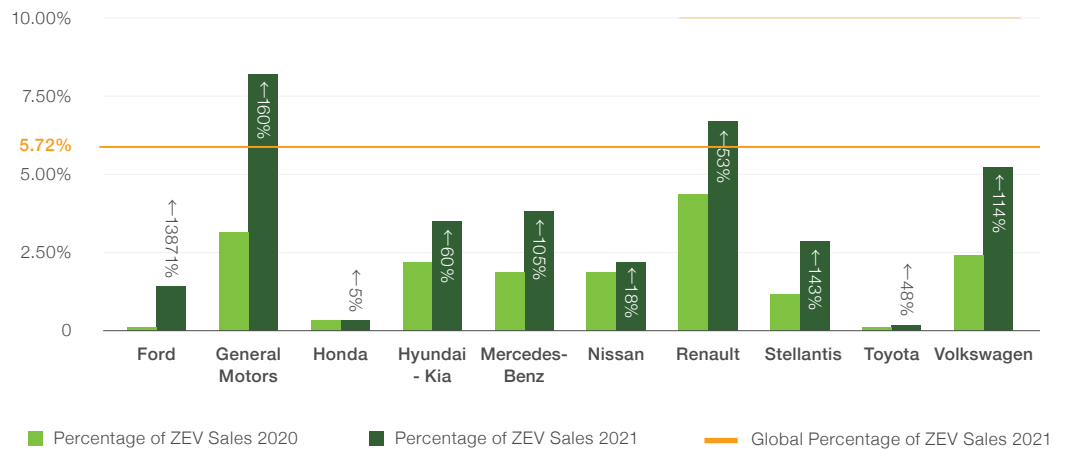
For ZEV sales as a percentage only two automakers exceeded the 2021 global market share for ZEVs of 5.72%. General Motors and Renault perform the best in this regard with percentages for ZEVs of 8.18% and 6.69% respectively.

Ford, General Motors, Mercedes-Benz, Stellantis and Volkswagen more than doubled their percentage of ZEV sales between 2020 and 2021, with Ford increasing its share of ZEV sales from roughly 0.01% to 1.40% in just one year. Other companies such as Hyundai-Kia, Nissan, and Renault have also increased their share of ZEV sales. Honda and Toyota, with the smallest percentage of ZEV sales in 2021, do not show much improvement compared to the previous year, only increasing their percentage of ZEV sales by 0.02% and 0.06%, respectively.

Figure 7.

Global sales of ZEVs as a percentage of total sales by company in 2020 and 2021 (Source: Greenpeace compilation based on data from Marklines).

Figure 7.



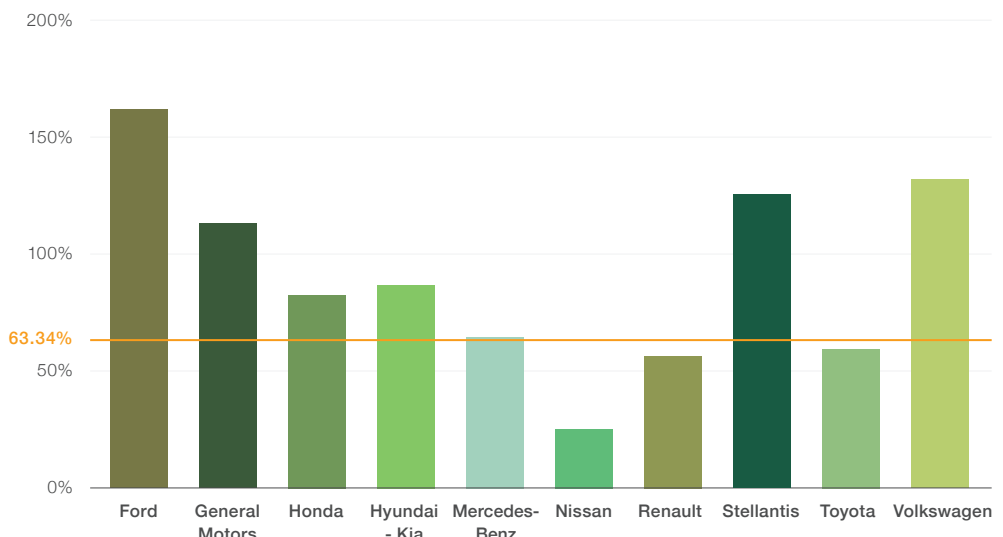
In considering the growth of ZEV sales through the compound annual growth rate (CAGR), all but three automakers exceeded the global CAGR of 63.34%. It should be noted that Ford's high CAGR value is largely due to their late start in ZEV development.

It is worth noting that Nissan and Toyota are the only two companies whose CAGR of the percentage of ZEV sales and 2021 percentage of ZEV sales are both lower than the global average. This means that Nissan and Toyota are the only two companies in the top ten that are transitioning to ZEVs more slowly than the overall global transition rate.

Figure 8.

CAGR for ZEVs as a percentage between 2017 and 2021, by company compared with that of global CAGR indicated by a horizontal line (Source: Greenpeace compilation based on data from Marklines).

Figure 8.



Additional analysis with data in the first half of 2022

Rising dependence on the Chinese market

A significant proportion of ZEV sales by General Motors and Honda are in China, with 96% and 83% respectively, in the first half of 2022.

Honda sells six different models in partnership with Guangqi Automobile and Dongfeng Automobile exclusively for sale in China. In contrast to its Chinese market, Honda sold 240 ZEVs in Japan in the first half of 2022, representing only 2.35% of all the ZEVs sold globally in the same period.

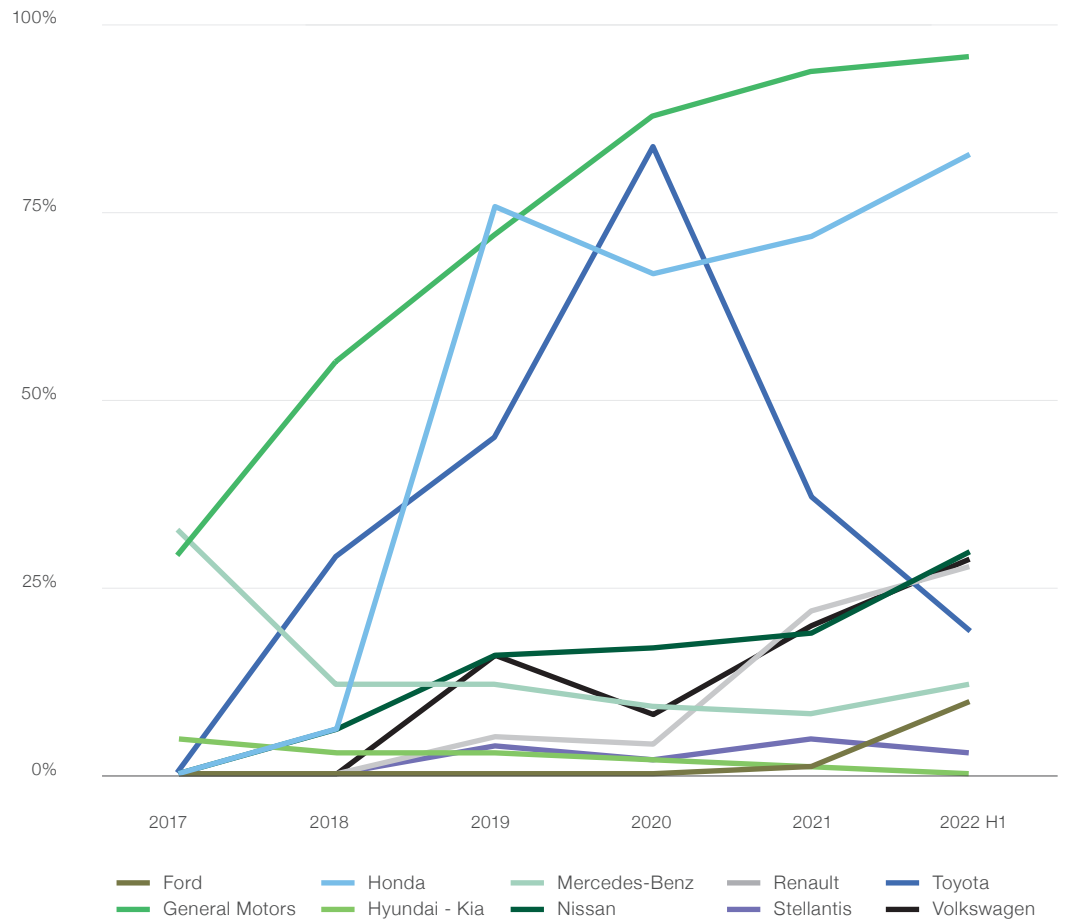
General Motors sells 14 different models in partnership with Chinese automakers SAIC and/or Wuling Automotive which are all only for sale in China. The most popular model by far is the Wuling Hongguang Mini EV which makes up around 90% of the sales in China. General Motors sold 96% of ZEVs in China in the first half of 2022, but it only sold 7820 ZEVs, 3.01% of total ZEV sales, in the US.

Toyota sales in China peaked in 2020 due to the iA5 model, which encompassed the majority of sales in China, was subject to alterations in 2021 causing a reduction in battery capacity and limitation in output power ultimately resulting in a plummet of its sales.⁴³ Similarly, another model sold in China, the C-HR was discontinued shortly afterwards leading to even less sales in the Chinese market.

Figure 9.

Figure 9.

ZEV sales in China as a percentage of global ZEV sales from 2017 to the first half of 2022 (Source: Greenpeace compilation based on data from Marklines).



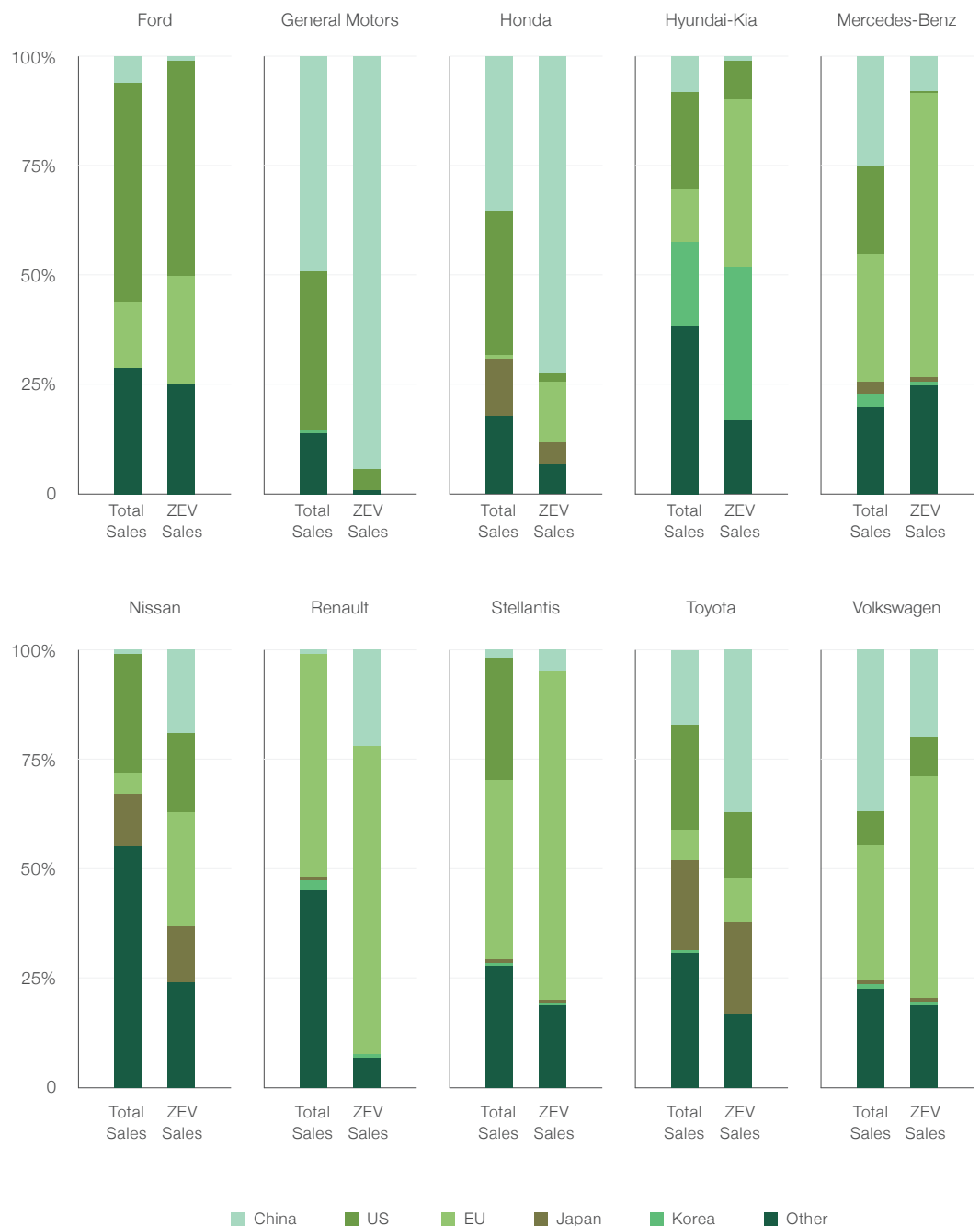
Upon review of the 2021 data, the market presence in China, the EU, and the US for each company's total sales and their ZEV sales only, it is apparent that General Motors and Honda have a significantly larger reliance on the Chinese market only for their ZEV sales. General Motors sells 49% of its cars in China, but 94% of its ZEVs in China and, similarly, Honda goes from selling 35% of cars to 72% of ZEVs in China. Similarly, Mercedes-Benz, Renault, and Stellantis have a larger presence in the EU when it comes to ZEVs. It is also notable that, with many companies such as General Motors, Honda, Mercedes-Benz, and Stellantis, the market size in the US when it comes to ZEVs shrinks a sizable amount suggesting a lack of effort to implement ZEV transition in the US.

Of the ten companies, Ford has the greatest share of their sales in the US. Nearly 50% of its sales are within the US market. Accordingly, Ford has a small presence in China which is similar to Hyundai-Kia and Stellantis.

Figure 10.

Figure 10.

Total sales and ZEV sales by region (China, EU, US, Japan, Korea, or other) for each automaker in 2021 (Source: Greenpeace compilation based on data from Marklines).



Box 1: Case study: Auto workers in South Korea call for a just transition

A shift to zero-emission vehicles (ZEVs) is inevitable, but many auto industry employees have expressed concern about what the transition means for job security. In South Korea, auto union members have spoken out to call for a timely ban on internal combustion engine (ICE) vehicles and measures to protect workers during the transition.

South Korea's auto industry is key to the country's economy. Automobiles are South Korea's number two export, and a substantial portion of the country's population either works in the auto industry or has a close friend or relative who does. In 2018 the industry employed approximately 360,000 workers, while indirect employment stood at 154,000.⁴⁴

Labour unions are an important part of Korean society, and auto unions in particular have been central to South Korea's labour movement. The Korea Metal Workers' Union (KMWU) represents approximately 115,000 workers from Hyundai Motors, Kia, and General Motors Korea. In Spring 2022, Greenpeace East Asia's Seoul office worked with the KMWU to survey more than 1,000 of the union's members on their views about an ICE vehicle phase-out and just transition.⁴⁵

The survey found strong support for the phase-out of ICE vehicles by 2035, a timeline that is significantly more ambitious than those announced by Korea's major auto companies. Four out of five workers said that they supported an ICE phase-out by 2035, and nearly two thirds of workers said they were in favour of the even earlier phase-out date of 2030.⁴⁵

Respondents emphasised the need for job security throughout the transition. They said that the government needed to take into account of "employment retention during transition," followed by "governance structure engaging labour unions," or the need to involve labour organisations in corporate policy-making amid the transition.⁴⁵

Union leaders have repeatedly called on auto corporations to prioritise employee retention and to offer up-skilling programmes during the electric vehicle transition era. Sung-Ki Kim, who works on the public relations team for the Hyundai Motor Company labour union, said, "Corporations should not lay off workers in the name of restructuring; rather, they should provide opportunities to workers by creating new jobs and offering re-education. [Management] should not forget that these are the people who have made a huge contribution to growing the company globally."⁴⁶



Ms. Kim Eun-joo, a manager in Hyundai Motors division of Korea Metal Workers' Union, urges the company to ensure a just transition for a better life for her son.

3.3

Renewable energy charging

BEVs outperform diesel and petrol cars on carbon emissions, even on carbon-intensive power grids,⁴⁷ but they are only zero carbon if the electricity used to manufacture and charge the cars is from renewable sources. The transition to BEVs will increase the share of electricity consumption from 0.2% of global power to 4% by 2030.² Automobile companies' should strive to increase the generation of renewable energy to meet increasing demand and devise solutions to provide renewable energy in all their charging stations. Therefore, the additionality of renewable energy capacity of the options provided by the automotive companies is one of the factors to be considered in this category.

From our analysis, most companies provide renewable charging options through partnerships with charging companies. Renewable energy mainly comes from two sources: from the local grid or through buying certificates to match the use of electricity by eligible EV owners. In most cases renewables are not available in the local grid, and many companies, such as Ford, General Motors, Hyundai-Kia, Mercedes-Benz, Stellantis, and Toyota, purchase renewable energy certificates with poor traceability to match the electricity charged. These certificates might create a very minimal additionality effect to renewable generation.⁴⁸

Moreover, the renewable energy charging options provided by the automakers are limited to certain cities and small groups of eligible customers. For example, General Motors is offering the programme only to employees of participating suppliers of the automakers.⁴⁹

Mercedes-Benz scores the highest points in this category for offering renewable energy options in the largest networks of charging stations, even though this is achieved by purchasing renewable energy certificates with unclear sources. Volkswagen receives the second highest points for offering the service in Germany by ensuring renewable energy comes from a network that is physically linked to nearby renewable sources. Honda's programme in the UK offers renewable energy through partnering with a domestic renewable energy supplier that provides renewable energy from a range of sources. Approaches by Volkswagen and Honda are believed to be able to create relatively better additionality to renewable energy generation, therefore even though their programmes are only available in a single country, they receive more credits than others.

3.4

Scope 1 and Scope 2 emissions: Carbon reduction and renewable energy targets

In general, auto companies are setting better goals for Scope 1 and Scope 2 carbon reduction commitments for their own operations than for Scope 3 purchased goods and services emissions that cover GHG emissions from parts and materials. Six of the ten companies commit to at least 50% reduction of GHG emissions by 2030. The targets set by Honda, Hyundai-Kia, Nissan, and Toyota are not progressive enough.

Although the adoption of renewable energy has become the norm in some industries, such as tech companies, the auto industry is falling behind. Only half of the companies commit to adopting 100% renewable energy globally by 2035 or earlier. Hyundai and Kia commit to a later date, while Honda, Nissan, Renault and Toyota do not have a commitment to using 100% renewable energy in their own operations.



Table 1.

Companies' Scope 1 and Scope 2 renewable energy adoption in own operations (Source: Companies' official announcements and sustainability reports).

Table 1.

Company	Renewable energy in own operations	
	Current percentage of renewable energy	Targets
Ford	32.4%	100% globally by 2035
General Motors	25%	100% globally by 2035
Honda	N/A	No
Hyundai-Kia	Hyundai: NA Kia: 3.89%	Hyundai: 100% globally by 2045 Kia: 100% globally by 2040
Mercedes-Benz	78%	100% globally by 2035
Nissan	10.5%	No
Renault	N/A	70% in all sites by 2030
Stellantis	45%	100% globally by 2030
Toyota	11%	25% globally by 2025
Volkswagen	49%	100% globally by 2030 (except for China)

3.5

Scope 3 purchased goods and services emissions: Disclosure and reduction targets

3.5.1

Disclosure

All companies report their Scope 3 purchased goods and services emissions data and disclose their data and methodology through the Carbon Disclosure Project (CDP) platform, apart from Stellantis. Although Stellantis devotes sections of its sustainability report to its upstream supply chain, the Scope 3 purchased goods and services emissions data could not be found in either its own report or on the CDP platform.

Despite the availability of emissions figures, the quality of the data varies. Only a few companies claim that they collect primary emissions data from their suppliers. Half of the companies, including Honda, Hyundai-Kia, Nissan, Renault and Toyota, rely heavily on industry average emissions factors to calculate the emissions figures.

Companies that make estimates using industry average emissions factors, could ignore actual emissions from their own supply chains. This makes it difficult to assess whether a company's supply chain is doing better or worse than its counterparts, particularly if other companies are using the same emissions factors. This means that there is no reference point on which to set meaningful targets to reduce the Scope 3 purchased goods and services emissions and no incentive to source materials from less carbon-intensive suppliers. It also makes it difficult for consumers, regulators or investors to compare the information meaningfully across companies and over time.

US Securities and Exchange Commission (SEC) is proposing regulations to audit supply chain emissions.^{vi} The ten companies with global markets would not only need to comply, considering the significant scale of their production and the volume of emissions of their purchased goods, they would be required to disclose good quality Scope 3 purchased goods and services emissions data.

3.5.2 Reduction targets

General Motors and Mercedes-Benz aim to procure only carbon neutral materials by 2038 and 2039 respectively. Renault and Volkswagen aim to cut emissions from their procured goods by 30% by 2030, and Stellantis sets such targets only for its BEVs. Hyundai and Kia have a different timeline. Hyundai aims for a 10% emissions reduction by 2035, and Kia sets a much more ambitious target of 50% reduction by 2030. Although Honda and Toyota mention life cycle emissions reduction targets, which theoretically include Scope 3 upstream emissions, the targets are too vague to be convincing.

The companies must provide a clear roadmap to reduce the carbon footprint of their purchased goods, especially the carbon-intensive sectors, such as steel and batteries.

Table 2.

Table 2.

Companies' Scope 3 purchased goods and services emissions and reduction targets (Source: CDP platform and companies' official announcements).

Company	Disclosed emissions data (metric tons CO ₂ -eq)	Reduction targets
Ford	45,137,148	N/A
General Motors	50,848,346	Carbon neutral by 2038 or sooner for raw materials
Honda	33,500,000	N/A
Hyundai-Kia	Hyundai: 17,014,155 Kia: 9,810,833	Hyundai: 10% reduction by 2035 Kia: 50% reduction by 2030
Mercedes-Benz	17,000,000	Plans to procure only CO ₂ neutral production materials by 2039
Nissan	12,726,000	N/A
Renault	9,006,763	30% reduction for parts and materials supply chain by 2030
Stellantis	N/A	40% reduction of CO ₂ emissions of purchased parts per BEV vs 2021
Toyota	54,400,725	N/A
Volkswagen	61,301,008	30% reduction for production by 2030

^{vi} The proposed rule requires listed companies to report Scope 1 and Scope 2 emissions, and further requires the disclosure of Scope 3 emissions when those emissions are material or when a company has announced a net-zero pledge that includes Scope 3 emissions.

3.6

Steel decarbonisation

In general, the top automakers are not paying enough attention to reducing the carbon footprint from their steel supply.

It is disappointing that none of the companies have any steel-specific decarbonisation targets. Clear commitments from automakers to purchasing zero-carbon steel could guarantee demands and encourage steel makers to invest in transitioning to coal-free technologies. The auto giants should show their ambition.

None of the companies specifically disclose the emissions data of their steel supply. Six of the ten companies specifically mentioned steel in regard to decarbonisation in their sustainability reports. Two companies, Hyundai-Kia and Stellantis, disclose the volume of annual steel usage. Apart from Stellantis and Renault, the European and US automakers have all recently invested or partnered with steel companies to develop low-carbon steel. Hyundai-Kia scored the highest point in this category with a relatively better steel disclosure practice and a partnership with POSCO to develop the capacity to produce direct reduced iron (DRI) steel using hydrogen.⁵⁰

The SUV problem

The increase in manufacture and sales of electric cars helped to avoid oil consumption and CO₂ emissions in 2021, however these benefits have been reduced or cancelled out by the corresponding increase in the sales of SUVs. The number of SUVs on the world's roads increased by more than 35 million over the past 12 months, driving up annual CO₂ emissions by 120 million metric tons.⁵ Because of their larger size and poor aerodynamics, SUVs release more tailpipe emissions and consume more energy even if they are BEVs. Not only do SUVs on average consume about one-quarter more energy than medium-size cars, they drive the increase in the automotive industry's demand for steel. This is due to the fact that the average SUV or pickup truck uses 20% more steel than the average car.²⁶ Therefore the share of SUV sales is also included in the criteria for evaluation in this edition.

In recent years, SUVs have become increasingly popular across the world. Overall passenger car sales peaked in 2015 before declining, but the SUV category has taken the lion's share of global sales, with a threefold increase between 2010 and 2019.²² Although all the companies rely on SUVs for 30% or more of their sales, Honda, Hyundai-Kia and Volkswagen rely the most on SUVs sales. Almost half of Hyundai-Kia's sales of passenger cars are SUVs, with sales that rose from 33% in 2018 to 49% in 2021, the highest of all companies. Hyundai-Kia might be more aware of its carbon footprint from steel, however it is increasing the production of steel and the related GHG emissions through its SUV-heavy business strategy.

It is also notable that Ford, on top of its SUV sales of 37%, also has an overwhelming number of pickup truck sales at 30%, based on 2021 values. In other words, 67% of Ford's sales are SUVs and pickup trucks, which are highly steel intensive cars.

Toyota, Honda and Renault are doing the least concerning steel emissions reduction in our evaluation.

Figure 11.

SUV sales as a percentage of overall sales by company from 2017 to 2021 (Source: Greenpeace compilation based on data from Marklines).

Figure 11.

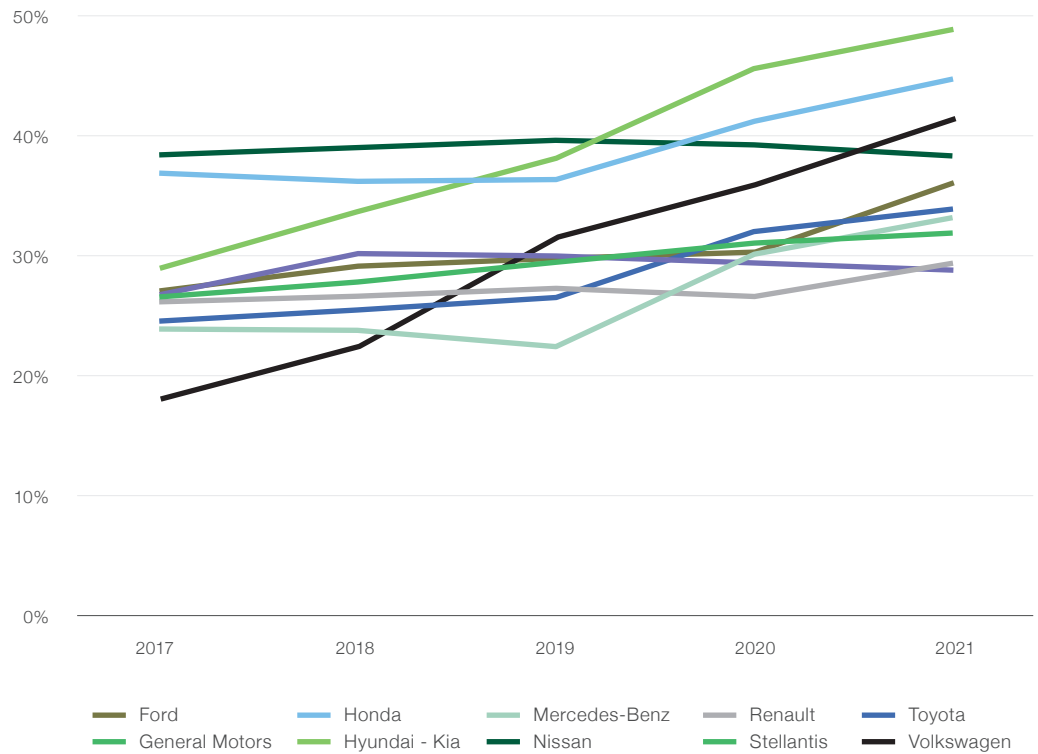


Table 3.

Data regarding companies' steel decarbonisation practices (Source: vehicles' sales data are Greenpeace compilation based on data from Marklines).

Table 3.

Company	Steel-specific targets	Steel consumption			Green steel partnership / Investment
		Disclosures (metric tons, 2020)	Percentage of SUV sales (2021)	Percentage of pickup truck sales (2021)	
Ford	no	/	37%	30%	\$500 million investment towards EAF technology ⁵¹
General Motors	no	/	32%	17%	Partnership with Nucor Corp to develop EAF technology ⁵²
Honda	no	/	45%	1%	
Hyundai-Kia	no	Hyundai: 940,277 (357,493 scrap steel); Kia: 175,982	49%	0%	Partnership with POSCO for DRI steel made from hydrogen ⁵⁰
Mercedes-Benz	no	/	33%	0%	Electrolysis technology and scrap steel use with partner ⁵³
Nissan	no	/	39%	6%	
Renault	no	/	31%	1%	
Stellantis	no	8,871,486	30%	15%	
Toyota	no	/	34%	8%	
Volkswagen	no	/	41%	1%	Partnership with steel partner using electrolysis technology ⁵⁴

Box 2: The urgency of steel decarbonisation

During the past ten years, CO₂ emissions from steel production have risen sharply because of the continued increase in steel production. The CO₂ emissions per crude steel cast unit has kept steady at around 1.8 metric tons, while the amount of steel produced has increased by 30% compared to 2010. The growth of CO₂ emissions from steel production is faster than that of global CO₂ emissions. In 2019, CO₂ emitted by steel production accounted for 9.4% of global CO₂ emissions.⁵⁵ Currently, the steel sector is one of the dominant contributors to CO₂ emissions in all sectors with no sign of slowing down, which makes the industry an obstacle on the path to carbon neutrality.

According to data from the World Steel Association, around 10% of steel is used in car production every year and is the dominant material used in cars – the average weight of steel in a car is 0.9 metric tons.²⁵ Therefore, decarbonising the steel sector is crucial for decarbonising vehicles and aligning with the Paris Agreement target.

The necessary technological transformation

Clean technologies that effectively reduce carbon emissions in the steel sector are still at an early stage of development. At present, the most widely used method of producing steel is called blast furnace-basic oxygen furnace (BF-BOF). The BF-BOF process consumes a significant quantity of coal for the major input of heat and carbon for the reduction process and is carbon intensive, emitting about 2 tCO₂ per metric ton of steel produced. The hydrogen-based direct reduced iron in the electric arc furnace (DRI/EAF) method of steel production is a

potential technology to decarbonise the sector. However, there is still a huge challenge in producing low-carbon hydrogen.²⁴ More than 95% of the world's hydrogen is currently produced using the steam methane reforming (SMR) process. This is known as grey hydrogen. Greenhouse gas emissions from the production of grey hydrogen can be separated into two parts: (a) the SMR process and the subsequent water gas shift (WGS) reaction in which methane is converted to carbon dioxide and hydrogen; and (b) the energy used to generate the heat and high pressure needed for the SMR process.⁵⁶ The CO₂ emissions from the production of grey hydrogen lie somewhere between natural gas and coal-fired power.⁵⁷ If fugitive methane emissions are also considered, the total emissions for the whole hydrogen production process could be as high as 550.8g CO₂-eq/kWh.⁵⁸

The quest for green hydrogen

Green hydrogen is produced by electrolyzing water using surplus renewable energy. Obtaining sufficient and low-cost electricity from renewable energy sources is the key challenge. At present, the cost of green hydrogen is three to four times as much as that of grey hydrogen.⁵⁹ In the long term, the price of green hydrogen is expected to reduce together with the development of renewable energy infrastructure. Although some predictions project that green hydrogen will be cost competitive with hydrogen made by fossil fuels with carbon capture and storage by 2030.^{60, 61, 62} Relying on green hydrogen is not an efficient solution to mitigate the climate impacts of carbon intensive steel production.

Automakers must commit to zero carbon steel and reduce sales of SUVs

Automobile manufacturers are in the position to create early demand for zero carbon steel than other industries due to the relatively high price of automobiles.⁶³ Very few automakers have time bound targets for using carbon neutral materials. Automobile companies should start taking action to decarbonise steel by auditing and disclosing the carbon footprint of their materials, committing to purchasing low-carbon steel, setting steel carbon reduction targets, producing fewer SUVs, and investing in fast-tracking the technological development of zero carbon steel.

On the one hand, manufacturers must minimise steel use in the car body and reduce the production of heavy cars such as SUVs to curb the growth of steel production and consumption in the automobile sector immediately. On the other hand, the use of end-of-life (EoL) steel should be promoted. Recycled steel production uses about 50% of the energy of primary steel and currently makes up 23% of current production.⁶⁴ Steel production can be further decarbonised if steel is recycled using renewable energy, though improving the quality of secondary steel could be a challenge.

Policy makers also need to formulate stringent policies and standards to limit the use of carbon-intensive steel in products. It is encouraging that the European Union is legislating the Carbon Border Adjustment Mechanism (CBAM) that will gradually apply to goods including iron and steel. Moreover, governments can support and promote products that employ green steel and have reduced life cycle GHG emissions through government procurement, provision of tax incentives and incentives for the public. This is a major opportunity to divert the money currently spent by many governments on subsidising fossil fuels and moving towards transforming the steel industry.

3.7 Resource reduction and efficiency

An evaluation of resource reduction and efficiency was included in the 2022 ranking scheme to emphasise the importance and scale of upstream (raw material) carbon emissions.

Unsurprisingly, but disappointingly, only one of the ten automakers committed to a target on reducing raw materials. Specifically, Nissan disclosed a target to reduce new natural resource usage by 30% per vehicle by 2022, but there is no progress in its latest report. In addition, Nissan disclosed its plan to use materials that do not rely on newly mined resources for 70% of the materials used in each vehicle by 2050.⁶⁵

Similarly, only one of the ten automakers has reported on targets for secondary materials usage. Mercedes-Benz has released plans to reduce the amount of material required for each unit, notably aiming for an increase in the share of secondary raw materials to 40% by 2030.⁶⁶

In regard to EV battery reuse and recycling performance, all automakers report some action or initiative. Mercedes-Benz and Volkswagen have demonstrated the most substantial actions relative to the other automakers. Mercedes-Benz has built the largest capacity for battery reuse as shown by its multiple second-life battery storage plants with a combined capacity at more than 95 MWh.⁶⁷ The other automakers have employed such initiatives but have not disclosed any useful quantifiable details.

3.8 Negative climate lobbying and violations of regulations

Over the past 12 months, all ten of the major automakers have shown an overall low level of engagement on the climate crisis, with InfluenceMap assessing their engagement intensity as at best 52% (Volkswagen) and at worst 26% (Nissan and Renault).⁶⁸ Engagement on climate policy ranged from a simple lack of participation (Ford, General Motors, and Mercedes-Benz were the only automakers to sign the COP26 Declaration on ZEVs⁴⁰), to active policy obstruction, with Toyota reported as being the alleged driving force behind the Japanese government holding back on the G7's ZEV sales target commitments.^{19, 20}

More than half of the top ten automakers have been involved in emissions violations. Over the past 12 months this notably took the form of falsifying or obstructing the release of emissions data, with Mercedes-Benz being fined nearly \$17m by South Korean regulators for the use of defeat devices in February 2022.⁶⁹

In June 2022, FCA (now Stellantis) pleaded guilty and was fined \$300m by the US Department of Justice for conspiracy to defraud US regulators and consumers by giving false emissions information,⁷⁰ and General Motors was also fined \$100,000 for making unapproved changes to their vehicles which resulted in subsequent emissions violations.⁷¹

Appendix 1: Glossary

B	BEV	Battery electric vehicle
	BF	Blast furnace
	BOF	Basic oxygen furnace
C	CAFE standards	Corporate Average Fuel Economy standards
	CAGR	Compound annual growth rate
	CBAM	Carbon Border Adjustment Mechanism
	CBP	Customs and Border Protection
	CDP	Carbon Disclosure Project
	COP26	The 26th Conference of the Parties (The United Nations Climate Change Conference held in Glasgow)
D	DRI	Direct reduced iron
E	EAF	Electric arc furnace
	EoL	End-of-life
	ESP	Electronic Stability Programme
	EU	European Union
	EV	Electric vehicle
F	FCEV	Fuel cell electric vehicle
G	GHG	Greenhouse gas
H	HEV	Hybrid electric vehicle
I	ICCT	International Council on Clean Transportation
	ICE	Internal combustion engine
	IEA	International Energy Agency
J	JAMA	Japan Automobile Manufacturers Association
K	KMWU	The Korea Metal Workers' Union
P	PHEV	Plug-in hybrid electric vehicle
R	RECs	Renewable Energy Certificates

S	SEC	Securities and Exchange Commission (US)
	SMR	Steam methane reforming
	SUV	Sport Utility Vehicle
U	UK	United Kingdom
	US	United States
	US EPA	United States Environmental Protection Agency
V	VOC	Volatile organic compounds
W	WGS	Water gas shift
Z	ZEV	Zero-emission vehicle

Definitions

Additionality	Additionality is the property of an activity being additional, in this report, it refers to being additional to the overall renewable energy capacity. A proposed activity is additional if the recognised interventions are deemed to be causing the activity to take place. The occurrence of additionality is determined by assessing whether a proposed activity is distinct from its baseline.
BEV	Vehicle without fuel tank or exhaust pipe and relying only on electricity for propulsion, a kind of non-ICE vehicle
EV	Vehicle fully or partially powered by electricity
FCEV	Vehicle using a fuel-cell and powered by compressed liquid hydrogen
HEV	Vehicle with small battery assisting the engine, a kind of ICE vehicle
PHEV	Vehicle powered by both gasoline and electricity, a kind of ICE vehicle
ZEV	A zero-emission vehicle (ZEV) is an electric car that does not produce exhaust emissions of pollutants or carbon when it operates. In this report, only BEV and FCEV are regarded as ZEV, while PHEV is not.

Appendix 2: Company profiles

Company profile: Ford [4th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
23.5	15.47	8	0.5	-0.5

Percentage of ZEV sales in 2021: 1.40%

Ford has performed substantially better compared to the previous year, mainly due to improvements in its ICE phase-out targets. Ford has been slow to transition to ZEVs which is apparent from its consistently low ZEV sales and percentages up to 2021. Even now, its current percentage of ZEV sales does not support its slightly more competitive ICE phase-out plan (relative to the other companies), which has a global goal of 50% ZEVs by 2030. Ford has the highest compound annual growth rate (CAGR) value, which is probably due to its slow start on transitioning to ZEVs and its recent increase in ZEV sales, combined with a steady decrease in overall sales. Ford also scores poorly on its supply chain decarbonisation efforts and resource efficiency, because of insufficient target-setting and disclosure. Ford collects a couple of points due to its recent and considerable investment in EAF technology for green steel. Although half a point has been deducted for poor performance on advocacy and lobbying,⁷² Ford still manages to move up the ranking from 8th to 4th place.

Ford Motor Company (Ford) is an American multinational automobile manufacturer founded in 1903. North America and Europe are Ford's two largest markets.

Ford was one of the early adopters of hybrid technology and offered its first hybrid model, Escape Hybrid in 2004. Ford has continued to make a small volume of hybrid and EV models with annual sales in the low thousands. Ford is a relatively minor player in Europe, with 5% of the passenger car market, and has struggled for years with the EU's increasingly strict emissions standards.⁷³

Until now, Ford has been focusing on hybrid models and only began to sell larger volumes of all-electric models from late 2020, lagging far behind in the EV competition. At the United Nations Climate Change Conference held in Glasgow (COP26), Ford committed to accelerating the transition to achieve 100% zero-emission cars and vans by 2040 (and by 2035 for leading markets).⁴⁰

Phase-out of ICE vehicles		15.47
ZEV sales		
Ford sold 3,955,133 vehicles in 2021 with ZEVs making up 1.40%, the third-lowest in the analysis. Nevertheless, this is a large increase from the four previous years (2017-2020) where the share of ZEVs ranged between just above 0% to 0.03%. Ford's jump in its percentages of ZEVs demonstrates huge growth and results in a high CAGR value of about 162%, which is 2.5 times larger than the global CAGR. Ford's large CAGR is also due to the steady decrease in yearly total sales, from over 6.2 million cars in 2017 to just under 4 million by 2021.	Percentage of ZEV sales (2021)	1.75
	Percentage of ZEV sales (2017-2021)	0.22
	CAGR for percentage of ZEV sales (2017-2021)	2.00

Ford has committed to 100% of vehicle sales to be all-electric by 2035 in major markets after signing the COP26 declaration on an accelerated transition. This declaration also commits Ford to achieving 100% ZEVs by 2040 globally. ⁴⁰ This is an improvement on previous years because Ford had no commitment to an ICE phase-out date in any market until May 2021, when it announced it expected 40% of global vehicle volume to be fully electric by 2030, which was neither ambitious nor detailed. ⁷⁴	ICE phase-out plan and improvements	10.9
In terms of EV charging, Ford has committed to making EV charging increasingly based on renewable energy by setting up an initiative to buy renewable energy certificates (RECs) to match the at-home energy consumption, ⁷⁵ but this initiative is only currently in California. More widespread access to programmes like this should be implemented.	Renewable energy charging	0.6
Supply chain decarbonisation		8
Scope 1 and Scope 2		
Ford has committed to reducing absolute Scope 1 and Scope 2 GHG emissions by 76% by 2035 from a 2017 base year. In addition, it commits to using 100% renewable energy by 2035. Ford scores perfectly for its renewable energy commitment. ⁷⁶	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Based on the CDP database, Ford manages to disclose its Scope 3 purchased goods and services emissions data. There are no Scope 3 purchased goods and services targets on Ford's official reports or the CDP database. The lack of targets drastically impacts its score. ⁷⁷	Disclosure and targets	3
While Ford does not disclose any steel-related information or targets in official reports, the company is reported to be making a 500 million dollar investment in a Canadian steel production company, ⁵¹ towards a complete conversion to electric-powered systems by 2028 by converting from coal-fired blast to electric arc furnace technology.	Steel	3
Resource reduction and efficiency		0.5
Ford has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
Ford has not set any specific targets to increase its percentage of overall use of secondary materials.	Secondary material usage	0
Ford is partnering with Redwood Materials, a battery materials company, to integrate battery recycling into its domestic battery strategy. Ford does not disclose any quantifiable measure of its investment or the capacity at which they work with Redwood Materials.	EV battery reuse and recycling	0.5
Deductions		-0.5
Ford has actively participated in regressive lobbying in the past, especially in regard to US Federal corporate average fuel economy (CAFE) standards. ^{vii} In recent years, LobbyMap reports that Ford has slowed down on regressive lobbying and has been more positively engaged. Ford continues to be a member of several regressive trade associations and only earns a C- on the LobbyMap Performance Band score. ⁷²	Negative climate lobbying	-0.5

vii CAFE standards: Corporate Average Fuel Economy (CAFE) standards is set by US National Highway Traffic Safety Administration (NHTSA) to regulate how far vehicles must travel on a gallon of fuel.

Company profile: General Motors [1st]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
38.5	24.98	14	0.5	-1.0

Percentage of ZEV sales in 2021: 8.18%

General Motors performs consistently in its percentage of ZEV sales and for its absolute sales. General Motors sells the most ZEVs relative to the other nine automakers, reaching more than half a million sales in 2021. It is worth noting that 85% of its ZEV sales in China were from the sale of the Wuling Hongguang Mini EV. Furthermore, their compound annual growth rate (CAGR) is also quite high, demonstrating that General Motors continues to expand its ZEV production resources. In line with its ambitious ZEV sales, General Motors has a goal to reach 100% ZEVs by 2035 in major markets. General Motors performs relatively well on its Scope 1, Scope 2, and Scope 3 disclosures and targets, but loses some points due to a lack of specific information regarding targets on steel decarbonisation. Like many other automakers, General Motors fails to disclose a vast amount of information regarding resource reduction and efficiency. Lastly, due to petitions against certain climate policies and violations of environmental regulation, one point has been deducted from General Motors' score. General Motors is the top performer amongst the ten companies. Nevertheless, only 1% of sales in the US were BEVs and zero BEVs were sold in Europe in 2021. General Motors needs to show more consistent progress on a global scale rather than boosting ZEV sales by selling low-cost cars in one market.

Founded in 1908, the General Motors Company (General Motors) is one of the largest automotive companies in the world, headquartered in Detroit, US. General Motors was an early pioneer of EV technology and manufactured the EV1 as early as 1996 in response to a 1990 California regulatory requirement.

General Motors released its first global BEV – the Chevrolet Bolt – in 2016 but did not release any new global EV models between 2017 and 2021. In 2021, General Motors sold 30,668 Bolt EVs globally and 426,482 units of the low-cost Wuling Hongguang Mini EV, sold exclusively in China at a starting price of \$4,300, which accounts for 85% of its BEV sales. Furthermore, in the first half of 2022, 96% of General Motors' BEV sales are in China.

Wuling Hongguang Mini EV

Although the Wuling Hongguang MINI EV is only sold in China, the model's low cost has made it the second best-selling BEV

in the world, behind Tesla's Model 3. The vehicle is produced as a joint-venture with the Chinese automaker, SAIC-GM-Wuling Automotive. The vehicle's basic versions come without air-conditioning and a driving range of 120km. The Wuling Hongguang safety specification is below par and has raised concerns. The basic versions of the model are not equipped with airbags or an Electronic Stability Programme (ESP).⁷⁸ Under regulations in the US, EU, Japan and India, it is illegal to sell cars without ESP; while in India and the US, it is illegal to have no airbags in the front seats.^{79, 80}

The very low cost might also contribute to an overconsumption problem. In May 2021, the Shanghai government removed the eligibility of the Wuling Hongguang Mini EV for a free New Energy Vehicle licence plate (a policy designed to fast-track the purchase of EVs),⁸¹ because its overwhelming sales contributed to an excess of new cars burdening the city's traffic system.

Phase-out of ICE vehicles		24.98
ZEV sales		
General Motors has consistently scored the highest or second highest (relative to the other nine automakers) percentage sales of ZEVs, which was 8.18% in 2021, representing the sale of 501,828 ZEVs. The number of ZEVs sold has increased nearly 13 fold and its percentage of ZEV sales almost 21 fold. In parallel, overall sales have steadily decreased from almost 10 million in 2017 to just over 6.1 million in 2021. General Motors' growth in the percentage of ZEV sales is more than 1.5 times the global average, with a CAGR of roughly 113%.	Percentage of ZEV sales (2021)	10.22
	Percentage of ZEV sales (2017-2021)	2.16
	CAGR for percentage of ZEV sales (2017-2021)	1.50

General Motors' regional brands in Europe, China, and the US have all committed to 100% EVs by 2035 through their agreement to the COP26 declaration. ⁴⁰ No substantial improvements have been made to its plan from the previous year. General Motors' 2035 EV goal is ambitious considering that in 2021, only 1% of sales in the US were BEVs and zero BEVs were sold in Europe. General Motors needs to show more practical actions to achieve the target.	ICE phase-out plan and improvements	9.9
General Motors has many projects in progress to make renewable energy EV charging more accessible. General Motors' public charging network, EVgo, is available throughout eight states in US, and the company has a target to expand EVgo stations by adding 3,250 charging stalls by 2025 across the US. ⁸² General Motors claims to provide 100% renewable energy by purchasing renewable energy certificates. The source of the certificates is unclear and the additionality of renewable energy is questionable.	Renewable energy charging	1.2
Supply chain decarbonisation		14
Scope 1 and Scope 2		
General Motors has committed to 100% renewable energy by 2035 and, as a milestone, has set a goal to achieve 60% globally and 100% in the US by 2025. In addition, it is committed to Scope 1 and Scope 2 goals to reduce GHG emissions by 72% by 2035 from a base year of 2018. ⁷⁹	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
General Motors reports its Scope 3 purchased goods and services emissions data on CDP. ⁸³ Additionally, it has set Scope 3 purchased goods and services decarbonisation targets. Specifically, General Motors plans to be carbon neutral by 2038 or sooner for raw materials. ⁷⁹	Disclosure and targets	7
In regard to steel, General Motors acknowledges the need to decarbonise steel. While it fails to set any steel-related targets or disclose steel-use data, General Motors partners with Nucor's Econiq Net-Zero Steel (which uses EAF technology). General Motors was Nucor's first customer and they project that all of the steel purchased from Nucor will be carbon neutral by the end of 2022. ⁸⁴	Steel	5
Resource reduction and efficiency		0.5
General Motors has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
General Motors has not set any quantifiable targets to increase its uptake of secondary materials.	Secondary material usage	0
Official General Motors reports indicate that there are several recycling initiatives, including a collaboration with the US Department of Energy Advanced Battery Consortium and recyclers, to advance lithium-ion battery recycling. In addition, General Motors is incorporating responsible battery recycling considerations such as the recycling/reusing of 100% of batteries returned to General Motors. ⁸⁵ Despite these initiatives, no quantitative targets are mentioned.	EV battery reuse and recycling	0.5
Deductions		-1.0
LobbyMap gives General Motors a score of C- in their Performance Band, due to its history of negative lobbying and membership of regressive trade associations. ⁸⁶	Negative climate lobbying	-0.5
Additionally, General Motors has had two recent environmental violations related to excessive volatile organic compounds (VOC) emissions and breaking regulations for gasoline engines. ^{71, 87} These two infractions cost General Motors \$10,500 and \$110,090, respectively.	Violations of environmental regulations	-0.5

Company profile: Honda [9th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
12.8	9.78	3	0.5	-0.5

Percentage of ZEV sales in 2021: 0.35%

As the only one of the Japanese majors to have an ICE phase-out date which was announced in April 2021, Honda has appeared to be very progressive. One year on, Honda loses points because it has not followed up its announcement with concrete actions. ZEVs still stand at less than 1% of Honda's total sales, setting a very steep path ahead for Honda. There are no further details on interim sales targets or whether there will be earlier phase-out dates for certain regions and markets. Honda has no overarching target for renewable energy uptake, and is performing poorly in supply chain decarbonisation. In addition, 45% of its total sales last year were SUVs, the second highest among the ten companies, increasing the carbon footprint of its fleet. Honda does not have any significant resource reduction and efficiency targets, with no disclosure around steel decarbonisation. Honda falls from 6th place last year to 9 this year.

Honda Motor Company (Honda) is a Japan-based auto manufacturer, selling approximately 4.4 million vehicles in 2021, with a 5.52% share of the global market. Although Honda is perhaps better known for its motorcycles, having sold more than 400 million units globally since 1949,⁸⁸ it is also a major automobile manufacturer.

Amongst the top three Japanese automakers, Honda is notable for being the first to announce a global ICE phase-out date of 2040, announced at the inauguration of CEO Toshihiro Mibe in April 2021.⁸⁹

Since that time, Honda made relatively few announcements until June 2022, when it announced another partnership with electronics company Sony to produce electric vehicles, the first of which would be going on sale in 2025.⁹⁰ Only a minor amount of information has been released demonstrating the plan or progress towards these goals. Honda did briefly develop a hydrogen fuel-cell vehicle, the Clarity, but reported that as of June 2021 both the FCEV and hybrid versions would be discontinued due to poor performance.⁹¹

Unlike most other automakers, Honda has had no recent evidence of falsifying emissions data or any related scandals. InfluenceMap says that despite overall broad support for electrification and decarbonisation, Honda is still a member of numerous trade associations involved in regressive climate legislation lobbying and has shown resistance to ZEV mandates.⁹²

Phase-out of ICE vehicles		9.78
ZEV sales		
Honda's ZEV sales within the past five years have increased tenfold, but this is still at less than 1% of total sales: in 2021 Honda sold 15,420 ZEVs, making up only 0.35% of the 4.4 million vehicles it sold globally. Since the company has a very low starting point, its five years CAGR of the percentage of ZEV sales is 82.71%, placing Honda near the middle in comparison with other automakers. Although it is not part of the evaluation, it is worth noting that Honda's ZEV sales have been heavily relying on the market in China. <i>Refer to Section 3.2.2</i>	Percentage of ZEV sales (2021)	0.43
	Percentage of ZEV sales (2017-2021)	0.14
	CAGR for percentage of ZEV sales (2017-2021)	1.00

Honda aims for an ICE phase-out date of 2040. ⁴¹ There have been no further details since the announcement last April on what the intermediate targets are, with not even an update on the plan for Europe where an ICE phase-out by 2035, including hybrids, will become mandatory.	ICE phase-out plan and improvements	6.6
Honda currently offers the SmartCharge system in the US, ⁹³ and e:PROGRESS in the UK both of which help source renewable energy for vehicle charging. ⁹⁴ e:PROGRESS programme partners with Octopus Energy which offers a mix of sources of renewable energy that might have a certain additionality impact to the overall renewable energy capacity. Honda currently has no renewable energy charging options available in Japan.	Renewable energy charging	1.6
Supply chain decarbonisation		3
Scope 1 and Scope 2		
Honda has only set a vague 2050 net zero emissions target for all products and activities. Specific to its corporate activities Honda has set an interim target of a 46% reduction of CO ₂ emissions by 2030 compared with FY2020, although these targets are relatively unambitious. In FY2021 Honda sites globally used 804GWh of renewable energy, however there are currently no targets or plans for increased usage. ⁹⁵	Renewable energy commitment	0
	Carbon reduction targets	0
Scope 3 purchased goods and services		
Honda publishes its Scope 3 purchased goods and services emissions, and uses CDP tools and methodology to set annual reduction targets of 1% for CO ₂ emissions, however the targets are too weak. ⁹⁵	Disclosure and targets	3
There is no evidence that Honda is taking any steps to decarbonise the steel used in its supply chain, with no mention of it in any reports, no targets set for reduction, and no disclosure of the amount of steel used. Furthermore, the share of SUVs in Honda's overall sales is 45% in 2021, the second highest of the ten companies.	Steel	0
Resource reduction and efficiency		0.5
Honda has not set any specific targets to reduce the overall use of raw materials.	Targets on raw materials reduction	0
Honda has not set any specific targets to raise its percentage of the use of secondary materials.	Secondary material usage	0
As of 2021, Honda was reported to have partnered with US-based firm Battery Resourcers to recycle lithium-ion batteries, with operations set to go ahead from 2022. ⁹⁶ The new partnership is due to have an annual recycling capacity of 20 million pounds of lithium-ion batteries, with Battery Resourcers claiming a 97% metal recovery rate.	EV battery reuse and recycling	0.5
Deductions		-0.5
LobbyMap ranks Honda as having a Performance Band of D+, with 32% engagement in climate policy. ⁹²	Negative climate lobbying	-0.5

Company profile: Hyundai-Kia [5th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
22.5	11.85	11	0.5	-1.0

Percentage of ZEV sales in 2021: 3.49%

Hyundai and Kia's combined percentage of ZEV sales rose from 2.18% in 2020 to 3.49% in 2021, which is at the mid-range among all companies. The absolute number of ZEV sales rose from 133,448 to 232,400 units, which represents an increase of about 75%. Hyundai-Kia has not set a global ICE phase-out date and has only committed to brand level or regional level targets, all of which are relatively unambitious. Hyundai-Kia set targets for its Scope 3 emissions demonstrating the initiative to decarbonise the raw materials supply chain. Hyundai-Kia performed well on its steel decarbonisation efforts, including a partnership with a low-carbon steel producer. Almost half of Hyundai-Kia's sales of passenger cars are SUVs, with sales that rose from 33% in 2018 to 49% in 2021, the highest of all companies. Hyundai-Kia might be more aware of its carbon footprint from steel, but it is encouraging the production of steel and its associated GHG emissions through its SUV-heavy business strategy. Overall, Hyundai-Kia is placed in 5th place.

Hyundai Motor Group (Hyundai-Kia), is a South Korean chaebol headquartered in Seoul, South Korea, mainly focused on the manufacture and sale of automobiles. The group includes the Hyundai Motor Company (Hyundai), the Kia Corporation (Kia), and Genesis. Hyundai is an international auto manufacturing company founded in 1967 and is one of the largest members of the chaebol. The company took over Kia in 1998. Despite complex shareholding arrangements between the affiliated companies, Hyundai is the de facto representative of the group. Hyundai and Kia share technologies, vehicle platforms, and development strategies to a great extent, therefore the two were evaluated together. It is notable that both Hyundai and Kia launched their first dedicated BEV models in 2021, the Ioniq 5 and the EV 6.

In April 2022, Hyundai-Kia announced its membership to Climate Group's RE100 initiative.⁹⁷ Soon after, Hyundai-Kia announced a plan to build a liquefied natural gas facility in Ulsan which would have the ability to produce about one-quarter the energy needed for its overall production. This was met with criticism that it did not align with the RE100 commitment.⁹⁸ In this case, Hyundai-Kia demonstrated a principled response as it retracted its plans for the Ulsan facility.

In June 2022, Hyundai and Kia offices in Germany, Frankfurt area, and in Luxembourg were raided by prosecutors and police as part of an ongoing investigation into the diesel scandal and suspected violations of emissions standards.⁹⁹ Hyundai vehicles have shown excessive NOx emissions both in random tests by the Kraftfahrtbundesamt (KBA), the German regulatory authority in charge of associated type approval and market surveillance, and the Emissions-Kontroll-Institut (EKI) of Deutsche Umwelthilfe (DUH), a German environmental NGO.¹⁰⁰

Phase-out of ICE vehicles		11.85
ZEV sales		
Hyundai-Kia's total vehicle sales were 6,656,025 units in 2021 and ZEV sales accounted for 3.49%, a 75% increase from 2.18% in 2020. The volume of ZEV sales in 2021 is 232,400 units, which is the 3rd highest of the ten companies. The CAGR from 2017 to 2021 was 87% which demonstrates mid-range growth.	Percentage of ZEV sales (2021)	4.36
	Percentage of ZEV sales (2017-2021)	1.42
	CAGR for percentage of ZEV sales (2017-2021)	1.00
Hyundai-Kia has no clear global ICE phase-out plan. By itself, Hyundai has a target to achieve 100% ZEVs by 2035 in Europe and 100% ZEVs by 2040 in the US, China and South Korea. ¹⁰¹ Notably, Hyundai's luxury brand Genesis will launch all new vehicles as EVs from 2025. By 2030, Genesis plans to establish itself as a 100% ZEV brand and pursue carbon net zero by 2035. ¹⁰² Kia announced a partial phase-out plan in November 2021 to fully electrify its vehicle line-up in major markets by 2040. Kia's electrification plan includes PHEVs which are not considered to be zero-emission vehicles. ¹⁰³	ICE phase-out plan and improvements	3.56
Hyundai-Kia provides renewable charging options such as Charge myHyundai which is one of the largest public charging networks in Europe. ¹⁰⁴ The programmes are based on Hyundai-Kia buying Guarantees of Origin certificates and are limited to certain countries. ^{viii} The additionality of renewable energy in the approach is unclear.	Renewable energy charging	1.5
Supply chain decarbonisation		11
Scope 1 and Scope 2		
While Hyundai-Kia committed to some targets on Scope 1 and Scope 2 emissions, they were ultimately too unambitious and ambiguous to be credited.	Renewable energy commitment	0
	Carbon reduction targets	0
Scope 3 purchased goods and services		
Hyundai-Kia has disclosed its Scope 3 purchased goods and services to CDP. In addition, Hyundai intends to reduce emissions from the supply chain of raw materials and parts by more than 10% by 2035, more than 65% by 2040, and to achieve carbon neutrality by 2045. ¹⁰¹ Kia has also set Scope 3 category 1 targets to reduce 50% of carbon for its core materials (including batteries, iron/steel, plastic) by 2030, and achieve 90% supply chain carbon neutrality by 2045. ¹⁰³	Disclosure and targets	5
Hyundai-Kia is one of two carmakers that disclose their steel usage and Hyundai even discloses the amount of scrap steel used. Hyundai has also partnered with POSCO Corp. to produce green steel from hydrogen. ⁵⁰ Although the company demonstrates good awareness of the carbon footprint from steel, Hyundai-Kia continues to promote SUVs as shown through its rising sales. SUVs make up 49% of the company's total sales in 2021, the highest among all the companies.	Steel	6
Resource reduction and efficiency		0.5
Hyundai-Kia has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0

viii A Guarantee of Origin is an EU guarantee that a given amount of power is produced at a particular power plant. It is a voluntary certification scheme allowing consumers to choose a source of production, typically the choice between renewable and non-renewable electricity.⁴⁹

Hyundai-Kia has not set any specific targets to increase its overall percentage of secondary materials usage.	Secondary material usage	0
Hyundai-Kia will build a global network and transportation control system to collect and transport used batteries discharged from various places, including junkyards and dealers around the world. Specifically, Hyundai has built a new 400 kWh Energy Storage System in Busan Eco Delta Smart City, which will be used in the peer-to-peer-based power transaction pilot project. ¹⁰¹	EV battery reuse and recycling	0.5
Deductions		-1.0
According to the LobbyMap assessment, Hyundai Motor's Performance Band score is D+. In a February 2022 Twitter post, Hyundai Motor Europe advocated for policymakers to delay the setting of an EU target for 2035 zero emissions from cars and vans until 2028, stating "it is simply too early today to fix a 100% CO ₂ reduction target at a time when there are still way too many open questions". ¹⁰⁵	Negative climate lobbying	-0.5
European Hyundai and Kia offices in the greater Frankfurt area (Germany) and in Luxembourg have been raided by prosecutors and police as part of an ongoing investigation into the diesel scandal and suspected violations of emissions standards. According to German media reports, 210,000 Euro 5 and Euro 6 vehicles registered up to 2020 are affected. These include all Hyundai and Kia models with 1.1 litre, 1.4 litre, 1.6 litre, 1.7 litre, 2.0 and 2.2 litre diesel engines. ^{99,106}	Violations of environmental regulations	-0.5

Company profile: Mercedes-Benz [2nd]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
37	21.03	14	3.0	-1.0

Percentage of ZEV sales in 2021: 3.82%

In 2021, Mercedes-Benz's ZEV sales significantly increased compared to the previous year, with an increased percentage of 3.82%, which is at the mid-range. Mercedes-Benz supported the COP26 declaration for 100% of new car and van sales to be zero-emission in leading markets by 2035. It is committed to reducing absolute Scope 1 and Scope 2 GHG emissions by 50% by 2030. The Group has scored well compared to other companies in the Scope 3 purchased goods and services section, by disclosing its data and setting targets to procure only carbon neutral materials by 2039. Moreover, Mercedes-Benz has invested in startups producing green steel with a plan to launch carbon-free steel vehicle models in 2025. Likewise, the company obtained a relatively high score for its secondary material usage targets and battery reuse and recycle capacity criteria. Due to violation of emissions regulations and not supporting more stringent options for GHG emissions 1 point was deducted from the total score.

Mercedes-Benz Group AG (Mercedes-Benz) is a German-based automotive company. It rebranded from Daimler AG in February 2022. The company manufactures high-end luxury cars and vans. In 2018, before it changed its name, Daimler hesitated to commit to electrification, stating that only 15-25% of total unit sales from the Mercedes-Benz brand would be electrified by 2025, depending on the development of the infrastructure and customer preferences.¹⁰⁷

In May 2019 Mercedes-Benz announced its 'Ambition2039' path to sustainability, which includes a milestone for carbon neutrality. The goal was to have a carbon-neutral passenger car fleet and have plug-in hybrids or all-electric vehicles making up more than 50% of its car sales by 2030.¹⁰⁸

In July 2021, Mercedes-Benz announced a goal that newly launched models will be electric-only from 2025, and the

company is ready to go electric at the end of the decade, where market conditions allow.¹⁰⁹ In addition, Mercedes-Benz signed the COP26 declaration supporting the accelerated transition to zero-emission vehicles, along with achieving 100% of new car and van sales as zero-emission in leading markets by 2035.⁴⁰

Despite its holistic carbon-neutrality strategy, in 2020 Mercedes-Benz (then Daimler) violated environmental laws by using defeat device software to circumvent emissions testing in the US. The US District Court for the District of Columbia and Mercedes-Benz reached a settlement to recall and repair the emissions system in Mercedes-Benz diesel vehicles sold between 2009 and 2016.¹¹⁰ In 2021, Germany's largest customer group filed a lawsuit against Mercedes-Benz with the same allegation of manipulating the diesel emissions test. The trial started in July 2022.¹¹¹

Phase-out of ICE vehicles		21.03
ZEV sales		
Mercedes-Benz's total vehicle sales were 2,413,212 units in 2021, which is a slight decrease compared to 2020. Nevertheless, the absolute number of ZEV units sold in 2021 nearly doubled from 46,978 to 92,190, accounting for 3.82% of total vehicle sales. In previous years (2017-2019) the percentage of ZEV sales ranged between 0.52 and 0.66. The CAGR for ZEV sales (2017-2021) is around 65%.	Percentage of ZEV sales (2021)	4.79
	Percentage of ZEV sales (2017-2021)	1.34
	CAGR for percentage of ZEV sales (2017-2021)	1.00
Mercedes-Benz signed the COP26 declaration to support the accelerated transition to zero-emission vehicles in line with achieving 100% of new car and van sales being zero-emission in leading markets by 2035. ⁴⁰ Furthermore Mercedes argues that it could achieve a 2030 ICE	ICE phase-out plan and improvements	10.09

phase-out if market conditions allow. This is a substantial improvement from the previous year where Mercedes-Benz had one of the lowest ICE phase-out plan scores.		
Mercedes-Benz offers a renewable energy charging service called Mercedes me Charge. Customers can charge their vehicles at public charging stations throughout Europe, the US, and Canada. After the charging process, the charged amounts of energy are matched by purchasing the corresponding amount of renewable energy certificates. ¹¹² Mercedes-Benz claims that the certificates are of “high-quality”, but no further details could be found.	Renewable energy charging	3
Supply chain decarbonisation		14
Scope 1 and Scope 2		
Mercedes-Benz aims for carbon neutrality by 2039. The company aims to reduce 50% of Scope 1 and Scope 2 emissions at Mercedes-Benz cars and vans plants worldwide by 2030. ¹¹³ As of 2021, 78% of the energy used by its own facilities is renewable. ³¹ From 2022, all of Mercedes-Benz’s own production plants worldwide will exclusively procure electricity from renewable sources. ¹¹⁴	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Mercedes-Benz disclosed its Scope 3 purchased goods and services emissions data in its official report and on the CDP database. ¹¹⁵ Mercedes-Benz plans to procure only CO ₂ -neutral production materials by 2039. ¹¹⁶	Disclosure and targets	7
Mercedes-Benz emphasises the importance of decarbonising the steel supply chain. In 2021, the company took an equity stake in H2 Green Steel and plans to launch carbon-free steel in a variety of vehicle models from as early as 2025. ¹¹⁷	Steel	5
Resource reduction and efficiency		3.0
Mercedes-Benz mentions its plan to decouple the consumption of resources from the growth of production volume. The company does not set specific targets to reduce its overall use of raw materials. ³¹	Targets on raw materials reduction	0
Mercedes-Benz has a target of increasing the share of secondary raw materials in its car fleet to an average of 40% by 2030. ⁶⁶	Secondary material usage	2.0
Mercedes-Benz is currently operating a 12.8 MWh second-life battery storage plant that opened in Lünen, Germany, and a 17.4 MWh replacement part storage facility in Hanover. With over 95 MWh energy storage facility using second-life battery, the company has built the most capacity in battery reuse among the ten companies. ^{31, 67}	EV battery reuse and recycling	1.0
Deductions		-1.0
Mercedes-Benz is a member of several highly regressive industry associations in Germany, the EU, and the US. It has not yet disclosed its involvement in such regressive industry associations on its official website. The company appears to have mixed engagement on GHG emissions standards for road transport. In July 2021, Mercedes-Benz took an unclear position in its press response to the 2035 zero-emission target for light-duty vehicles included in the EU fit for 55 package. In September 2021, Mercedes-Benz’s consultation response to US GHG emissions standards for vehicles, appears to not support more stringent options for GHG emissions. According to the LobbyMap assessment, Mercedes-Benz’s Performance Band score is D+. ¹¹⁸	Negative climate lobbying	-0.5
In 2022, South Korea’s antitrust regulator decided to fine Mercedes-Benz and its Korean unit \$16.9 million for false advertising in connection to gas emissions of its diesel passenger vehicle. ⁶⁹	Violations of environmental regulations	-0.5

Company profile: Nissan [8th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
13.4	6.41	5	2.5	-0.5

Percentage of ZEV sales in 2021: 2.20%

Nissan was 5th in last year's ranking report, but has dropped to 8th this year. It has lost points mainly due to slow growth in its ZEV sales as a percentage of all vehicles. Over the past five years, the percentage of Nissan's ZEV sales has been in the mid-range, yet, its compound annual growth rate (CAGR) of ZEV sales is about 25%, making Nissan's ZEV sales the lowest among the ten auto companies. Likewise, Nissan secured no points due to its inaction over the last year, both in setting an ICE phase-out plan and on supply chain decarbonisation, while their counterparts caught up. Nissan's goal is only to reach more than 50% of the electrification mix globally by 2030, which includes both hybrids and BEVs. The company is committed to rather unambitious Scope 1 and Scope 2 emissions reduction targets of 30% by 2030 compared to 2018 levels, and Scope 3 targets are not decided. Moreover, Nissan demonstrates negative climate lobbying by opposing the vehicle CO₂ reduction targets in the US and New Zealand, which resulted in 0.5 points deduction, lowering the total score.

Nissan Motor Co Ltd (Nissan) is a Japan-based automobile company. Nissan's total vehicle sales have been decreasing since 2017. In 2021, global sales were 3.7 million units and 80,878 ZEVs were sold, which only accounts for 2.20% of Nissan's global sales. The majority of ZEV sales are due to the LEAF model which sparked the birth of modern EVs when it was introduced in 2010. Nissan was ahead of the game with the popularity of its EV the Leaf in the past decade. Yet, as the competition in the EV market became much more fierce in recent years, Nissan is losing the race.

Significant attention was placed on Nissan surrounding the dramatic arrest and subsequent escape from Japan of former CEO Carlos Ghosn in 2019 after accusations of financial misconduct. From exile, Ghosn has gone on to say that Nissan needed to take more progressive action to electrify, stating in December 2021 that Nissan's plans were "too timid".¹¹⁹

Phase-out of ICE vehicles		6.41
ZEV sales		
Nissan's total vehicle sales in 2021 are 3,678,177 units, with ZEV sales only accounting for 2.20% at 80,878 units. The percentage of ZEVs sold has steadily increased, yet due to the significant fall in total vehicles since 2017, the numbers of ZEVs sold in 2021 are less than in 2018 and 2019 when the share of ZEV sales was 1.75% and 1.77% respectively. As a result, Nissan's CAGR of ZEV sales is about 25% which is the lowest among ten auto companies.	Percentage of ZEV sales (2021)	2.75
	Percentage of ZEV sales (2017-2021)	1.55
	CAGR for percentage of ZEV sales (2017-2021)	0
Nissan does not have a clear ICE phase-out plan. The company is aiming for an electrification mix of more than 50% globally across the Nissan and INFINITI brands by 2030, which includes both BEVs and PHEVs. ¹²⁰ This electrification target varies from market to market, with 2026 targets being more than 75% in Europe, 55% in Japan, and 40% in China. The targets include PHEVs, which are not credited with any point. Nissan has set a BEV target of 40% by 2030 on in the US. ¹²⁴	ICE phase-out plan and improvements	2.11

Nissan does not provide at scale any renewable energy charging services for customers. In February 2021, the company announced a partnership with three communities in Fukushima Prefecture to test providing an integrated Mobility as a Service option and renewable energy charging system. This project provides local residents with EV transport charged with renewable energy, but charging is specific to the EV vehicles used in the project and isn't available to the general public. ¹²¹ In December 2021, the company also announced it will sell electricity generated from renewable sources to its employees living in Kanto, Japan, with a view to building up their generating capacity prior to providing renewable energy for EV charging to the general market. ¹²² These programmes are only available to a limited group of people therefore they are not credited with any points in this evaluation.	Renewable energy charging	0
Supply chain decarbonisation		5
Scope 1 and Scope 2		
Nissan committed to reduce absolute Scope 1 and Scope 2 GHG emissions by 30% by 2030 from the base year of 2018. ⁶⁵ Nissan has not set renewable energy targets for its own operations. In the fiscal year 2020, the company's renewable energy usage reached 10.5%. ¹²³	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Nissan disclosed Scope 3 purchased goods and services emissions in its official report and on the CDP database. ¹²⁴ There are no specific reduction targets regarding Scope 3 purchased goods and services.	Disclosure and targets	3
Nissan recognises the importance of steel in regard to decarbonisation and works closely with global partners to collect and reuse steel scrap. ⁶⁵	Steel	2
Resource reduction and efficiency		2.5
As part of the Nissan Green Program 2022, Nissan's goal is to cut the use of newly extracted resources to 70% of the materials used in each vehicle in 2022. The company aims to reduce the use of virgin materials to 30% by 2050. ⁶⁵ The company does not report on the progress of achieving the 2022 target.	Targets on raw materials reduction	2
Nissan's actions to use secondary materials is sporadic, and lacks specific and holistic plans.	Secondary material usage	0
In 2010, Nissan launched 4REnergy to develop EV battery reuse solutions. The company runs several small-scale projects in Japan, such as promoting the application of secondary EV batteries. Nissan does not report on the scale of the initiatives.	EV battery reuse and recycling	0.5
Deductions		-0.5
Nissan takes mixed positions on a number of climate policies globally. In its response to a September 2021 US consultation, Nissan directly opposed more stringent GHG emissions and CAFE standards. Likewise, it did not support the higher proposed CO ₂ targets for light-duty vehicles included in New Zealand's Clean Car Bill. The company is a member of a number of obstructive trade associations both in Japan and globally but it has not disclosed the memberships on its official website or on the 2021 CDP disclosure system. According to the LobbyMap assessment, Nissan's Performance Band score is D+. ¹²⁵	Negative climate lobbying	-0.5

Company profile: Renault [6th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
20.3	14.27	6	0.5	-0.5

Percentage of ZEV sales in 2021: 6.69%

Renault has a consistently high percentage of ZEV sales compared to the other nine companies, and in 2021 it had the second highest value. Despite its relatively high share of ZEV sales, Renault has failed to set a progressive ICE phase-out plan and is in the worst scoring bracket as a result. Renault does relatively better on Scope 3 purchased goods and services disclosures and target setting, but falls short on Scope 1 and Scope 2 goals, steel decarbonisation, and resource reduction and efficiency. Furthermore, half a point is deducted from Renault's score due to its poor lobbying record. Overall, Renault lost points for its ZEV growth rate and ICE phase-out plan, which led to this year's fall from 3rd to 6th place.

Renault Group (Renault) is a French multinational automobile manufacturer established in 1899. Although Renault, Nissan and Mitsubishi have formed an alliance to enhance their competitiveness and profitability, the strategic partnership between the three partner companies is not a merger or an acquisition. Therefore Renault is considered as an independent car manufacturer in this report.

With more than 2.5 million units of vehicles sold in more than 130 countries in 2020, Renault is among the top ten car manufacturers. Renault has actively embraced BEVs in recent years. The low-priced Zoe model was the largest-selling BEV on the European market for many years.

Renault has been criticised for exaggerating the scale of its European sales of electric vehicles and hybrids in relation to sales of all vehicles in its advertising. An analysis found that 68% of Renault adverts promoted hybrid and/or purely electric cars, while such vehicles account for just 30% of their sales in Europe. Such advertising presents a deceptively environmentally friendly image, so-called 'greenwashing'.¹²⁶

Phase-out of ICE vehicles		14.27
ZEV sales		
Renault has consistently scored the highest or second highest (relative to the other nine automakers) when it comes to the percentage of ZEVs sold. In 2021, it had a ZEV percentage of 6.69%, representing 167,152 ZEVs. Since 2017, Renault's ZEV sales have grown steadily, with a 4.5 fold increase, concurrent with a 1.3 fold decrease in overall sales. Its growth in the percentage of ZEV sales is on par, but slightly below the global average, with a CAGR of roughly 57%.	Percentage of ZEV sales (2021)	8.37
	Percentage of ZEV sales (2017-2021)	2.66
	CAGR for percentage of ZEV sales (2017-2021)	0
Relative to the other automakers, Renault has one of the least ambitious ICE phase-out plans and does not have a global ICE phase-out plan. Instead, Renault's Europe division set a target of 100% ZEVs by 2030. While Renaults' Europe brand shows ambition, the entire group has not followed suit. Therefore not much can be said regarding the entire group's global ICE phase-out plan or any improvements to it.	ICE phase-out plan and improvements	2.64

Renault is in partnership with Dutch firm We Drive Solar whose smart charging stations supply exclusively locally-generated solar power in a neighbourhood in Utrecht in the Netherlands. ¹²⁷ The company runs a project in a Brazilian neighbourhood involved in setting up solar charging garages for dozens of EVs. ¹²⁸ It should be highlighted that these two projects operate in small communities. Renault should focus on scaling-up this sort of technology and making it more accessible globally.	Renewable energy charging	0.6
Supply chain decarbonisation		6
Scope 1 and Scope 2		
Renault has committed to 100% renewable energy by 2030, but only in France, Spain, Slovenia and Portugal and not the rest of its global facilities. The group is committed to reducing Scope 1 and Scope 2 GHG emissions by 60% per car by 2030 (from a base year of 2012). ¹²⁹	Renewable energy commitment	0
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Renault performs well of disclosing information and data on its Scope 3 purchased goods and services as well as on setting targets for its supply chain partners. Specifically, Renault sets a target to reduce emissions by 30% in its parts and materials supply chain by 2030. ¹²⁹	Disclosure and targets	5
Renault does not disclose much on its steel supply, and says relatively little on steel decarbonisation. It has not set any related targets.	Steel	0
Resource reduction and efficiency		0.5
Renault has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
Renault has not set any holistic targets to increase its percentage of secondary materials usage.	Secondary material usage	0
Renault reports that advanced battery storage is operating by reusing retired batteries from electric vehicles, but this information was vague and no quantitative information was provided.	EV battery reuse and recycling	0.5
Deductions		-0.5
According to LobbyMap's study, Renault has demonstrated mixed lobbying engagement in the past and it scores D+ overall in its Performance Band. ¹³⁰	Negative climate lobbying	-0.5

Company profile: Stellantis [7th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
19.3	13.81	6	0.5	-1.0

Percentage of ZEV sales in 2021: 2.86%

Stellantis had a slow start to the manufacturing and selling of ZEVs but has demonstrated slightly more growth in the past two years. As a result, Stellantis has a relatively high compound annual growth rate (CAGR). Despite growth in ZEV sales, Stellantis fails to show any ambition or plan to phase out ICE vehicles. In fact, its only global target is to sell 5 million annual BEV units by 2030. In terms of Scope 1, Scope 2, and Scope 3 disclosures and targets, Stellantis falls short. Finally, an additional point has been deducted due to violations of several environmental regulations and regressive lobbying.

Stellantis N.V. (Stellantis) is a multinational automotive company formed in January 2021 by the 50/50 merger of Fiat Chrysler Automobiles (FCA) and Peugeot S.A. (PSA).

In July 2021, Stellantis gave its first public statement on its electrification strategy, saying that it would be investing approximately \$35 billion through 2025 developing low-emission vehicles, with the goal of increasing its sales of low-emission vehicles to 70% of European sales and 40% of US sales by 2030.¹³¹ The plan is unambitious because the so-called “low-emission vehicles” are likely to include hybrid vehicles. 2021 is the first year that Stellantis has published goals as an entire group, and its targets are considerably more streamlined than the previous year when PSA and FCA both lacked a set of solid ICE phase-out targets.

Stellantis was criticised for its advertising of electric vehicles and hybrids, which unrepresentative of its European sales of those vehicles. An analysis found that 68% of Stellantis’s advertisements promoted hybrid and/or purely electric cars, while such vehicles represent less than 13% of sales across the Stellantis N.V. group in Europe. Such advertising presents a deceptively environmentally friendly image, so-called ‘greenwashing’.¹²⁶

Phase-out of ICE vehicles		13.81
ZEV sales		
Stellantis sold 182,945 ZEVs representing 2.86% of total sales. This is almost twice as much as the previous year when Stellantis sold only 133,448 ZEVs, representing 1.18% of sales. Furthermore, there were substantially fewer ZEV sales in the previous three years, ranging from 0.11% to 0.14% of sales. Accordingly, the growth in the percentage of ZEV sales is relatively large, with a CAGR of 126%, almost twice that of the global average.	Percentage of ZEV sales (2021)	3.58
	Percentage of ZEV sales (2017-2021)	0.75
	CAGR for percentage of ZEV sales (2017-2021)	2.50
Stellantis fails to commit to an ambitious ICE phase-out plan. Globally, the only target set is to achieve 5 million annual BEV sales by 2030. For the European market, Stellantis sets a target to sell 100% BEVs by 2030 and in the US market, 50% BEVs by 2030. Stellantis’ regional brands show more ambition in the phase-out of ICE vehicles, raising the question: why isn’t the group doing the same globally? ¹³² Since 2021, the first year that Stellantis published goals as an entire group, its targets are considerably more streamlined than the previous year where PSA and FCA both lacked a set of solid ICE phase-out targets.	ICE phase-out plan and improvements	5.78

Stellantis is involved in several renewable energy EV charging initiatives and projects. The first is an initiative with its partner, TheF Charging. Together, the two partners installed more than 600 EV charging points throughout Italy and claim to be based on 100% renewable energy. ¹³³ Stellantis is ambiguous in the source of renewable energy, and its additionality of renewable energy capacity is questionable.	Renewable energy charging	1.2
Supply chain decarbonisation		6
Scope 1 and Scope 2		
Stellantis has committed to using 100% renewable energy in their own operations by 2030 and reports that in 2021, it has reached 45%. On its carbon reduction commitment, Stellantis has set a goal of net zero GHG emissions by 2038, which includes a Scope 1 and Scope 2 target of a 50% reduction of GHG emissions by 2025 (from a base year of 2021). ¹³²	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Stellantis does not disclose much information on its Scope 3 purchased goods and services, however, it does set one related target to reduce the CO ₂ emissions of purchased parts per BEV by 40% by 2030 (from a base year of 2021). ¹³² The 40% target is only related to BEVs, which is not considered ambitious.	Disclosure and targets	1
Stellantis demonstrates that it takes steel decarbonisation seriously as an issue, but it fails to show any tangible efforts to act on this issue. Unlike many other automakers, Stellantis discloses its annual steel-use which was 8,871,486 metric tons in 2021. ¹³²	Steel	3
Resource reduction and efficiency		0.5
Stellantis has not set specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
Stellantis has not set quantifiable targets to increase its percentage of use of secondary materials.	Secondary material usage	0
Stellantis reports recycling rates of 69.3% for lithium-ion batteries and 83.8% for nickel metal hydride batteries in European markets. This is significantly higher than the regulatory rates of 50%. ¹³²	EV battery reuse and recycling	0.5
Deductions		-1.0
Stellantis is given a D+ by LobbyMap in its Performance Band, due to mixed engagement in the EU and US, specifically regarding high GHG standards. ¹³⁴	Negative climate lobbying	-0.5
Stellantis has been at the centre of a couple of recent environmental regulations violations. First, Stellantis was found to have violated air-quality regulations in Michigan and will face fines. ¹³⁵ Stellantis has also recently pleaded guilty to a fraud conspiracy involving misrepresentations of their vehicle emissions standards. ⁷⁰ Both violations demonstrate substantial environmental misconduct.	Violations of environmental regulations	-0.5

Company profile: Toyota [10th]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
10.0	7.48	3	0.5	-1.0

Percentage of ZEV sales in 2021: 0.18%

Toyota has long refused to set ICE phase-out dates, citing their often-used mantra that “the enemy is carbon, not the internal combustion engine”. As such their proportion of ZEV sales proportion remains extremely low both for 2021 (0.18%) as well for the last five years, giving Toyota the second-lowest compound annual growth rate (CAGR) of the top ten manufacturers (59.72%). In December 2021, shortly after being ranked last in Greenpeace's Auto Environmental Guide 2021, CEO Akio Toyoda announced a BEV sales target of 3.5 million vehicles by 2030. Although not an explicit phase-out plan, this is a 75% increase on the previous BEV sales target of 2 million and is a notable improvement. Along with Honda, Toyota has a very poor record on supply chain decarbonisation, with no plans around steel or any targets to improve the uptake of renewable energy beyond 25% by 2025. This is similarly the case with its lack of plans around resource reduction and efficiency. Toyota also continues to have a poor level of climate policy engagement at home and abroad, most notably in June 2022 pushing the Japanese government to ensure allowances were made for hybrids in upcoming economic policy, allowing them to be counted equally alongside ZEVs.

Toyota Motor Corporation (Toyota) is a Japan-based auto manufacturer, delivering some 9.9 million vehicles worldwide in 2021, making it the world's largest automaker by volume, with 12.26% of the global market. As the maker of the Prius, the world's first mass-produced hybrid car, Toyota was a pioneer in eco-friendly cars for many years. In recent years Toyota has continued to lean heavily into hybrids despite an overall trend in the auto industry towards zero-emission transition.

In April 2022 Toyota introduced its new BEV, the bZ4X, to the global market but it was recalled two months later due to safety concerns around faulty parts.¹³⁶

CEO Akio Toyoda has been extremely vocal about his mistrust of EVs, stating in September 2021 that politicians advocating for a shift to EVs were “wrong”,¹³⁷ and the position of the Japan Automobile Manufacturers Association (JAMA), the peak industry body for Japan's auto industry of which Toyoda is the chair, has reflected his personal position.¹³⁸

Toyota's long-held green image, due mostly to the success of the Prius, is coming under fire because investors are expressing concerns and pushing for more progressive climate policy and action, with Danish asset fund Akademiker Pension attempting a shareholder resolution during the 2022 annual general meeting.¹³⁹

Phase-out of ICE vehicles		7.48
ZEV sales		
The total sales of ZEVs in 2021 are 17,462. The average percentage of ZEV sales from 2017 to 2021 is 0.08%. This is in addition to having a low growth rate for its percentage of ZEV sales over the last five years of 59.72%, lower than the global figure.	Percentage of ZEV sales (2021)	0.22
	Percentage of ZEV sales (2017-2021)	0.08
	CAGR for percentage of ZEV sales (2017-2021)	0

Toyota has resisted calls to phase-out ICE vehicles. ¹³⁸ Within the Toyota group Lexus is set to phase-out ICE vehicles globally by 2035, and the Toyota brand has a target of 100% CO ₂ reduction in Western Europe by 2035. ¹⁴⁰ No ICE phase-out date was specified (or a ZEV sales target). In December 2021, Toyota raised its 2030 BEV sales target from \$2m to \$3.5m in 2030. ^{141, 142}	ICE phase-out plan and improvements	5.78
Toyota is currently offering the Clean Assist Program, whereby Toyota buys renewable energy credits equivalent to the amount used by owners of two eligible PHEV car models, but only in California. ¹⁴³ The additionality of renewable energy in the approach is unclear. In Japan the Green Charge system introduces a range of home charging system options (including construction and installation), along with suggesting options to purchase renewable electricity. ¹⁴⁴ The service is helpful to provide home charging and green energy options limited to individuals and parties who are willing to invest in building the systems, but less so to the broader public.	Renewable energy charging	1.4
Supply chain decarbonisation		3
Scope 1 and Scope 2		
Toyota has broad targets for Scope 1 and Scope 2 decarbonisation, most of which lack detail. Under Scope 1, by 2050 Toyota plans to have zero carbon emissions for its factories. In the interim it plans to reduce new vehicle and factory emissions by 35% by 2030 in comparison to 2013 levels, which is unambitious compared to other auto makers. For Scope 2, use of renewable energy stands at 11% with a target of merely 25% set for 2025. ¹⁴⁵	Renewable energy commitment	0
	Carbon reduction targets	0
Scope 3 purchased goods and services		
Toyota discloses its Scope 3 purchased goods and services emissions, but it does not have any publicly-released targets for emissions reductions. ¹⁴⁵	Disclosure and targets	3
There is no evidence that Toyota is taking steps to decarbonise the steel used in its supply chain, with no mention of it in any reports, no targets set for reduction, or release of the amount of steel used.	Steel	0
Resource reduction and efficiency		0.5
Toyota has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
Toyota has not set any specific targets to increase its percentage of secondary materials used in production.	Secondary material usage	0
Toyota has one battery life cycle management plant in Thailand, capable of diagnosing hybrid vehicle batteries and recycling up to 20,000 per year. ¹⁴⁶ It also cooperates with Chubu Electric to run a battery storage system using old vehicle batteries, with a capacity of 10,000kW in FY 2020. ¹⁴⁷	EV battery reuse and recycling	0.5
Deductions		-1.0
Reports released in June 2022 revealed that the Japanese government had, at Toyota's request, specifically pushed to support hybrids. ²⁰ LobbyMap ranks Toyota as having a Performance Band of D, with 31% engagement in climate policy. ¹⁴⁸	Negative climate lobbying	-0.5
In March 2022, Toyota subsidiary Hino revealed that it had been knowingly falsifying emissions data for years. ¹⁴⁹ A report claimed there is evidence to show the data was falsified in 2003. ¹⁵⁰	Violations of environmental regulations	-0.5

Company profile: Volkswagen [3rd]

Overall score	Phase-out of ICE vehicles	Supply chain decarbonisation	Resource reduction and efficiency	Deductions
33.3	20.76	12	1.0	-0.5

Percentage of ZEV sales in 2021: 5.21%

Volkswagen's sales of ZEVs as a percentage of all vehicle sales doubled from 2020 to 2021. The absolute number of ZEV sales jumped from 212,959 to 430,537 units, which is an increase of about 202%. The company has not set a global ICE phase-out date, but the company aims for a 100% ICE phase-out in Europe by 2035 and a 50% ICE phase-out in the US and China by 2030. Regarding supply chain decarbonisation, Volkswagen's Scope 1 and Scope 2 emissions reduction targets have been strengthened significantly. The company aims to achieve the adoption of 100% renewable energy in its own operations globally by 2030, except in China. The company has also disclosed Scope 3 purchased goods and services emissions data and a reduction target. Furthermore, it gained points for identifying the importance of steel decarbonisation and for its partnership with a low-carbon steel production start-up. Volkswagen performed well on resource reduction and efficiency criteria by setting targets for secondary material usage and taking the initiative to reuse and recycle batteries. Due to lobbying and not supporting Paris-aligned climate policy, 1 point was deducted from the total score.

Volkswagen AG (Volkswagen), based in Wolfsburg, Germany, is one of the largest automotive manufacturers in the world. In 2021, the global vehicle sales of Volkswagen were 8.3 million units in total,¹⁵¹ the second largest market share following Toyota, whose global sales reached 9.9 million units.¹⁵²

In September 2015, it came to light that Volkswagen had been intentionally installing "defeat devices" on diesel engines since 2009. These devices lowered emissions of NOx during laboratory testing, allowing vehicles to meet US EPA (and other national) emissions standards.¹⁵³ This disguised the fact that real-world emissions were approximately 40 times greater than claimed for nearly 11 million cars globally,¹⁵⁴ resulting in more than \$37.8 billion of costs, much of it for fines, buybacks, and compensation payouts in the US.¹⁵⁵

The "Dieselgate" incident continues to plague Volkswagen, with the EU levelling antitrust fines against the group as recently as July 2021, for colluding on technical development in the area of nitrogen oxide cleaning.¹⁵⁶ Regarding the incident, in July 2022, the EU Court of Justice ruled that Volkswagen used an illegal defeat device that alters its cars' emissions based on the outside temperature.¹⁵⁷

Following on from this, Volkswagen sought to recover from the incident by leaning fully into electric vehicles, with the stated goal of launching 70 all-electric models across the group by 2030.¹⁵⁸ In Europe, Volkswagen is selling its battery electric ID models as climate neutral, by buying carbon credits from controversial carbon offset projects,¹⁵⁹ and it is expanding the target to double the sale of electric ID models in China.¹⁶⁰

Phase-out of ICE vehicles		20.76
ZEV sales		
Volkswagen's total vehicle sales are 8,263,398 units in 2021, and ZEV sales account for 5.21%, more than twice as high as ZEV sales in 2020 of 2.43%. It is also a significant increase on the percentage of ZEV sales from 2017 to 2019 which ranged between 0.18% to 0.67% of total sales. Due to the hike in ZEV sales, the CAGR reached 132%, which is the second highest out of the ten auto companies.	Percentage of ZEV sales (2021)	6.51
	Percentage of ZEV sales (2017-2021)	1.48
	CAGR for percentage of ZEV sales (2017-2021)	2.50

Volkswagen refused to commit to a global ICE phase-out plan. The company's target is to increase the share of BEVs sales to more than 50% in the US and Chinese markets by 2030. ¹⁶¹ In Europe, the group aims to achieve 100% BEV for Volkswagen's passenger cars brand by 2035. ¹⁶²	ICE phase-out plan and improvements	8.26
Volkswagen provides renewable charging options through its subsidiary Elli which offers an eco-power tariff that is available throughout Germany. An accreditation body confirms that the quantity of power purchased by the customer is taken mainly from CO ₂ -free plants in a network that is physically linked to nearby renewable sources. ¹⁶³ This is considered to have a better additionality impact to the overall renewable energy generation.	Renewable energy charging	2
Supply chain decarbonisation		12
Scope 1 and Scope 2		
The company has increased its targets to reduce the absolute Scope 1 and Scope 2 GHG emissions by 50.4% by 2030 from a base year of 2018. On its renewable energy commitment, Volkswagen has already obtained 96% of its external electricity from renewable energy sources at its EU sites. The company aims to achieve 100% in the EU by 2023 and by 2030 the same target is planned for all locations except China. ¹⁶⁴	Renewable energy commitment	1
	Carbon reduction targets	1
Scope 3 purchased goods and services		
Volkswagen has disclosed its Scope 3 purchased goods and services emissions data in its official report and on the CDP database. The company has set targets to reduce emissions in vehicle production by 30% by 2030 based on 2018 emissions. ¹⁶⁵	Disclosure and targets	5
Volkswagen does not have targets related to steel decarbonisation. Nevertheless, the company has mentioned the importance of steel decarbonisation, identifying it as the biggest driver of reductions of CO ₂ emissions in the supply chain. Volkswagen signed a memorandum with Salzgitter for a plan to use low-carbon steel that is going to be produced from the end of 2025. ⁵⁴ Moreover, Group subsidiary Scania has entered into a collaboration with the start-up H2 Green steel. ¹⁶⁶ 41% of Volkswagen's sales are SUVs, which is counterproductive to its carbon reduction effort. ²⁶	Steel	5
Resource reduction and efficiency		1.0
Volkswagen has not set any specific targets to reduce its overall use of raw materials.	Targets on raw materials reduction	0
The company claims that each brand of the Volkswagen Group has targets and measures for the use of recycled materials in new vehicles, ¹⁶¹ but the details of the targets are not disclosed.	Secondary material usage	0
Volkswagen Group Components opened a facility for recycling batteries at the Salzgitter site at the start of 2021. The facility has been designed to recycle up to 3,600 battery systems per year in a pilot project. ¹⁶¹	EV battery reuse and recycling	1.0
Deductions		-0.5
Volkswagen's engagement in governmental policies to phase out ICE vehicles is mixed. In July 2021, the company made a statement in response to the EU Fit for 55 plan for a green transition, arguing that a phase-out of ICE is not necessary, because e-mobility would dominate in the EU by 2030. In October 2021, Volkswagen's position paper appeared to support the EU's 2035 zero-emission CO ₂ target for the first time. Volkswagen did not sign the global pledge made at COP26 to phase-out ICE vehicles in leading markets by 2035. According to the LobbyMap assessment, Volkswagen's Performance Band score was a C. ¹⁶⁷ The head of Porsche, which is one of Volkswagen's subsidiaries, is claimed to have a substantial influence on e-fuel policy. Porsche's lobbying for an e-fuel loophole has potentially weakened the EU's legislation to phase out ICEs. ¹⁶⁸	Negative climate lobbying	-0.5

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