



Stuck in neutral: How automotive and transportation manufacturers are failing to drive essential change

Insights report

December 2024

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The 2024 Automotive and Transportation Manufacturers Benchmark

The transformation required to decarbonise the transport of people and goods starts with the technological choices for powering vehicles, vessels, planes and trains. By 2030, sales of electric vehicles need to outstrip conventional ones (IEA 2024), hydrogen vessels must be made market-ready and the first hybrid-electric regional aircraft need to take off. Disruption is needed, certainly in a sector accounting for 21% of global energy emissions and employing millions of workers. How are keystone manufacturers preparing for such a challenge?

The Automotive Benchmark was the first benchmark released by WBA in 2019, as part of its Climate and Energy Benchmark series. Since its inception, the benchmark has evaluated 30 key automotive manufacturers, providing ongoing insights into their performance. This 2024 benchmark iteration builds on assessments using an updated version of the Accelerate Climate Transition (ACT) Automotive methodology¹. This methodology has been updated mainly to include more ambitious and up-to-date climate scenarios and related emissions reduction pathways (1.5°C aligned), to better cover the upstream emissions of automotive manufacturers (associated with purchased materials), and to reflect some scoring set-up improvements of brought to more recent ACT assessment methodologies. These deep changes make ACT score comparisons more challenging for assessed automotive manufacturers. The benchmark has been renamed the Automotive and Transportation Manufacturers Benchmark in order to highlight the expansion of the assessed scope of activities – see [Keystone companies in the 2024 Automotive and Transportation Manufacturers Benchmark](#) section.

In this benchmark iteration, WBA also assesses keystone manufacturers for other transportation modes besides automobiles, including aircraft, ships, trains, and trucks and buses. The expansion of the benchmark scope addresses the growing need to account for the rising share of emissions and activities associated with both passenger and freight transportation. Air travel is returning to pre-Covid levels, leading to a corresponding increase in emissions. Additionally, 70% of global freight is transported by ships, while road freight has surged by 40% since 2010. All companies included in this benchmark are assessed both against the low-carbon transition to meet the Paris Agreement and the social challenges for a just transition – see [Summary of results](#) section.

In 2022, the transport of people and goods across cities, regions and continents released 8 gigatonnes (Gt) of carbon dioxide (CO₂), accounting for 21% of global energy-related emissions (IEA 2023). The technological choices powering vehicles, vessels, planes and trains are central to the sector's decarbonisation. In the remaining years up to 2030, transportation manufacturers must align their technology offering with that required to achieve a 25% reduction in CO₂ transport emissions from 2023 levels. Automotive manufacturers need to scale up proven battery systems, while other manufacturers need to pursue diverse technological solutions, including new fuels, substantial efficiency gains and breakthrough innovations.

¹ ACT Automotive v2.0 released in June 2024, see Automotive and Transportation Manufacturers Benchmark FAQ



The automotive industry is on the verge of undergoing a major transition as internal combustion engine (ICE) vehicles are replaced by electric vehicles (EVs), leading to impacts from the factory floor to global trade. In early 2024, China surpassed Tesla in EV exports, reshaping market competition ([Sustainalytics 2024](#)). Protectionist trade tariffs risk driving up prices and slowing production ([IFW 2024](#)). EV production requires new technologies and skills, creating opportunities for upskilling but also risking job losses where skills are non-transferable. To meet the 1.5°C target, automotive manufacturers must commit adequate investments and scale up EV production globally in order to displace ICE vehicles from their production lines no later than 2035, while ensuring adequate workforce reskilling and upskilling to minimise social disruption.

Achieving full transport system decarbonisation, however, requires all transportation manufacturers to actively prepare for the challenging technological advancements needed to make their products low-carbon. Manufacturers must actively invest to ensure that 45% of heavy trucks sold by 2030 are battery-electric, while advancing hydrogen fuel cell (HFC) research for powering long-haul transport ([ICCT 2022](#)). Shipbuilders need to adopt ammonia or hydrogen power by 2030 so that low-carbon fuels meet the 13% target for international shipping ([IEA 2023](#)). Plane manufacturers need to engage with industries and governments on scaling up the capacity of sustainable aviation fuels² (SAFs), and with clients on innovative ways to tackle rising demand.

This report presents the five key findings from the 2024 Automotive and Transportation Manufacturers Benchmark – see [Five key findings](#) section – and a [Technical summary](#) of the ACT assessment findings covering key elements of companies’ low-carbon transition plans. The findings are designed to provide investors, civil society and policymakers – as well as the companies themselves – with the insights needed to take responsible and effective action.

WBA’s mission is to build a movement to measure and incentivise business impact towards a sustainable future that works for everyone. Working with over 420 organisations in our Alliance, we envision a society that values the success of business by what it contributes to the world. To achieve this, we need all actors in the ecosystem to drive the needed transformations. If you have any feedback on our findings, please reach out to Vicky Sins, Decarbonisation and Energy Transformation Lead at WBA: info.climate@worldbenchmarkingalliance.org

² Aviation fuel produced from sustainable feedstocks (cooking oil, energy crops or municipal waste) rather than fossil sources like crude oil.



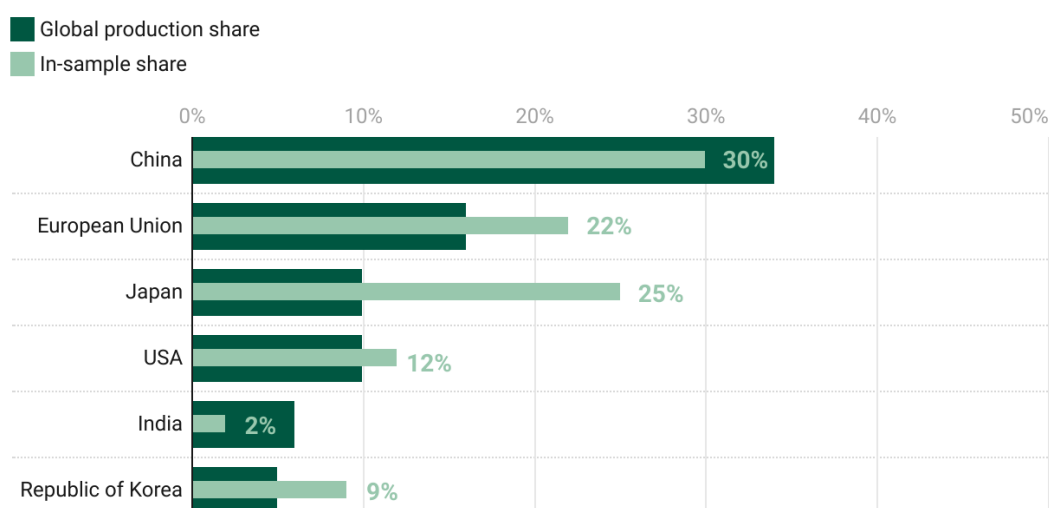
Keystone companies in the 2024 Automotive and Transportation Manufacturers Benchmark

The 2024 Automotive and Transportation Manufacturers Benchmark evaluates 44 companies, including 30 major global automotive manufacturers and 14 influential transportation manufacturers producing aircraft (three companies), ships (four companies), trains (three companies), and trucks and buses (four companies). These companies are a dominant force within the respective industries, with a combined revenue of USD 3.2 trillion in 2023 and directly employing 5.5 million workers.

The selected companies are directly responsible for a significant share of global production in their respective industries. Automotive manufacturers included in the benchmark accounted for 80% of global vehicle sales in 2023, manufacturing approximately 81 million vehicles.³ The truck manufacturers included in the benchmark made up nearly 54% of global truck production in 2023, while the plane manufacturers (due to the particular global duopoly characterising this industry) contributed to almost the entirety of global production of commercial aircraft in the same year.

The automotive manufacturers assessed in this benchmark are representative of the overall regional patterns of car production in 2023. Production in China, the European Union and the United States in 2023 was 34%, 16% and 10% of global output, respectively (ACEA 2024). A comparable geographical aggregation of the manufacturers included in the benchmark - see Figure 1 shows shares of 30%, 22% and 12%, respectively, of the total share of vehicle production assessed.⁴

FIGURE 1: 2023 SHARES OF AUTOMOTIVE GLOBAL PRODUCTION



Sources: European Automobile Manufacturers Association (ACEA), Economic and Market Report Global and European auto industry; company reports

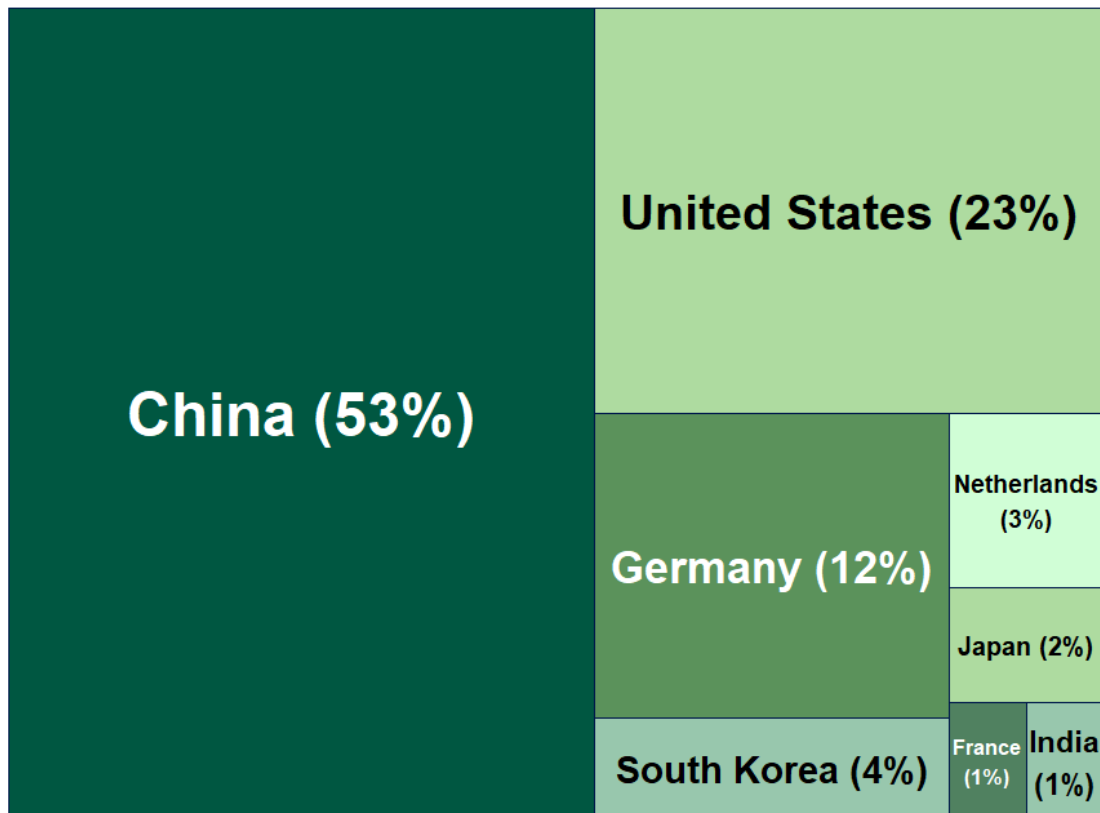
³ For more details on how this was calculated, refer to our FAQ document: [2024 Automotive and Transportation Manufacturers Benchmark: Technical FAQs](#)

⁴ Country-level distribution between global estimates and in-sample estimates differ due to the fact that in-sample estimates are based on company reports, meaning that they represent the number of vehicles produced by companies headquartered in each country instead of vehicles produced in the country.



In terms of delivering solutions, the evaluated manufacturers play an important role in the electrification of the global vehicle fleet. In 2023, electric vehicles (EVs)⁵ accounted for 14% of the total sales of light-duty vehicles (LDVs) by the benchmarked companies, up from 12% in 2022 and 7% in 2021. Global production of EVs exceeded 11 million units in 2023, rising from approximately 9 million in 2022 and 5.5 million in 2021. Reflecting broader trends in LDV production – and in line with dedicated literature ([EV Outlook 2024](#)) – China dominated EV production in our sample, producing over half of the EVs globally, followed by the United States with around 2.5 million units - see Figure 2.

FIGURE 2: 2023 EV PRODUCTION BY COUNTRY FOR THE ASSESSED AUTOMOTIVE MANUFACTURERS



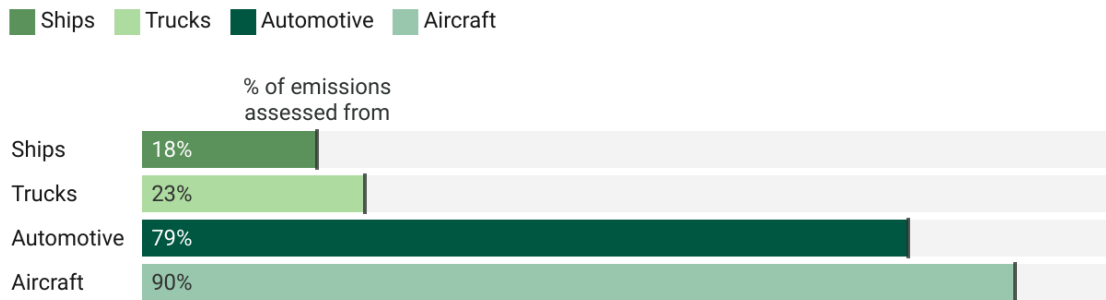
As a reflection of their dominant position, the emissions associated with the use of products from the automotive and transportation manufacturers included in this benchmark have a substantial impact on the planet. In 2023, this accounted for 52% of the global transport sector emissions, which totalled 8.2 Gt CO₂, and 11% of global energy-related emissions, which amounted to 37.7 Gt CO₂ in the same year. Product emissions from the benchmarked automotive manufacturers in 2023 totalled 2.65 Gt CO₂, representing approximately 7% of global energy-related emissions and 79% of the global emissions from the use of cars. That is a bit more than the CO₂ emissions from the European Union, or Africa and South America together, in the same year, considering fossil-fuel combustion and industries ([Our World in Data, 2024](#)). Emissions from the other transportation manufacturers included

⁵ In this report, EVs are defined according to the ACT Automotive methodology as battery-electric vehicles (BEVs) or fuel cell electric vehicles (FCEVs); hybrid vehicles using combustion engines are excluded.



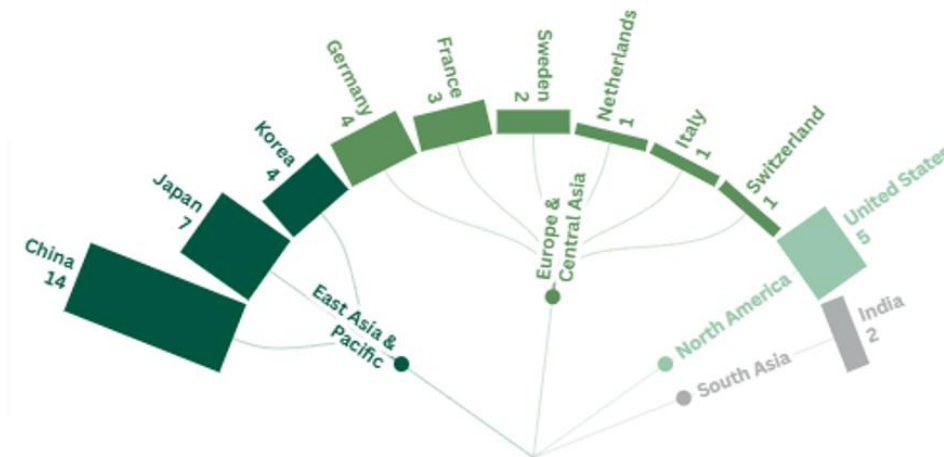
in this benchmark iteration also represent a significant share of global emissions in their respective industries - see Figure 3.⁶

FIGURE 3: PRODUCT-USE FROM THE ASSESSED MANUFACTURERS RESPONSIBLE FOR 52% OF 2023 GLOBAL TRANSPORT EMISSIONS



In terms of geographical coverage, 20 (67%) of the assessed automobile manufacturers are headquartered in the East Asia and Pacific region, with 11 companies based in China, followed by Japan with seven and the Republic of Korea with two - see Figure 4. The remaining ten automobile manufacturers are headquartered across other regions, with five in Europe and Central Asia, three in North America and two in South Asia. Half of the other transportation manufacturers are headquartered in Europe and Central Asia, followed by five companies in East Asia and Pacific and two companies in North America. In terms of ownership, 23 (77%) of the automotive manufacturers are publicly listed, six (20%) are state-owned and one is privately owned. Similarly, ten (71%) of the other transportation manufacturers are publicly listed, three (21%) are state-owned and one is privately owned.

FIGURE 4: REGIONAL DISTRIBUTION OF THE ASSESSED COMPANIES BY HEADQUARTER



The following sections of the report present an overall summary of the benchmark results, detail the five key findings and provide summaries of technical topics from companies' ACT assessments.

⁶ Emissions coverage for trains cannot be properly estimated since two of the three assessed companies do not report emissions data, while the other one sold products responsible for 41% of sectoral emissions in 2022. It should be noted that rail-related emissions are far lower than those from other transportation modes.



Summary of results

The average score for the 30 automotive manufacturers evaluated in the 2024 Automotive and Transportation Manufacturers Benchmark was 23.9 out of 100, with the ACT assessment contributing 17.0 points (out of 60) and the social assessment contributing 6.9 points (out of 40). Transportation manufacturers' scores followed the same trend, only performing half a percentage point below the automotive manufacturers in the overall score. Both sectors showed comparative performance, with the larger differences noted between regions of companies' headquarters.

FIGURE 5: AVERAGE SCORES BY REGION – AUTOMOTIVE MANUFACTURERS

Region	ACT (60%)	Social (40%)	Total (100%)
Europe & Central Asia (5)	33.0	15.8	48.8
North America (3)	32.4	13.3	45.7
South Asia (2)	13.7	6.8	20.4
East Asia & Pacific (20)	11.1	3.7	14.8

FIGURE 6: AVERAGE SCORES BY REGION – TRANSPORTATION MANUFACTURERS

Region	ACT (60%)	Social (40%)	Total (100%)
Europe & Central Asia (7)	24.2	10.2	34.4
North America (2)	18.4	6.0	24.4
East Asia & Pacific (5)	4.6	3.0	7.6

The average scores per region were noted to be higher for companies headquartered in Europe and Central Asia followed by North America, for both automotive and transportation manufacturers - see Figure 5 and Figure 6. It is interesting to note that automotive manufacturers in both regions performed similarly in their ACT and social assessments, with an average difference of only 3.2 percentage points. In contrast, the transportation manufacturers in Europe and Central Asia outperformed those in North America by almost 10 percentage points on their overall scores. The laggards are concentrated in the East Asia and Pacific and South Asia regions, with the lowest performing group being transportation manufacturers headquartered in East Asia and Pacific.

FIGURE 7: AVERAGE SCORES BY ECONOMY TYPE

Average score	ACT (60%)	Social (40%)	Total (100%)
Advanced economies (28)	22.7	9.8	32.5
Emerging economies (16)	6.5	1.9	8.4



Similarly, when looking at score distribution by type of economic development - see Figure 7, companies headquartered in advanced economies outperformed those in developing and emerging markets, with a wider difference observed for the transportation manufacturers.

Following the pattern observed in other WBA Climate and Energy benchmarks, automotive and transportation manufacturers that are publicly traded outperform those owned by government - see Figure 8. For both automotive and transportation manufacturers, there is a wide gap between the ACT and social performance scores of publicly traded and government-owned companies. This can be partly explained by the level of disclosure required from publicly traded companies. The performance of Chinese companies is discussed further in this section, since the government-owned companies in this benchmark are exclusively headquartered in this country. From the 44 companies assessed in the 2024 Automotive and Transportation Manufacturers Benchmark, only two companies are privately owned, meaning we cannot draw significant conclusions from their comparative performance.

FIGURE 8: AVERAGE SCORES BY OWNERSHIP TYPE

Ownership type	ACT (60%)	Social (40%)	Total (100%)
Public (33)	19.9	8.3	28.2
Government (9)	5.3	1.8	7.1

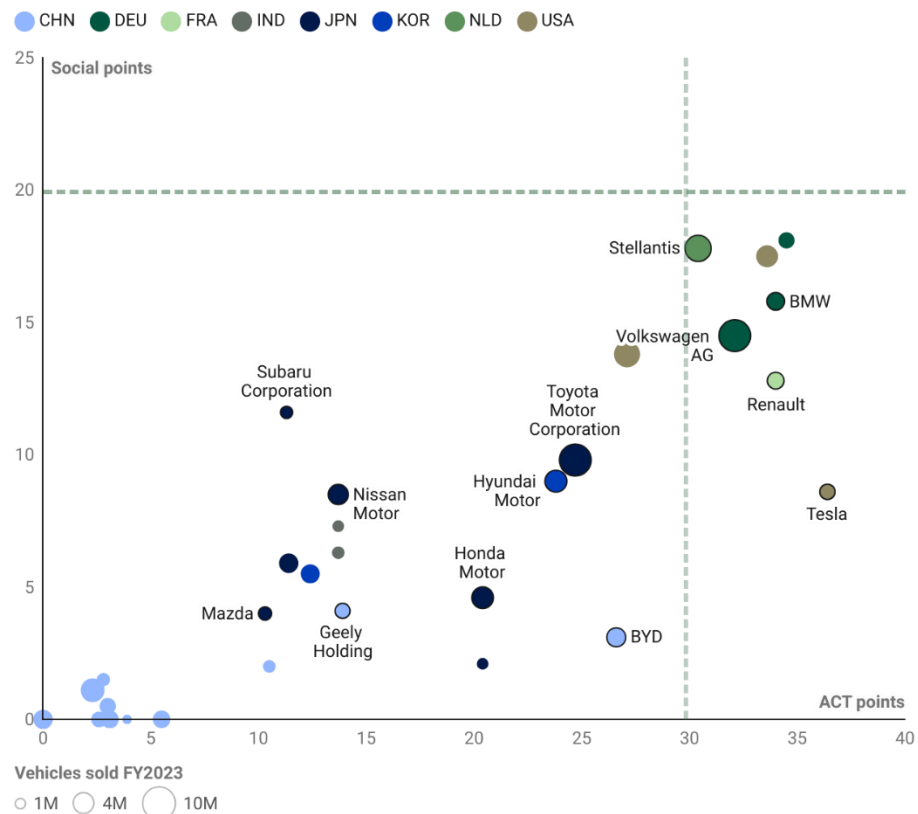
Country policies and regulations on climate have an impact on how companies position their transition plans and business models. Europe’s main legislative body has set strong CO₂ standards for LDVs, a 55% reduction target by 2030 and a 100% reduction target by 2035, with exceptions for carbon-neutral fuel vehicles ([EU 2022](#)). Some member states, such as Austria, Denmark and the Netherlands, plan to phase out ICE vehicles earlier, by 2030.

To some extent, the underlying policy environment in the geographies that car companies operate in can be observed as exerting an influence on the benchmark scores. Companies headquartered in Europe have – on the aggregate – better ACT and social scores, which are clearly higher than the companies from other investigated regions. Presently, the United States lacks a binding federal ICE phase-out policy. In September 2022, the National Blueprint for Transportation Decarbonization ([NBTD 2022](#)) set aspirational goals: 100% zero-emission vehicle (ZEV) sales for heavy-duty vehicles (HDVs) by 2040 and 50% for LDVs by 2030. Consistent with the less ambitious policy set-up, companies headquarters in the United States also rank lower than European ones.

Automotive manufacturers exhibit varying levels of performance across both ACT and social dimensions in the benchmark. Notably, as seen in Figure 9, only seven companies attain more than 50% of the total ACT score (30 points), and none attain more than 50% of the total social score (20 points). Scores are negatively impacted by companies with poor disclosure practices, particularly those headquartered in East Asia. Key areas for improvement include enhancing disclosure of emissions, including scope 3, setting emissions reduction targets, increasing transparency in research and development (R&D) disclosures and developing comprehensive transition plans. The gaps underscore underperformance in the ACT dimensions compared to leading practices.



FIGURE 9: CORRELATION BETWEEN SOCIAL AND CLIMATE PERFORMANCE



Although there is a positive correlation between ACT and social scores, certain companies, such as Tesla, achieve a strong ACT score but have their overall score reduced due to weaker social performance. Medium and large manufacturers are distributed across the performance spectrum. Toyota Motor, for instance, ranked as a mid-performer and Volkswagen as a top performer, despite both being the largest automotive manufacturers with similar vehicle production volumes. The regional headquarter location also appears to have a significant influence on performance outcomes.

Chinese automotive manufacturers in the context of the current and other global benchmarks

In the 2024 Automotive and Transportation Manufacturers Benchmark, 11 Chinese automotive manufacturers were evaluated, achieving an average ACT score of 6.7 (out of 60 points) and a social score of 1.1 (out of 40 points). This is significantly lower than the overall average score of 17.0 for the ACT and 6.9 for the social dimensions for the 30 automotive manufacturers assessed in total (see above). Even though a strict comparison of scores between the 2021 and the 2024 assessments of automotive manufacturers is not entirely accurate, it is worth noting that, on average, Chinese companies appear to rank lower in the 2024 benchmark iteration.

The lower performance of Chinese companies mostly results from the revised ACT Automotive methodology, which introduced more stringent data requirements, a comprehensive assessment of scope 3 emissions, detailed evaluation of management practices and a greater emphasis on policy engagement. In particular, the following changes were observed with the adaptation of the ACT methodology and the addition of the social assessment:



- *Low level of publicly visible required information from the published disclosure:*
 - ACT score average for Chinese companies was at 39% of the all-company average.
 - Three companies scored low due to the lack of English disclosure.
 - None reported scope 3 emissions.
 - Only two companies could be scored on the reported share of low-carbon vehicles.
 - Only one of the five Scope 1 and 2 emission targets had enough detail for scoring.
- *Poor performance on social and just transition:*
 - Social score average for Chinese companies was 16% of the all-company average.
 - Seven companies scored zero on social and transition metrics, with the top performer earning just 10%..

Figure 10 compares the evaluation criteria of WBA's 2024 Automotive and Transportation Manufacturers Benchmark with those from [2023 ICCT](#) and [2023 Lead the Charge](#) benchmarks on the automotive low-carbon transition. Chinese companies scored highest in ICCT, relatively lower in WBA's benchmark and lowest in Lead the Charge. 2023 ICCT emphasises zero-emissions vehicle (ZEV) sales targets, including plug-in hybrid vehicles (PHEVs), class coverage and technical performance – areas where Chinese manufacturers perform strongly. In contrast, 2023 Lead the Charge focuses on sustainable supply chains and human rights, highlighting areas for improvement. The 2024 Automotive and Transportation Manufacturers Benchmark combines stringent assessments of scope 1, 2 and 3 emissions, share of low-carbon vehicle (LCV) sales, management practices and policy engagement, revealing gaps in data transparency and strategic planning.

Despite producing 53% of the world's EVs, Chinese companies face challenges in meeting the comprehensive standards of the 2024 Automotive and Transportation Manufacturers Benchmark. The benchmark offers a holistic assessment, integrating companies' transition planning and accountability to their workforce, and provides valuable insights for Chinese companies to enhance their overall performance and align with peers worldwide. To address these gaps, Chinese companies must prioritise completeness and transparency in their disclosures, with a focus on articulating their progress in the low-carbon transition and social impacts. This could soon gain urgency as these companies are building factories in regions such as the European Union, which will make them subject to enhanced disclosure regulations from local markets.



FIGURE 10: EVALUATION CRITERIA OF GLOBAL AUTOMOTIVE BENCHMARKS

Aspect	2023 ICCT	2024 Automotive and Transportation Manufacturers	2023 Lead the Charge
Targets and goals	Zero-emission vehicle sales target only	Scope 1, 2 and 3 targets; Time horizon and achievement	Sustainable supply chains
Investment	R&D and CapEx on ZEVs	R&D, CapEx, patents on low-carbon tech; Scope 1 and 2 emissions	Investments in sustainable supply chains and human rights
Sold product performance	ZEV sales (BEVs, FCEVs, PHEVs); Class coverage; Tech performance (charging speed, range, renewable energy, battery recycling)	LCV sales (BEVs, FCEVs); Scope 3 emissions; LCV efficiency; Locked-in emissions	--
Management	Executive incentives	Management oversight; Low-carbon transition plan; Scenario testing	Human rights and responsible sourcing
Supplier and client engagement	--	Supplier and client GHG reduction strategies	Supplier and client GHG reduction strategies
Policy engagement	--	Engagement with associations and climate policies	Lobbying and sustainable practices
Business model	--	Low-carbon product revenue; Business model changes	Supply chain sustainability and human rights
Just transition and social aspects	--	Social and just transition assessments in decarbonisation	Human rights and responsible sourcing
Average score (% of total) *	47%	8%	0.3%

(*) Average score = (Average score of Chinese companies / Total score for each benchmark) X 100%



Five key findings

This section presents the five key benchmark findings, outlining the most significant challenges and opportunities for achieving a just low-carbon transition in the automotive and transportation industries. Key findings 1 through 4 address the automotive industry's preparedness for the transition, covering climate and social aspects. Key finding 5 specifically focuses on transportation manufacturers. A more detailed analysis of the findings for individual ACT assessment modules is covered in the technical summary in the next section.

Key finding 1: Transition of the automotive sector is stalling as companies fail to scale their electrification commitments globally

Driven by supportive policies and growing momentum, electric vehicle (EV)⁷ sales doubled from 7% in 2021 to 14% in 2023. Yet, on the long-term, the transition is at peril. No automotive manufacturer is determined to phasing out fossil fuel vehicles from their production lines by 2035. Commitments to full electric sales are only made for specific markets and by six companies. As a result, only about 40% of vehicles in 2035 are expected to be fully electric according to company planning, far below the 100% needed to meet the 1.5°C climate target.

EVs are steadily transitioning into mass-market products across an increasing number of countries. EV sales doubled from 7% in 2021 to 14% in 2023, and this growth is expected to continue. Declining battery prices which narrow the cost gap with internal combustion engine (ICE) vehicles, and heightened competition among automotive manufacturers to offer EVs across a broader range of vehicle classes, are key drivers of this trend. Additionally, government policies aimed at promoting EV adoption are gaining momentum. For example, in the European Union, stringent emissions reduction targets for vehicles are pushing automotive manufacturers to scale up their EV offerings.

Despite these encouraging trends, the anticipated growth in the EV market remains insufficient. The International Energy Agency's (IEA) 2023 Net Zero Roadmap projects EV share of global light-duty vehicle (LDV) sales to rise dramatically, from 20% in 2023 to 67% by 2030 – more than a three-fold increase within seven years – and to reach 100% by 2035. While current EV sales trends are broadly in line with the roadmap's 2030 projections, automotive manufacturers are at risk of falling significantly behind by 2035 due to commitments that are limited in scope and geography. Notably, none of the assessed companies have pledged to fully phase out fossil fuel vehicles from production by 2035. Furthermore, only six manufacturers have committed to 100% EV sales in specific markets, with five targeting Europe and one the United States.

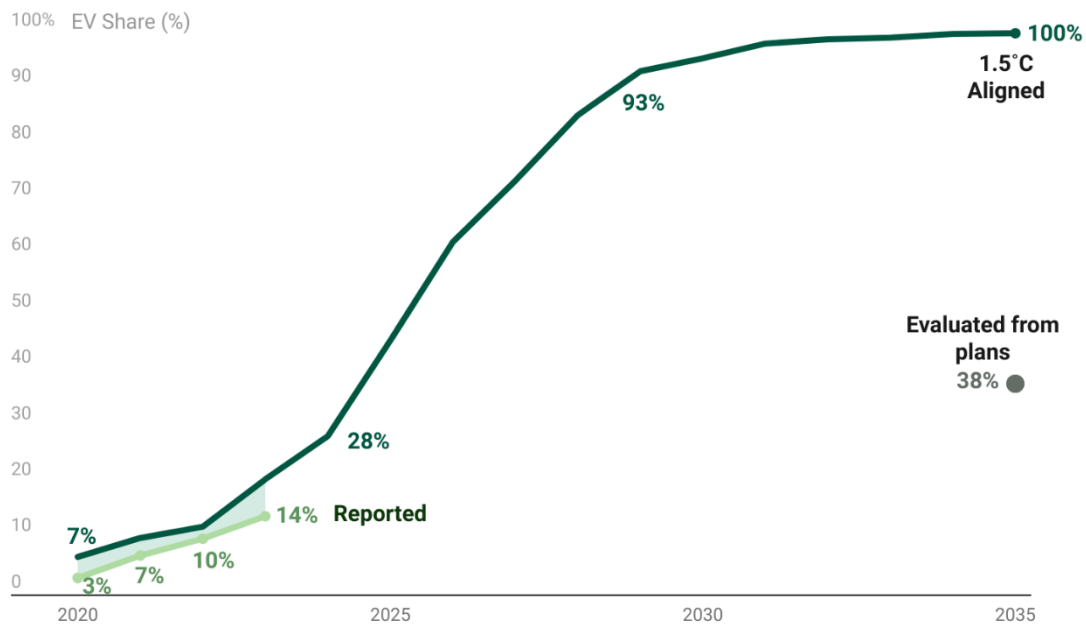
Even if all automotive manufacturers fully achieve their publicly disclosed phase-out targets and Chinese companies meet the national goal of 40% new energy vehicle (NEV) sales, only about 38% of vehicles globally are projected to be fully electric by 2035 under current company plans - see Figure 11. This estimate is optimistic, as any shortfalls in meeting these targets could leave significantly more

⁷ The ACT Automotive methodology acknowledges only battery-electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) as low-carbon vehicles.



ICE vehicles on the road. Such projections fall drastically short of the 100% EV adoption required to align with the 1.5°C climate target.

FIGURE 11: ELECTRIC VEHICLE SALES GAP



Sources: Climate Action Tracker - Decarbonising road transport: light-duty vehicles; company reports

Moreover, the fragmented nature of the EV market reflects regional disparities. In 2023, EV sales were predominantly driven by companies headquartered in China (53%), the United States (23%) and Germany (12%) Together, these three countries accounted for approximately 88% of global EV sales, underscoring the geographical concentration of EV adoption and the uneven development of EV industries across countries.

Automobile manufacturers rely on relevant ecosystems to enable an effective transition to the electrification of their fleets. Clear public policies, such as ICE bans with clear deadlines, subsidies to stimulate the market demand for EV uptake and deploying extensive charging infrastructure, are essential. Additionally, companies should engage positively in policy advocacy rather than hindering the shift to electrification. The change required will not happen without coordinated efforts from regulators and companies.



Key finding 2: Automotive manufacturers are not financially committed to a low-carbon future

Despite planning for a low-carbon transition, there is little evidence of companies financially committing to their goals. Only seven of the benchmarked companies, representing 28% of total vehicle production, have committed to increasing low-carbon investments by 2025. Of these, only two have disclosed financial commitments at the level required for a low-carbon transition. Lacking sufficient low-carbon investments to facilitate change, the market is lagging. In 2023, automotive manufacturers relied primarily on fossil fuel vehicle sales, with low-carbon vehicle revenue averaging at only 17% for the nine companies that disclosed this data. Without substantial investments and strategic financial planning, it is unclear how automotive manufacturers will navigate to a low-carbon future.

To successfully transition to a low-carbon future, it is essential for companies to have time-bound, comprehensive action plans backed by clear financial commitment, outlining exactly how the company aims to shift its business model, assets and operations to align with the latest climate science recommendations.

Automotive manufacturers were assessed on transition planning based on several best practice elements. Of the 30 benchmarked companies, 90% have a transition plan in place and 60% have a moderate to high score (over 55/100) on these best practice elements. This indicates that companies have mapped pathways towards a low-carbon transition, at least on paper. However, the benchmark results tell a different story when it comes to practice.

Quantified financial elements are crucial to any transition plan. These include financial projections, cost estimates, financial viability assessments and financial risks and opportunities. While over half of the benchmarked companies include quantified financial elements in their transition plans to some degree, only two companies have clearly integrated these elements into their greater business strategy. Overall, 44% of the companies included no financial content in their transition plan.

This lack of financial commitment becomes increasingly alarming when looking at low-carbon investments. Here again, only seven companies, representing 28% of total vehicle production from all assessed manufacturers, have committed to increasing low-carbon capital expenditure by 2025. Only two of these companies have disclosed a financial commitment at the level needed for a low-carbon transition. Considering that the technological pathways towards a low-carbon transition are clear for the automotive industry, this lack of financial commitment reveals a missed opportunity. Furthermore, without low-carbon investments to facilitate necessary changes, the market is lagging.

In 2023, automotive manufacturers relied primarily on fossil fuel vehicle sales, with low-carbon vehicle revenue averaging at only 17% for the nine companies that disclosed this data. Despite adequate transition planning, companies are financially prioritising business as usual. Without substantial investments and strategic financial considerations, it is unclear how automotive manufacturers will take action on their transition planning and navigate to a low-carbon future.



Key finding 3: Automotive companies must urgently strengthen oversight of battery suppliers to achieve complete decarbonisation

In a 1.5°C world, battery production will dominate upstream emissions from electric-vehicle production. Only two companies – representing 6% of the EV market – require suppliers to meet 1.5°C-aligned emissions goals, and none have specific targets for battery suppliers. Meanwhile, 12 companies, accounting for 30% of the EV market, are advancing innovation and collaboration with suppliers to support EV production. 11 companies, covering 60% of the global EV market, are moving to in-house battery production, potentially boosting low-carbon efforts through tighter control. To drive full decarbonisation of the sector, in-house production needs to be rationalised, while external production should include explicit emissions targets.

Effective supplier engagement strategies are essential for decarbonising the automotive sector, particularly for addressing the high emissions associated with battery production. While EVs have environmental advantages over traditional ICE vehicles, the production of battery-electric vehicles (BEVs) faces distinctive challenges in a 1.5°C world. Battery production stands out as the most significant source of upstream emissions in EV production, accounting for as much as 60% of the emissions in this category (McKinsey 2023).

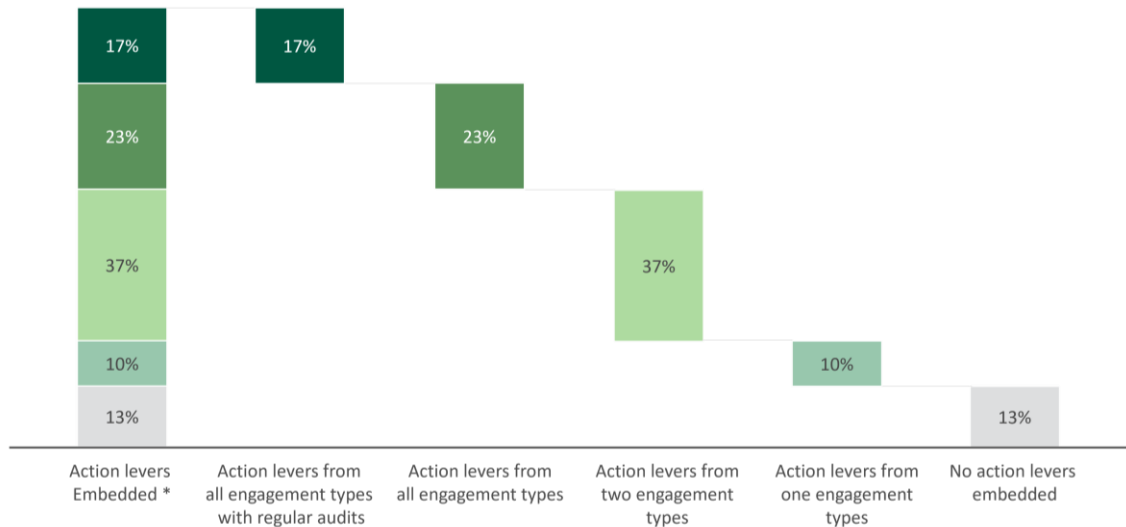
Among the automotive manufacturers assessed, 28 (93%) companies have supplier engagement strategies in place for full decarbonisation of the sector, but they communicate these only in general terms and lack actionable levers, such as quantified emissions targets or practical action frameworks. Only two companies, BMW and Kia, have incorporated quantified, science-based emissions reduction targets into their key procurement templates. Overall, there is an urgent need for companies to align their supplier engagement efforts with global climate targets, requiring not only more actionable engagement strategies but also mechanisms to reinforce supplier accountability.

Of the assessed companies, 25 (83%) focus on understanding and changing supplier behaviour for the low-carbon transition by embedding action levers, such as information collection, and engagement and incentivisation, into their strategic plans. Meanwhile, 12 (35%) of the companies have committed to engaging suppliers through innovation and collaboration, a more practical action lever likely to change the market and support EV production.

Including action levers within the supplier engagement strategy is not only a best practice but also correlates with better performance in terms of emissions intensity. 12 (40%) companies committed to include action levers from all engagement types, while only 4 (13%) have not yet incorporated any types of action levers into their strategy to engage with suppliers - see Figure 12. Companies that are committed to engaging with suppliers through all engagement types (BMW, Mercedes, and Renault) and to conducting regular supplier audits were observed to reduce their scope 3 related to *category 1* (purchased goods and services) emissions intensity between 2021-2023. Although this evidence suggests that improving supplier engagement could enhance emissions reduction upstream, poor data disclosure on scope 3 emissions prevents the establishment of a more definitive relationship and its consistency across the sample.



FIGURE 12: ACTION LEVERS EMBEDDED TO ENGAGE SUPPLIERS



(*) Action levers are grouped into three engagement types: Information collection, Engagement & incentivisation, Innovation & collaboration

In-house battery production is adopted by 11 (37%) of the assessed companies, with an additional seven (23%) companies in the planning phase of producing batteries within three years. This approach offers greater control over the emissions footprint of EV manufacturing while achieving cost-effectiveness in advancing EV production. However, this trend must be balanced with strategies to engage external suppliers effectively. If companies fail to extend their decarbonisation frameworks beyond in-house operations, this will leave a substantial portion of the automotive supply chain outside the scope of emissions reduction initiatives. Integrating external production with explicit emissions targets will be essential to closing this gap.

Key finding 4: Without an increased focus on reskilling, the automotive sector remains unprepared for a low-carbon future and risks leaving at least 1.3 million workers behind

Producing EVs requires different skills than those that have been needed for producing ICE vehicles. While many companies offer educational programmes for their staff, only four of the assessed companies are committed to reskilling their existing workforce, and none have shown that they have a process to understand what skills are lacking to successfully decarbonise. About 1.3 million workers are currently employed by the 13 companies that scored zero on all fundamentals of reskilling and upskilling their workforce for a just transition. Overall, automotive manufacturers lack the commitments, processes and educational programmes to ensure a workforce with the skills needed to be successful in a decarbonised future.

Failing to prioritise risks to workers could jeopardise the automotive industry's ability to decarbonise in a just way. Transitioning to EV manufacturing, requires at least as many workers as ICE vehicles, when accounting for battery production (Cotterman et al. 2024). However, autoworkers need to be equipped with a range of new and evolving skills compared to those needed so far to produce ICE



vehicles. Despite the evolving skills that are required, only four companies are committed to reskilling their existing workforce in the low-carbon transition. This risks leaving many workers with outdated skillsets and no suitable job opportunities, more so if the new jobs are created in different places.

While the transition to EVs is well underway, it is still crucial to understand exactly what skills will be needed, when and in what quantities, to make sure that the low-carbon transition can stay on track. None of the assessed companies disclosed a process to identify the skill gaps that may arise during the transition, which shows that all automotive manufacturers may be unprepared for and lack an understanding of the challenges that lie ahead. The details of how companies plan to decarbonise their business remains vague, and companies are not financially committed to the low-carbon future. Without facing the reality of decarbonisation, companies remain unprepared for what it will mean for their workers.

Many automotive manufacturers offer some sort of educational programmes for their staff to make sure they have the skills needed to do their current jobs. However, these efforts rarely extend to other impacted stakeholders and fail to consider equality of opportunity for women and other vulnerable groups, who are more likely to be left behind at times of transition. Of the assessed automotive companies, 13 scored zero on all fundamentals of reskilling and upskilling for a just transition as they have no related commitments or processes in place. This means that the 1.3 million workers they employ may be at a serious risk of being left behind in the transition. If these gaps persist, companies risk not only failing to meet the demands of a decarbonised future but also abandoning workers whose specialised skills may soon become obsolete.

Automotive manufacturers must embrace their responsibility to ensure a just transition. The need to urgently decarbonise their business should not be used as an excuse to make unjust choices that exclude the current workforce from the opportunities created in the electrification of the industry. While the number of jobs in the sector is expected to remain relatively stable, companies need to understand what the future of work may look like and engage in reskilling initiatives. This should be paired with efforts to expand EV production in the same locations where ICE manufacturing is being phased out, ensuring a just transition for the workforce and local communities.

Key finding 5: More ambition needed from transportation manufacturers to address the decarbonisation challenges ahead

Technological uncertainty and reliance on long-lived assets from transportation manufacturers - building ships, trucks, trains, and aircraft - result in a more challenging path to decarbonisation. However, their response is subdued. In 2023, low-carbon R&D across all companies accounted for just 5% of total research spending, despite its critical role for developing the necessary clean technologies. Only three companies have a client engagement strategy covering more than 90% of scope 3 emissions, missing out on an important lever for achieving sector-wide decarbonisation as the manufacturer products will be decades in operation. A full transport-system transformation is therefore dependent on transportation manufacturers increasing their ambition.

The full decarbonisation of the transport system requires strong and ambitious transition plans from transportation manufacturers beyond the automotive industry. Research on key companies producing aircraft, ships, trains and trucks shows that despite facing more complex decarbonisation pathways,



the low-carbon commitments and performance of these companies remain comparable to those of automotive manufacturers. This lack of extra effort is notable, given differences in technological readiness and the long lifespan of these transportation assets. While automotive manufacturers focus on fleet electrification, other transportation manufacturers face the challenge of navigating multiple fuel options, including ammonia, hydrogen, liquefied natural gas (LNG) and methanol. Limited infrastructure, regulatory uncertainty, high costs and operational complexity further hinder progress. In contrast, the automotive sector's simpler electrification approach, supported by mature technology and robust infrastructure, enables faster carbon reductions. To add to this, other transportation manufacturers lag even further behind than automotive manufacturers on some key issues. Only 29% of the assessed transportation manufacturers disclosed upstream emissions, in comparison to 47% of the automotive manufacturers.

Of the assessed transportation manufacturers, 11 (80%) show significant shortcomings in their climate engagement strategies, encompassing policy, actions and impact, scoring less than half of the possible points. This is especially concerning given the long lifespans of planes, ships, and trains, and the need for robust climate strategies to reduce emissions from their use. In cases where companies did have client engagement strategies, these often lacked adequate coverage and depth. Only three (20%) of the companies provided evidence of engagement activities with clients resulting in measurable impacts, and just one – PACCAR – demonstrated a clear link between its strategies and potential energy savings or emissions reductions from its sold products.

Furthermore, the assessed transportation manufacturers fail to provide clear disclosures regarding both their R&D spending and capital expenditure (CapEx) dedicated to advancing low-carbon technologies. None of the companies outlined plans to increase future CapEx in this critical area, and current allocations to low-carbon R&D remain alarmingly low, averaging at just 5% of total research spending. This lack of transparency and commitment underscores a significant gap between the industry's needs and actionable progress towards decarbonisation, rendering the outlook for a successful decarbonisation of the transportation sector bleak.



Technical summary

This section provides an in-depth look into the ACT assessment results of the 2024 Automotive and Transportation Manufacturers Benchmark. It only discusses the results for the automotive manufacturers as the profiles and number of automotive companies covered in the benchmark allows to draw insights at the industry level. The summary is arranged by topic, drawing on analyses from the individual ACT performance modules and indicators. The table below outlines the modules and indicators discussed under each topic. For more information about the ACT performance scoring, please refer to the dedicated [ACT Automotive methodology](#).

The 2024 Automotive and Transportation Manufacturers Benchmark has only utilised public sources of data, primarily from companies' disclosure in sustainability, integrated, annual or financial reports. Complementary data, such as that included in the [CDP](#) climate questionnaire or other sources, was also considered, provided it was publicly available.

TABLE 1: TECHNICAL SUMMARY TOPICS AND THE ACT MODULES AND INDICATORS COVERED

Technical summary topic	ACT modules/indicators
Targets	Module 1
Emissions performance	Modules 2 and 4, specifically <i>Trend in past emissions</i> and <i>Locked-in emissions</i> indicators
Investments	Module 3 and <i>Low-carbon CapEx</i> indicator
Climate oversight and governance	Indicators 5.1, 5.2 and 5.4
Transition planning and scenario analysis	Indicators 5.3 and 5.5
Supplier and client engagement	Modules 6 and 7
Trade associations and policy engagement	Module 8
Low-carbon business activities	Module 9

Targets

A public-facing decarbonisation target is an indication of corporate commitment to reducing emissions. Companies without ambitious targets are unlikely to be adequately committed to decarbonising. Targets provide a direction towards which companies can align their strategy, CapEx and R&D to deliver the requisite emissions reductions.

The emissions reduction targets set by the automotive manufacturers in the benchmark fall short of what is needed to drive a low-carbon transition at the required scale and speed. Of the 30 assessed companies, almost a third are yet to set any target, more than three quarters have not yet set a net-zero target for their scope 1 and 2 emissions and almost half have not set net-zero targets that include their scope 3 emissions.

What targets have been set?

Out of the 30 automotive manufacturers assessed in this benchmark, 23 (77%) have publicly disclosed an emissions reduction target. The seven (23%) companies without any emissions reduction target contribute to at least a third of the combined scope 1 and 2 emissions of all the companies covered in the benchmark. This includes BYD, Changan Automobile, Chery Holding Group, Dongfeng Motor Group, FAW, JAC Motors and SAIC Motor. There is a clear lack of emissions reduction commitment



from Chinese companies, which is problematic considering that 11 (37%) of the 30 benchmarked keystone companies are headquartered in China.

Scope 1 and 2 emissions make up a smaller proportion of an automotive manufacturer's total emissions than scope 3 emissions. However, it is important for organisations to set targets for their operational emissions, over which they have total control, to demonstrate their intentions to transition. Out of the 30 automotive manufacturers in the benchmark, 19 (63%) have a target for their scope 1 and 2 emissions. The majority of companies without such a target are Chinese, namely BYD, Changan Automobile, Chery Holding Group, Dongfeng Motor Group, FAW, Geely Holding, Guangzhou Automobile Group, JAC Motors and SAIC Motor, except for Kia and Tesla, both of which have not set isolated scope 1 and 2 targets. Kia has only set a vague net-zero target for its scope 1, 2 and 3 emissions by 2045. Tesla's net-zero target for its scope 1, 2 and 3 emissions does not even include a target year.

Under an ambitious EV adoption scenario, fleet electrification will lead to upstream scope 3 emissions being predominant in the overall emissions of automotive manufacturers. Therefore, having scope 3 emissions reduction targets in place will only become more important. Yet, only six (20%) of the companies have set targets to reduce their upstream scope 3 emissions: BMW, Hyundai Motor, Mercedes-Benz, Renault, Stellantis, Tata Motors. Further, only Hyundai Motor reported both near- and long-term targets. No Chinese, American or Japanese company has a target to tackle upstream scope 3 emissions.

Currently, downstream scope 3 emissions represent the majority of emissions in an automotive manufacturer's value chain. However, half the companies assessed have not set targets to reduce emissions in the use phase of sold products. Once again, no Chinese company has a target to reduce these vital emissions.

To align with the IEA's Net Zero Emissions by 2050 Scenario, all car and van sales will need to be zero-emission by 2035 (IEA, [2024](#)). However, only 18 (60%) companies have set net-zero targets covering all scope 1, 2 and 3 emissions, and no company has net-zero targets aligned with the IEA's recommended timeframe. Tata Motors and Mercedes-Benz are the only two companies that target net zero across all emissions prior to 2040. Two more companies target net zero by 2040, three by 2045 and ten by 2050. Tesla does not even provide an end year for its target. Moreover, only one net-zero target, set by Stellantis, could be scored for alignment with a 1.5°C pathway. Automotive manufacturers questionably lack the crucial transparency required around inclusive net-zero targets, such as disclosure emissions intensities and use of carbon offsets.

Are the targets ambitious enough?

To determine whether a company's target is aligned with its 1.5°C pathway, and is therefore sufficiently ambitious, ACT methodologies require a company to disclose sufficient detail on each target. Only 18 (60%) companies in the 2024 benchmark disclosed enough information surrounding their targets, such as emissions intensities, activities and use of carbon offsets, which would enable their targets to be assessed.

In total, 19 (63%) companies were found to have targets for their scope 1 and 2 emissions. Out of these companies, 15 (50%) disclosed enough information for their targets to be assessed for alignment with a 1.5°C pathway. Among these companies, Stellantis stands out with its aim to reduce its scope 1 and 2 emissions by 50% by 2025, 75% by 2030 and 100% by 2050, compared to 2021. It is the only company in the benchmark that has both a near- and long-term scope 1 and 2 emissions target aligned with its 1.5°C pathway.



Further, 15 (50%) of the companies were found to have targets for their downstream scope 3 emissions. Out of these companies, only seven (23%) disclosed enough information for their targets to be assessed for alignment with a 1.5°C pathway. Among these companies, Tata Motors stands out as the only company with a short-term target aligned with its 1.5°C pathway, but it still lacks a long-term target.

Hyundai Motor

Hyundai Motor has improved its target setting compared to the assessment in 2021. Hyundai Motor is one of the few companies in the current benchmark to have set upstream scope 3 emissions reduction targets. Further, it is the only company to have set both near- and long-term targets for this scope of emissions. It now also has several downstream scope 3 emissions reduction targets. For its scope 1 and 2 as well as scope 3 emissions, Hyundai Motor has set targets at gaps no longer than five years, starting from 2030 until 2050. Yet, as with most companies, it fails to publicly report data on emissions intensity for its downstream scope 3 emissions targets and on carbon offsets for its net-zero scope 1, 2 and 3 emissions target.

Another element assessed in the benchmark is the time horizon of emissions targets. The ideal set of targets should be forward-looking enough to cover the majority of the lifetime of a company's assets and should include sufficient interim targets that incentivise action in the present. Of the assessed companies, 19 (63%) have set emissions targets for 2050. Yet, among these, only four (13%) have also set interim targets for 2025 and 2030, namely Geely Holding, Renault, Stellantis and Suzuki. Moreover, none of the companies have set regular interim targets at gaps of no more than five years extending until the end year of their long-term target.

When assessing targets, the ACT methodology also measures companies' historic target achievement and current progress towards active emissions reduction targets. In total, three (10%) of the companies are on track to achieving all their emissions targets, while 14 (47%) of the companies scored zero on this indicator.

Emissions performance

The indicators on trend in past emissions intensity compare a company's rate of emissions reduction over the previous five years with the rate required by its 1.5°C pathway over the coming five years. The past emissions trends of automotive manufacturers are assessed for the following sources of emissions, which remain the main contributors to these companies' overall emissions: upstream emissions associated with purchased materials (scope 3 category 1), emissions from manufacturing operations, and downstream emissions arising from the use of sold products (scope 3 category 11). Trends in past emissions are assessed using emissions intensities, whatever the scope of emissions. Additionally, the locked-in emissions from sold products are also compared with companies' 1.5°C carbon budget.

Alignment of past emissions intensities: emissions from manufacturing operations

Of the 30 automotive manufacturers, 24 (80%) reported sufficient data to enable an assessment of the past trend in their scope 1 and 2 emissions. Among these companies, 13 (43%) reported a five-year time series starting from the reporting year. Three (10%) of the companies, all Chinese, did not report scope 1 and 2 emissions at all. All companies from Europe and Central Asia, North America and South



Asia reported their scope 1 and 2 emissions for the last three years, compared to 60% from East Asia and Pacific.

The average score for the past scope 1 and 2 emissions trend for the 24 companies mentioned above is 59%. In total, 11 (37%) of the companies scored 100%, showing a trend aligned with their 1.5°C pathway. This demonstrates the capability of a decent share of automotive manufacturers to decarbonise their own operations, which is a positive outcome, even though scope 1 and 2 emissions represent a minor share of their overall emissions. However, many companies scored 0% for their past scope 1 and 2 emissions trend due to no disclosed data (six companies) or poor performance (five companies). Further, all companies receiving nil scores are either Chinese or Japanese.

Alignment of past emissions intensities: upstream emissions from purchased materials

Of the 30 automotive manufacturers, 15 (50%) reported their scope 3 category 1 emissions, among which eight (27%) reported a five-year time series starting from the reporting year. The assessment considers emissions intensities for the main sources of upstream emissions for automotive manufacturers: aluminium, batteries (for EVs), glass, plastics and steel. None of the assessed companies reported data on upstream emissions intensities to allow for a proper estimation of trends, consequently receiving a score of zero on the related indicator. Companies should more clearly disclose emissions data related to materials used in the vehicles they manufacture, especially considering that with fleet electrification, these emissions are expected to become the largest contributor to companies' overall emissions.

Alignment of past emissions intensities: downstream emissions from use of sold products

Of the 30 automotive manufacturers, 18 (60%) reported sufficient data to enable an assessment of the past trend in their scope 3 category 11 emissions. Among these companies, nine (30%) reported a five-year time series starting from the reporting year. In total, 11 (37%) of the companies, all Chinese, did not report scope 3 category 11 emissions at all. All companies from Europe and Central Asia, North America and South Asia reported their scope 3 category 11 emissions for the last three years, compared to 25% from East Asia and Pacific.

The average score for the trend in past downstream emissions from the use of sold vehicles for the 18 companies mentioned above is 20%. As a result of its full battery-electric fleet sales, only Tesla scored 100%, showing a trend aligned with its 1.5°C pathway. On the other hand, 18 (60%) of the companies scored 0% for their past trend in these emissions due to no disclosed data (12 companies) or poor performance (six companies).

What amount of emissions are automotive manufacturers locking in with their sold fleet?

The locked-in emissions indicator compares projections of companies' cumulative absolute emissions resulting from the use of their sold vehicles against the cumulative carbon budget allocated based on their 1.5°C pathways, for the five years following the reporting year. To score this indicator, projections of sold vehicles (units per year) and projections of average emissions intensity of these vehicles are required.

Strikingly, none of the 30 assessed automotive manufacturers reported this information. Consequently, future vehicle sales and emissions intensities were estimated in-house to allow for scoring companies on the locked-in emissions indicator. The maximum score was obtained by Tesla, which is the only automotive manufacturer in the benchmark solely selling low-carbon vehicles (with a 100% BEV fleet).



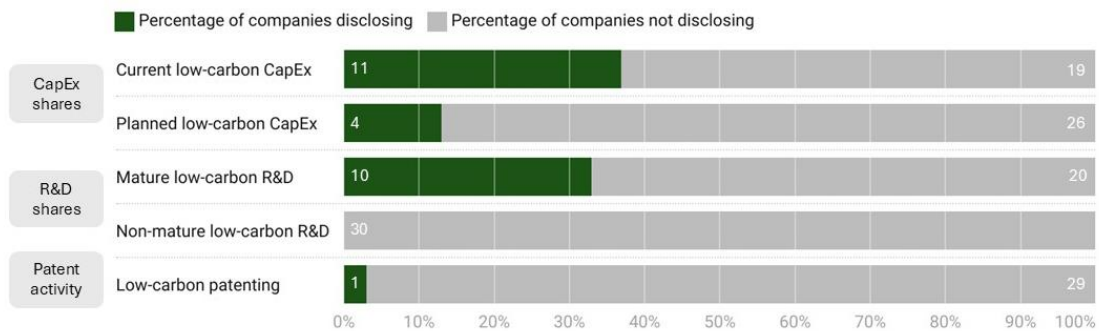
BMW and Tesla

By selling BEVs only, Tesla is the only company in the benchmark with no emissions arising from the use of sold products – the main source of emissions for automotive manufacturers. Tesla holds a unique place in the industry because it does not sell any fossil-fuel powered vehicles, transitioning away from which is identified as the main lever for the industry to decarbonise. The company has also significantly reduced its scope 1 and 2 emissions intensity. While the company has not disclosed this data, it has been calculated to have dropped from 0.63 to 0.37 tonnes of carbon dioxide per vehicle (tCO₂/vehicle) between 2021 and 2023. However, Tesla can improve its disclosure of emissions data for previous years to allow for a more insightful assessment of its past emissions trend. The company should also disclose more information about emissions associated with its purchased materials (by far its largest source of emissions) and its plans and actions to reduce these emissions.

In its 2023 Group Report, BMW disclosed a five-year time series for its scope 1 and 2 emissions intensity, which decreased from 0.40 to 0.28 tCO₂/vehicle between 2019 and 2023 – an average yearly reduction of 7.5%. This rate exceeds BMW’s 1.5°C pathway. The company also disclosed its average global fleet-wide carbon emissions (scope 3 category 11 emissions). These emissions have dropped from 218.5 to 185.4 gCO₂/km for BMW’s passenger cars between 2019 and 2023 – an average yearly reduction of 3.8%. This rate demonstrates BMW’s efforts to decarbonise its sold vehicles, even though it does not fully align with the company’s 1.5°C pathway. The company should additionally disclose more information about the emissions associated with its purchased materials (by far its largest source of emissions) and its plans and actions to reduce these emissions.

Investments

FIGURE 13: DISCLOSURE OF INVESTMENTS AND PATENTS IN LOW-CARBON TECHNOLOGIES



In the IEA’s Net Zero Emissions by 2050 Scenario, EV sales need to reach around 65% of total car sales in 2030 (IEA 2024). To reduce their emissions and help maintain revenues in a low-carbon economy, automotive manufacturers must ensure that the majority of their capital expenditure (CapEx) and research and development (R&D) spending goes towards advancing and patenting new low-carbon technologies, such as batteries and fast-charging infrastructure. Yet, 19 (63%) of the assessed companies do not disclose their low-carbon CapEx shares, while 20 (67%) do not disclose their low-carbon R&D investment shares - see Figure 13.



Capital expenditure

Recent studies show that from 2022 to 2023, investment announcements in EV and battery manufacturing totalled almost USD 500 billion, of which around 40% has been committed (IEA 2024). Yet, of the 30 automotive manufacturers assessed, only 11 (37%) disclosed the proportion of CapEx they have invested in low-carbon technologies in 2023. Of the companies that disclosed this information, eight (73%) spend less than 40% on low-carbon technologies. The three leaders in this area: Tesla, Ford and Tata Motors, invest 100%, 73% and 71%, respectively. The average low-carbon CapEx share for the 11 reporting companies is 39%.

All companies headquartered in Germany and India disclosed their low-carbon CapEx. This share falls to 67% for companies in the United States and 14% for companies in Japan, while no evidence was found for companies in China disclosing their low-carbon CapEx. Companies based in the United States allocate 87% of their CapEx to low-carbon technologies on average. In contrast, companies in India and Germany allocate only 50% and 28%, respectively.

Future investment plans demonstrate a company's commitments and reflect its internal planning towards a low-carbon transition. Yet, of the assessed companies, only four (13%) publish information on their planned low-carbon CapEx share for 2025, signalling significant inaction overall. The average share of this planned investment constitutes 69% of the four companies' total planned CapEx. The two leading companies, Tesla and General Motors, both plan to invest 100%. Companies headquartered in the United States thus lead in both disclosing more information on their planned low-carbon CapEx shares and investing the largest proportion of their planned CapEx in low-carbon technologies.

Research and development

Investment in R&D is necessary to reduce the costs and speed up deployment of innovative low-carbon technologies. Out of the 30 automotive manufacturers assessed, 29 (97%) reported information on their R&D expenditure; however, only ten (33%) reported information on how much of this is dedicated to low-carbon technologies. Tesla, Mitsubishi and Mahindra lead in low-carbon R&D shares, with investments of 100%, 47% and 47%, respectively. The average low-carbon R&D share for the ten reporting companies is 34%.

About 67% of companies headquartered in Germany and the United States disclosed their low-carbon R&D. This share falls to 50% for companies in India and 43% for companies in Japan. No evidence was found for companies in China disclosing their low-carbon R&D. Companies based in the United States allocate 60% of their R&D to low-carbon technologies on average. In contrast, companies in Japan and Germany allocate 30% and 28%, respectively.

Non-mature technologies are key to addressing some of the intractable, hard-to-abate emissions from different sectors. Consequently, the ACT assessment methodology rewards companies for their investments in these technologies. Around 35% of global CO₂ reductions between now and 2050 will result from low-carbon technologies that are currently in the demonstration or prototype phase (IEA 2021). Yet, none of the companies disclosed the share of their R&D investments in non-mature technologies.

Low-carbon patenting

Low-carbon patenting activity is an important indicator of a company's ability to transition and develop new low-carbon business models. Evidence of low-carbon patenting activity could only be found for one of the assessed companies, Ford, with 20% of its patents targeting low-carbon technologies.



Climate governance and oversight

Corporate climate oversight and governance help ensure that companies include the low-carbon transition in their strategic plans and address other environmental challenges. By having a structured framework for climate oversight, companies can set and meet emissions reduction targets and commit to achieving the Paris Agreement goals.

Climate governance

For 24 (80%) of the assessed companies, there was evidence indicating the presence of board-level oversight of climate-related issues, with responsibility for the organisations' corporate direction resting with either the board of directors or the chief executive officer (CEO). Four (13%) of the companies reported oversight of climate change resting with a level below the board and CEO. Two of the assessed companies lacked disclosure in English that could indicate the existence of an established structure dedicated to climate governance.

Despite 93% of the companies in the benchmark having oversight of climate issues from at least the board or an employee one level below the board, only five (17%) of the companies were found to have significant expertise in climate change and the low-carbon transition, which informs strategic investment planning and decision-making. Four out of these five rank at the top in the benchmark overall: Mercedes-Benz, Ford, BMW and Stellantis.

In the ACT methodology, climate expertise is characterised by five key attributes: possessing academic or professional qualifications specifically related to climate change and the low-carbon transition (excluding purely energy-related backgrounds); professional experience in roles or organisations focused on climate change and low-carbon initiatives; active membership in organisations that drive corporate knowledge on these issues; and demonstrating technical knowledge through recent publications/outputs on the impacts, risks and solutions associated with climate change. Having at least three of these attributes is considered significant expertise.

Climate-related incentives

Out of the 30 assessed companies, only 14 (47%) reported having management incentives linked to climate change mitigation. For 13 (43%) of the companies, management incentives were set at the highest level of decision-making authority in the organisation (responsible for guiding its overall strategy and direction). The remaining 16 (53%) companies did not report any climate-related incentives. None of the companies headquartered in China had climate-related incentives.

Companies provide different types of monetary rewards for achieving climate-related performance, including annual bonuses, bonuses as a percentage of salary, salary increases and other forms of incentives over both the short and long term. Among the companies in this benchmark, the most popular type of incentive was the inclusion of monetary rewards within the company's short-term incentive plan in terms of annual bonuses. This was observed for eight (27%) of the companies. The remaining companies with climate-related incentives adopted a long-term view by making incentives part of equity, increasing the likelihood of a successful low-carbon transition.

Transition planning and scenario analysis

Companies should establish a time-bound action plan outlining how they will adapt and prepare for a low-carbon transition. This action plan should include medium- and long-term targets, quantified



objectives and financial commitments. The plan should also be informed by climate scenario analysis to ensure its ambition is sufficient to align with a 1.5°C pathway.

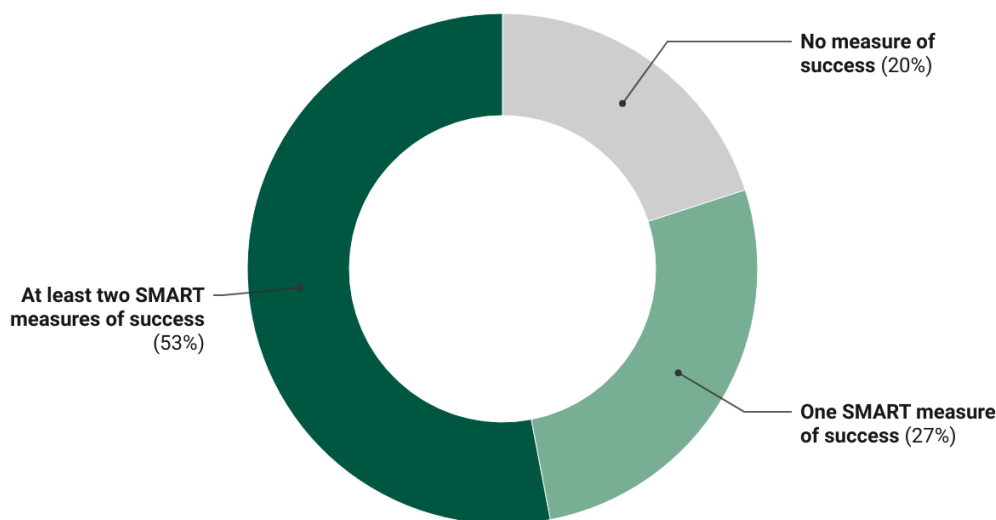
Transition planning

Overall, only three of the 30 automotive companies assessed, BYD, FAW and JAC Motors, appeared to lack any elements of transition planning. Notably, no English-language disclosures were found for FAW and JAC Motors, while for BYD, evidence of a transition plan was absent despite available disclosures.

Among the remaining 27 companies, 16 (59%) demonstrated convincing evidence of a transition plan that covers all business units and operations as well as upstream and downstream activities related to the company's production operations. However, none of these plans were fully aligned with a low-carbon future. The assessment revealed significant variability in companies' readiness for the transition, with the scores indicating differing levels of commitment and detail.

Key elements of robust transition planning include setting clear, measurable objectives that can be monitored and reported. In 2023, 24 (80%) of the assessed automotive companies disclosed at least one quantified, time bound measure of success – see Figure 14. Among these, two-thirds provided two or more objectives with both qualitative and quantitative details aligned with a low-carbon scenario. Examples of such measures include setting greenhouse gas (GHG) emissions reduction targets, shifting to a 100% electric fleet and committing to phase out fossil-fuel powered vehicles, expanding the manufacturing facilities of EVs and their components and increasing the capacity for renewable energy generation.

FIGURE 14: MEASURES OF SUCCESS FOR A LOW-CARBON TRANSITION PLAN

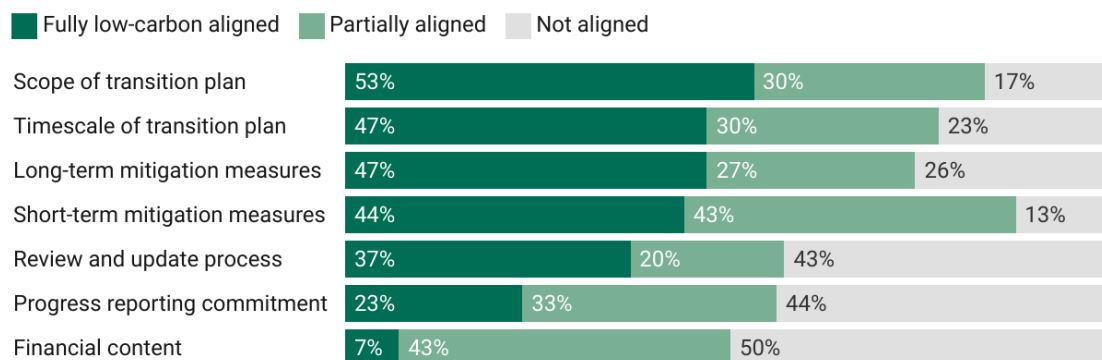


To achieve their decarbonisation goals, companies should develop both short- and long-term actions for the next five years and beyond. While 26 (86%) of the companies disclosed examples of measures they expect to implement in the short term, only 50% of these have developed comprehensive plans that contain detailed descriptions of these actions. Similarly, while 22 (74%) of the companies disclosed a description of planned long-term actions, detailed descriptions of relevant and achievable long-term actions were observed for only 47% of them. This eight (26%) companies without long-term commitment to actions – see Figure 15.



Commitments by companies to establish processes for reviewing and updating their transition plan were found to be missing across 23% of the assessed companies. Of the 30 companies, only 11 (37%) disclosed a commitment to review and update their transition plan at least every five years, with a defined process in place – a process ACT methodologies consider to be fully -low-carbon aligned. Similarly, evidence of commitments by companies to report their progress against their transition plan and any material change annually, with a defined stakeholder feedback process, was found to be missing across 30% of the assessed companies.

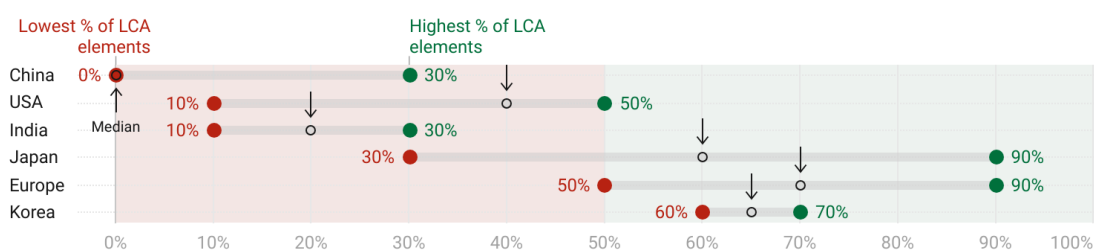
FIGURE 15: ALIGNMENT OF KEY TRANSITION PLAN ELEMENTS IN ASSESSED COMPANIES



Another critical aspect of a robust transition plan is the inclusion of financial considerations, such as financial projections or indicators, and how decarbonisation aligns with the company's long-term vision and business strategy. Failing to present convincing evidence of financial considerations in the transition plan weakens the credibility of companies, as it becomes unclear whether they are embedding carbon reduction efforts in key operational activities. For 15 (50%) of the companies assessed, no evidence was found of quantified financial content, such as projections, cost estimates or other estimates of financial viability associated with the transition plan, although these might have been referred to within the plan – see Figure 15.

At a country level, a pattern can be observed whereby companies located in Europe, Japan and the Republic of Korea give a strong indication of having more mature transition plans in place. This can be inferred from the existence of a higher number of key elements of their transition plans attaining 'low-carbon aligned' classification as per the ACT Automotive methodology – see median values in Figure 16.

FIGURE 16: MATURITY GAP IN KEY TRANSITION PLAN ELEMENTS



For companies headquartered in a given country, the gap between the best and worst company transition plans is the narrowest in the Republic of Korea and the largest in Japan. Admittedly, European policy towards signalling the end of the ICE has been one of the most progressive and, on aggregate, companies headquartered in the region have produced compelling transition plans. Nevertheless, not all companies have interpreted the policy environment in the same way and only



half of the key elements composing their transition plan are low-carbon aligned. Companies located in the United States, India and China show evidence of less mature transition plans, revealed by a significantly lower median number of low-carbon aligned key elements.

BMW and Nissan Motor

Both BMW and Nissan Motor have transition plans in place that encompass all business units and operations and the rest of the value chain, including both upstream and downstream activities. The transition plans of both companies consider short- and long-term actions to be implemented to make the low-carbon transition a reality. Examples of these actions include expanding the product range of BEVs, expanding the infrastructure for electromobility, increasing renewable energy production and integrating circularity measures in production methods. Furthermore, both companies commit to reviewing and updating their transition plans at least every five years for continuous relevancy and efficacy and have established a process to do so. Both companies also commit to reporting progress against their transition plans on an annual basis. In terms of financial content, both companies have addressed key financial aspects of their transition plans and integrate an internal carbon pricing system in their financial assessment. Climate change scenario testing and analysis has also been employed to inform the companies' transition plan development following the Intergovernmental Panel on Climate Change's (IPCC) well-below 2°C pathway.

Scenario testing and carbon pricing

Companies should develop their transition plans based on a 1.5°C scenario to ensure alignment with global climate goals. However, more than 40% of the 30 automotive companies have not conducted any scenario analysis. Only 11 (37%) of the companies have conducted an analysis using three or more scenarios, including a 1.5°C scenario. Furthermore, 18 (60%) of the companies have reported leveraging scenario testing to inform the development of their transition plans, but only one company provided comprehensive results expressed in qualitative, quantitative and financial terms translated into value-at-risk.

Additionally, among the 30 companies assessed, only six (20%) demonstrated the use of a carbon price embedded in cost calculations as a financial indicator. For the remaining 24 (80%) companies, no evidence was found of the consideration of a carbon price, either qualitatively or quantitatively. Notably, only two (7%) of the companies, Nissan Motor and Mitsubishi Motors Corporation, aligned their carbon pricing with a low-carbon scenario and integrated it into the financial scenario used for strategic business decisions. This lack of widespread adoption of scenario analysis and financial tools, such as carbon pricing, highlights a critical gap in the industry's readiness to navigate to a low-carbon future.

Overall, when all indicators are considered, the analysis highlights both progress and significant gaps in transition planning among automotive companies. While most companies have started incorporating measurable objectives, short- and long-term actions and some level of financial consideration into their plans, the lack of alignment with low-carbon scenarios and inadequate detail in critical areas remain major challenges. Companies that fail to address these gaps risk undermining the credibility of their transition efforts, potentially impacting the decarbonisation of the automotive industry.



Hyundai Motor

Hyundai Motor's scenario testing encompasses a comprehensive analysis of all its business units and operations and the rest of its value chain, from upstream procurement and direct operations to downstream demand for its products and services. This testing spans a medium- to long-term timeframe, extending up to 2050, and includes evaluations of social, technological, environmental, economic and political shifts following the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). The company assesses the potential impacts of global temperature increases under three scenarios: the IEA's Net Zero Emissions by 2050 Scenario (NZE) with 1.4°C, the Announced Pledges Scenario (APS) with 1.7°C and the Stated Policies Scenario (STEPS) with 2.4°C, considering assumptions around the following six key aspects: the global energy mix, carbon pricing, emissions trading systems, low-carbon technology shifts, strengthening of global regulations and physical risks. Additionally, Hyundai Motor has provided the results of its scenario analysis in qualitative, quantitative and financial terms, ensuring that the company is prepared for various future developments.

Supplier and client engagement

The automotive manufacturing industry plays a pivotal role in shaping emissions across its value chain, relying on suppliers from energy-intensive sectors, such as steel, glass, and, notably, batteries. Upstream emissions – covering raw material production, component manufacturing (e.g. batteries) and logistics – represent 60-70% of total life cycle emissions in internal combustion engines (ICE) and hybrid electric vehicles (HEVs). In EV production, battery manufacturing alone can account for up to 60% of GHG emissions in the supply chain ([McKinsey 2023](#)). For instance, producing a 40 kilowatt-hour (kWh) battery for a mid-sized battery-electric vehicle (BEV) results in emissions ranging from 35 to 70 kilograms of CO₂ equivalent per kWh, depending on the carbon intensity of the energy used ([IEA 2024](#)). To enable a comprehensive low-carbon transition, it is crucial for automotive manufacturers to develop robust engagement strategies with both suppliers and clients.

Supplier engagement

Overall, automotive manufacturers demonstrate moderate performance in terms of climate-related supplier engagement. On average, the companies received 49% of the points available for supplier engagement strategy and activities.

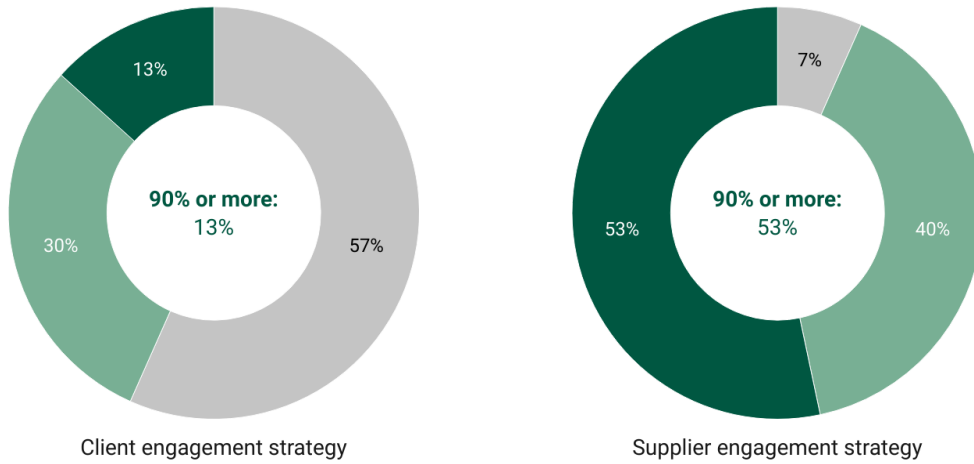
Despite their position in the supply chain and the importance of indirect emissions for their own decarbonisation, few companies have implemented comprehensive supplier engagement strategies. Of the 30 automotive manufacturers assessed, 28 (93%) reported having some form of strategy to engage with suppliers. However, only 12 (40%) have effectively implemented these strategies by employing all three action levers: information collection, engagement and incentivisation, and innovation and collaboration. Among these companies, only two, BMW and Kia, have incorporated quantified, science-based emissions reduction targets into their key procurement templates.



FIGURE 17 SCOPE OF CLIENT AND SUPPLIER ENGAGEMENT STRATEGIES

Percentage of benchmarked companies whose engagement strategies apply to more (or less) than 90% of their revenues or client-/supplier-related scope 3 emissions.

■ No strategy ■ Less than 90% ■ 90% or more



In total, 16 (53%) of the companies assessed have a supplier engagement strategy that encompasses over 90% of their procurement spending or covers more than 90% of supplier-related scope 3 emissions – see Figure 17. The remaining 14 companies failed to explicitly define the scope of their supplier engagement strategies, indicating room for improvement in disclosure practices.

While 28 (93%) of the companies assessed reported having some form of supplier engagement strategy, only 23 (77%) of the companies have established emissions reduction requirements for their suppliers. BMW and Kia are the sole companies to have implemented quantified, science-based emissions reduction targets directly in their key procurement templates. Furthermore, BMW and Kia require suppliers to report progress against these targets, reflecting a higher level of accountability and more effective mechanisms for tracking progress. This disparity underscores the urgent need for wider adoption of measurable and enforceable supplier engagement practices across the automotive industry to achieve significant reductions in supply chain emissions.

Only five (17%) of the companies mandate their suppliers to publicly report emissions, which is a key step in enhancing transparency and driving accountability across the supply chain. While 11 (37%) companies include GHG reduction or reporting requirements in their supplier selection and contract renewal processes, only six (20%) exclude suppliers who fail to make significant improvements after engagement. Through stringent measures, such as exclusion, automotive manufacturers can effectively push their suppliers towards better sustainability practices. Further, only nine (30%) companies evaluate the impact of their strategies using quantitative measures, while 17 (57%) either do not assess or disclose the effectiveness of their strategies.

At a country level, companies based in China, India and the United States lag behind in setting GHG emissions reduction goals and requiring their suppliers to publicly report emissions. In contrast, European companies are leading the way in supplier GHG disclosure requirements, while Japanese companies are increasingly embedding GHG emissions reduction and reporting criteria into supplier selection and contract renewal processes.



BMW

BMW stands out as the top-performing company under the supplier engagement module. The company has set a science-based, 1.5°C-aligned emissions reduction target throughout its entire product life cycle. This target is included in its supplier code of conduct, which requires suppliers to report on their GHG emissions, implement decarbonisation measures, report progress and participate in the CDP Supply Chain Program. The company also includes education initiatives in its engagement strategy and cooperates with suppliers to promote the use of green electricity and other decarbonisation measures. Moreover, BMW measures and discloses the impact of its strategy in quantitative terms.

Client engagement

Automotive manufacturers demonstrate poor performance in terms of climate-related client engagement. On average, the companies received only 23% of the points available for client engagement strategy and activities.

Among the 30 companies assessed, 12 (40%) lack a client emissions reduction strategy. In total, 22 (73%) of the companies have implemented various measures to encourage their clients to reduce emissions. Toyota Motor Corporation stands out as the only company with quantified GHG emissions reduction target(s) included in its client engagement strategy. Additionally, only four (16%) of the companies disclosed the impact of their client engagement activities in quantitative terms.

Most of the companies assessed disclosed client education and information sharing as the most common engagement strategies. Financial incentives are largely limited to existing state subsidies. Ford stands out as the only company to use all action levers suggested in the ACT methodology in its client engagement strategy, namely education and information sharing, collaboration and innovation, compensation and customer motivation.

Despite existing efforts, the automotive industry's approach to client engagement generally lacks clear objectives, active initiatives to promote low-carbon vehicles over conventional ones and quantitative measures to assess effectiveness. Moreover, the majority of companies' client engagement efforts are concentrated in mature low-carbon vehicle markets, such as Europe, North America and China. To achieve the low-carbon vehicle sales necessary for meeting the 1.5°C scenario, companies must expand their client engagement strategies to developing markets, such as India and Japan.

Trade associations and policy engagement

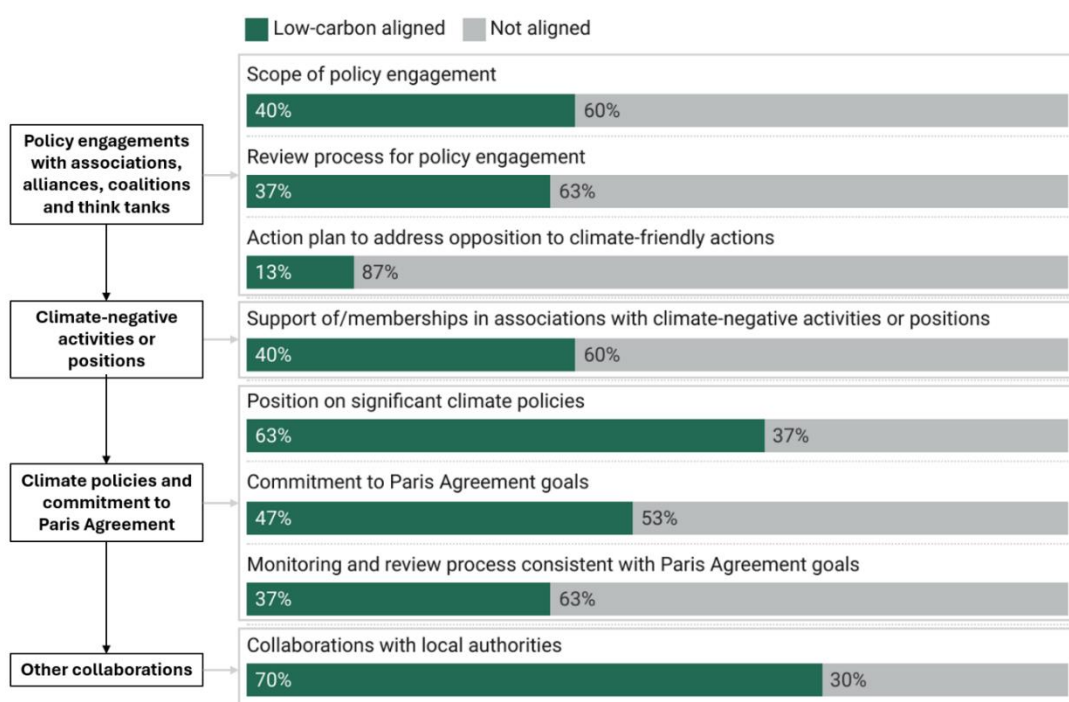
Negative lobbying by the world's largest automakers was found to increase the risk of a global transition to electrification ([InfluenceMap 2024](#)). The current misaligned policy positions and advocacy of the leading automotive manufacturers constitutes a significant obstacle to operationalising climate-friendly policies in the automotive industry. Many of the companies are found to still support policies that favour long-term ICE vehicles, driving opposition to climate-science based policies aiming at the reduction of global GHG emissions. This active negative strategic pressure from the major automotive companies undermines the global climate targets and slows down the unavoidable transition towards fleet electrification that will lock consumers and society in an ever-rising demand for fossil fuels.



Strength of engagement strategies

Trade alliances, associations, coalitions and think tanks are key means through which companies can indirectly influence climate-related policy. Yet, 18 (60%) of the assessed automotive manufacturers have not disclosed how they govern their relationships with these influential parties – see Figure 18. Furthermore, over 63% of the companies do not have a process in place to monitor and review the climate policy positions of the alliances, associations, coalitions and think tanks they are members of. Additionally, 26 out of the 30 automotive manufacturers fail to disclose an action plan for addressing instances when the associations they support are found to oppose climate policies. Only four companies mentioned action plans to withdraw funding, suspend or end memberships in alliances, associations, coalitions or think tanks when they oppose climate policies or engage in climate-negative activities.

FIGURE 18: HOW COMPANIES ENGAGE WITH CLIMATE POLICIES



Out of the 30 assessed companies, only 12 (40%) are not members of or do not provide funding to any alliances or associations with climate-negative activities or positions, but significantly, the remaining majority of the companies do engage with influential parties who are linked to negative climate actions.

Support for the Paris Agreement and climate initiatives

On a more positive note, 19 (63%) of the assessed companies publicly support significant climate policies, though 16 of the companies do not explicitly commit to the Paris Agreement. Despite this stated support, and on the pragmatic side, only 11 (37%) of the companies have implemented a monitoring and review process to ensure their policy positions align with the Paris Agreement goals. In terms of collaborations with local authorities, a good number of companies, 21 out of 30, actively participate in small-scale or pilot projects to implement climate-related partnerships.



Ford

Ford ranks at first place in the policy engagement module, with a score of 93%. The company has implemented an engagement policy that covers all its subsidiaries and business areas, and all operational jurisdictions. Moreover, the company publicly discloses all associations, alliances and coalitions of which it is a member. Ford supports a range of coalitions and associations and its impact on climate is aligned with the Paris Agreement goals. It has a process, implemented by the board of directors, to annually review its memberships and the results of this process are shared with management for action. The action plan includes advocating for Ford's position independently and withdrawing or ending memberships where necessary (for example, the company withdrew its membership from the Engine Manufacturers Association in 2023, after the association opposed the implementation of California's clean truck regulation – an action not aligned with Ford's ambition for a zero-emissions transportation future).

Further, the company engages in initiatives against climate change and its GHG goals are aligned with the Paris Agreement and supported by the Science Based Targets initiative (SBTi). Ford is committed to the UN's Business Ambition for 1.5°C pledge, as well as the New Deal for Europe initiative. Additionally, the company collaborates with local authorities to reduce emissions in different countries, including projects to deploy alternative fuel infrastructure, fleet regulation and life cycle assessment.

Low-carbon business activities

Companies must adapt to stay profitable in a low-carbon economy. They need to transition away from high-carbon business models to ensure that all revenue stems from low-carbon products and services. The ACT assessment focuses on two key aspects of companies' businesses: the share of income from low-carbon products and services and their actions to embrace new low-carbon business models while phasing out high-carbon ones.

Revenue from low-carbon products and services

Electric car sales keep rising and could reach around 17 million units in 2024, accounting for more than one in five cars sold worldwide (IEA 2024). Yet, only nine (30%) of the assessed companies disclosed their share of revenue from low-carbon products and services. These nine companies collectively reported an average low-carbon revenue share of 17%. Only Tesla, reported a low-carbon revenue share of over 30%, with all its revenues originating from low-carbon activities. Changan Automobile and Mercedes-Benz follow, with 26% and 14%, respectively.

Overall, all three companies in the benchmark headquartered in Germany disclosed information on their low-carbon revenue shares, while only 67% of the companies in the United States and 18% of the companies in China did so. No evidence was found of companies in India or Japan reporting their share of revenues from low-carbon activities. Companies headquartered in the United States earn the largest proportion of their revenue, specifically 52%, from low-carbon products and services, whereas companies headquartered in China and in Germany have low-carbon revenue shares of 17% and 13%, respectively.



Termination/phasing out existing high-carbon business models

Strikingly, none of the benchmarked companies has pledged to fully phase out fossil fuel vehicles from production by 2035, which is a necessity to align with the 1.5°C climate target. Except for Tesla, which already only sells zero-emission vehicles. Moreover, only six automotive manufacturers have committed to 100% EV sales in specific markets, with five targeting Europe and one the United States. This shows significant inaction on the part of companies, threatening their very survival in a decarbonised economy.

BYD and Tesla

Since Tesla only sells BEVs, its business model is aligned with a low-carbon economy. Moreover, Tesla produces its batteries in-house at three of its plants. In 2023, Tesla deployed slightly less than 15 GWh of energy storage, accounting for USD 1 billion in revenue. Its mature battery manufacturing business model is scheduled to more than double in size to 40 GWh.

In 2023, BYD was responsible for nearly a quarter of all BEV and PHEV sales worldwide and was the second-largest battery manufacturer globally (IEA 2024). It plans to grow both of these mature business models.

Changes to business models

The low-carbon business models identified for the automotive industry were defined in line with the EU Taxonomy for Sustainable Activities. These recommendations focus on the actions considered most critical for achieving a global net-zero transition. To demonstrate they are implementing these business models, companies were required, at a minimum, to show active exploration through collaborations, pilot projects or research funding. Future-oriented exploratory actions were not taken into account.

Creation/expansion of low-carbon business models

This dimension evaluated the extent to which companies are currently producing low-carbon vehicles and are positioned to scale up their production, alongside the development of essential technologies and low-carbon transport enablers to support and grow their market share. Automobile manufacturers were specifically evaluated on their production of battery-electric light-duty vehicles (LDVs); manufacturing of other non-LDV low-carbon vehicles, such as buses, trains and e-scooters; development of battery infrastructure (i.e. in-house battery production) and development of EV charging infrastructure.

The IEA's Net Zero Roadmap expects EVs to represent 20% of the global LDV fleet in 2023. Currently, three (10%) of the assessed automotive manufacturers are aligned with this target. Notably, Tesla is the only company to exclusively produce low-carbon vehicles, followed by BYD, with more than half of its production comprised of low-carbon vehicles, despite a decline in its low-carbon vehicle share in comparison to 2021 levels and Changan Automobile. Guangzhou Automobile Company and Dongfeng Motor Group have also made significant progress, rapidly increasing the share of their low-carbon vehicles to 20% and 16%, respectively, in just five years. The remaining automotive manufacturers either have low-carbon vehicles accounting for less than 20% of their fleet or fail to disclose adequate information regarding their breakdown of EVs (BEVs, PHEVs, FCEVs) or the size of this business model.



Further, five (17%) of the 30 assessed companies plan to double this in size over the next five years. While the other 15 (50%) companies also plan to increase their production share of electric LDVs, there is no evidence of commitments to double this share within the next five years⁸. The remaining 10 (33%) companies lack specific growth plans for low-carbon vehicles. While some automotive manufacturers outline intentions to expand the production of PHEVs alongside BEVs, or aim to increase the number of EV models, the projected growth of their business models cannot be reliably estimated.

In-house battery production is adopted by 11 (37%) of the assessed companies. BYD and Tesla are the forerunners. The cumulative in-house battery production capacity of BYD for 2023 is 151 GWh, positioning the company as one of the biggest battery manufacturers in the world. Tesla, on the other hand, deployed slightly less than 15 GWh of energy storage, accounting for almost 1.1 billion in revenue. Changan Automobile has established a joint venture with Contemporary Amperex Technology (CATL) for a battery production capacity of 30 GWh. This accounts for 4.5% of the company's total investments. Further, Ford is investing 6% of its revenue in 2023 to EV production factory, which includes investments in battery production. The remaining automotive manufacturers either lack evidence of in-house battery production or are still in the early phases of shifting from outsourced battery production to in-house capabilities. In relation to the scheduled growth of battery production capacity, Mercedes-Benz and Honda Motor, in addition to the previously mentioned companies, have announced plans to expand their capacity. However, none of the companies have committed to doubling their production capacity within the next five years⁹.

None of the assessed automotive manufacturers allocate more than 20% of their efforts towards developing EV charging infrastructure. However, eight (20%) of the companies have concrete plans to expand their EV charging networks. Among them, Tata Motors stands out with an ambitious goal to at least double the size of its charging network within the next five years. As part of this plan, the company aims to install over 22,000 public chargers across India over the next 12-18 years.

Actions to decarbonise activities within the existing business models

This dimension relates to actions the company is taking to decarbonise the activities making up its existing business model, to transition to lower carbon overall. The three main activities companies are assessed on are: vehicle-as-a-service offerings, such as usage-based subscription models; component-as-a-service offerings, such as battery leasing models; and end-of-life management to increase recyclability.

Of the 30 assessed companies, 17 (57%) reported having vehicle-as-a-service offerings as an activity to decarbonise their existing business models. Yet, for all these companies, this remains a non-mature activity, still in the pilot stages, and is estimated to apply to less than a quarter of the activities being considered for all companies, except for Geely Holding, which has a more mature model due to its subsidiary Volvo AG's 'Volvo on Demand' service. Only five (17%) of the companies have scheduled growth plans for this activity. Renault and Stellantis both plan to double it in size over the next five years. However, the poor performance of automotive manufacturers overall in relation to vehicle-as-a-service offerings is alarming given its high importance for the global low-carbon transition. For eight

⁸ The ACT Automotive methodology scores growth of business models low-carbon aligned if business models are scheduled to at least double in size over the next five years.

⁹ The ACT Automotive methodology scores growth of business models low-carbon aligned if business models are scheduled to at least double in size over the next five years.



(27%) of the companies, this activity impacts the most relevant life cycle phase of the business model in terms of emissions.

Component-as-a-service and end-of-life management are both activities of medium importance for the global low-carbon transition. Five (17%) of the companies reported having component-as-a-service as an activity to decarbonise their existing business models. However, this activity is estimated to apply to less than a quarter of the activities being considered for all companies, and none of the companies plan to grow it. Further, 22 (73%) of the companies reported end-of-life management to increase recyclability. However, this activity only applies to over three-quarters of the activities being considered in the case of BMW and Hyundai Motor. While four (13%) of the companies have scheduled growth plans for this activity, only Toyota Motor Corporation plans to double this activity in size over the next five years.



Appendix: Companies in the 2024 Automotive and Transportation Manufacturers Benchmark

WBA builds on academic research introducing the concept of 'keystone actors', inspired by the ecological term 'keystone species'. Just as keystone species have a disproportionate impact on their ecosystems, the largest companies in an industry significantly shape their sectors and systems. WBA has adapted this idea to identify 'keystone companies' – the SDG2000 – using five guiding principles:

- Dominance in global production revenues or volumes within their sector
- Control of globally significant segments of production or services
- Global connectivity through subsidiaries and supply chains
- Influence on global governance processes and institutions
- A broad global footprint, particularly in developing countries

The Automotive and Transportation Manufacturers Benchmark applies this framework to companies in the Motor Vehicle & Parts (ISIC 2910) and Construction & Engineering (ISIC 4390) sectors. Metrics were collected to confirm companies meeting at least one keystone criterion. Subsequently, the following keystone companies were identified.

N°	Company name	Country of headquarters
Automotive manufacturers		
1	BAIC	China
2	BMW	Germany
3	BYD	China
4	Changan Automobile	China
5	Chery Holding Group	China
6	Dongfeng Motor Group	China
7	FAW	China
8	Ford	United States of America
9	Geely Holding	China
10	General Motors	United States of America
11	Great Wall Motor Company	China
12	Guangzhou Automobile Group	China
13	Honda Motor	Japan



14	Hyundai Motor	Republic of Korea
15	JAC Motors	China
16	Kia	Republic of Korea
17	Mahindra and Mahindra	India
18	Mazda	Japan
19	Mercedes-Benz	Germany
20	Mitsubishi Motors Corporation	Japan
21	Nissan Motor	Japan
22	Renault	France
23	SAIC Motor	China
24	Stellantis	Netherlands
25	Subaru Corporation	Japan
26	Suzuki	Japan
27	Tata Motors	India
28	Tesla	United States of America
29	Toyota Motor Corporation	Japan
30	Volkswagen AG	Germany
Transportation manufacturers		
31	Airbus	France
32	Alstom	France
33	Boeing	United States of America
34	China State Shipbuilding	China
35	Comac	China
36	CRRC Corporation	China
37	Daimler Truck	Germany
38	Fincantieri	Italia
39	Hanwha Ocean	Republic of Korea
40	Korea Shipbuilding & Offshore Engineering	Republic of Korea
41	PACCAR	United States of America
42	Scania AB	Sweden
43	Stadler Rail	Switzerland
44	Volvo AB	Sweden



About the World Benchmarking Alliance

Founded in 2018, the World Benchmarking Alliance (WBA) is a non-profit organisation holding 2,000 of the world's most influential companies accountable for their part in achieving the United Nations Sustainable Development Goals (SDGs). It does this by publishing free and publicly available benchmarks on their performance.

WBA shows what good corporate practice looks like so that leading companies have an incentive to keep progressing and laggards feel pressure to catch up. WBA has identified seven systems that, if transformed, have the greatest potential to put our society, planet and economy on a more sustainable and resilient path. These are the transformation of our social system, our agriculture and food system, our decarbonisation and energy system, our nature system, our digital system, our urban system and our financial system.

By benchmarking companies on each system transformation every second year, WBA reveals where each company stands in comparison to its peers, where it can improve and where urgent action is needed. The benchmarks provide companies with a clear roadmap of the commitments and changes they must make. Over time, they will show whether or not these 2,000 companies are improving their business impact on people, workers, communities and the environment. The benchmarks equip everyone – including the community of WBA Allies comprising about 420 organisations – with the insights that they need to collectively ensure that the private sector delivers on the imperative transformations.

For more information, visit www.worldbenchmarkingalliance.org and follow us on Twitter @SDGBenchmarks.

If you have any feedback on our findings, please reach out to Vicky Sins, Decarbonisation and Energy Transformation Lead at WBA: info.climate@worldbenchmarkingalliance.org

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